

SURVIVING TO THRIVE IN COMPLEXITY:
A MIXED METHOD EVALUATION OF MILITARY REHABILITATION POST
LOWER LIMB AMPUTATION.

This thesis is submitted for the degree of
Doctor of Philosophy of Imperial College London

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Declaration of Originality

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NO MAN IS AN ISLAND,
ENTIRE OF ITSELF;
EVERY MAN IS A PIECE OF THE CONTINENT,
A PART OF THE MAIN.

IF A CLOD BE WASHED AWAY BY THE SEA,
EUROPE IS THE LESS,
AS WELL AS IF A PROMONTORY WERE:
AS WELL AS IF A MANOR OF THY FRIEND'S
OR OF THINE OWN WERE.

ANY MAN'S DEATH DIMINISHES ME,
BECAUSE I AM INVOLVED IN MANKIND.
AND THEREFORE NEVER SEND TO KNOW FOR WHOM THE BELL TOLLS;
IT TOLLS FOR THEE.

JOHN DONNE (1572-1631)

Foreword

The purpose of the foreword is to present the researcher, his background, experience, and biases. It is written in the first person.

As a sports scientist and physiotherapist, with experience of military and NHS roles, I have worked throughout the care continuum including three deployments to Iraq and Afghanistan (2003/09/14). My role is frequently that of a coordinator, liaising between primary and secondary care, critical care, and wards, often circumventing organisational barriers to give patients what they need. Teamwork, partnership, and collaboration are qualities, I have sought to foster, and I have a predisposition towards. These qualities were honed whilst working in Role 4 rehabilitation (definitive military hospital care) between 2006-2014.

In 2006, I was posted to Royal Centre for Defence Medicine (RCDM), Selly Oak Hospital, Birmingham. As combat casualties arrived, we, the clinical and military staff, were thrust into a situation we were unprepared for. The bureaucracy required excessive hours to overcome, and I witnessed many who burnt out trying. But I also experienced a sense of purpose and belonging with military colleagues. Over time, military clinicians and civilian practitioners sharing our vision started to group. An eclectic mix of a chain-smoking consultant, eccentric pain nurse, plain speaking burns nurse, a frantic ward matron and an energetic physio team founded the military ward round. As media interest probed the quality of care received at Selly Oak, the military supplemented NHS staffing, and clinical provision formally became part of the RCDM's mission. This military contribution helped create a greater sense of equivalence and partnership with the NHS.

When posted to Defence Medical Rehabilitation Centre, Headley Court (DMRC) in 2010, I found myself in the middle of a political drama as the unit moved from a departmental to interdisciplinary structure. The sense of calamity proceeding this reorganisation, contrasted with the ease and enjoyment we experienced following it. With greater efficiency, sharing ideas, unencumbered by the need to defend our professional autonomy, I recognised something special had happened. I also recall the first triple amputee I met on intensive care, and distinctly remember my misplaced sense of desolation about his future. This individual and many others have since shown me what is possible. Again, something special had happened.

The system allowed us to experiment with ideas, admit we were not experts, often wrong, and all in an effort to discover solutions. By 2014 and my final tour of Afghanistan, I worked with Afghan National Army casualties. I felt ease working in this place of uncertainty. I recognised the emotions each casualty had as they arrived on the ward, but now I knew what was possible. My clinical practice embodied expectation and hope, rather than desolation. I knew we could take soldiers and help them walk again. But, in this setting the focus was on saving lives rather than helping those who had survived, to thrive. My deployed colleagues had not experienced what I had been part of. This highlighted the need for me to understand what had been special in rehabilitating British combat casualties. There was a need to reframe how we delivered trauma care with a focus on thriving not just surviving. Why did many British casualties seem to thrive? Our

elation at their achievements was tempered by also knowing that not everyone had; some made themselves absent, others self-discharged or simply disappeared.

When I commenced this research, it looked dramatically different. I recognised the veteran's achievements, but I had not discovered the term 'thriving'. I assumed the key to their success was the prosthetic. I planned a gait study, believing that intensive rehabilitation achieved efficient gait and provided amputees with the physical resources to maintain active lives. Yet, I also had learnt the power of listening to patients and wanted this research to start with hearing their experiences. As I commenced focus groups, the collective message was different to my assumption. As I sought to make sense of this, I found the MRC framework and from there complexity science. As I read and consulted colleagues, I recognised a social cognitive dynamic. These explorations occurred alongside interviews and focus groups, enabling me to test theory. I came to see identical patterns in clinician and veteran group data, not clinical features, equipment provision or exercise-based approaches, but social dynamics that appeared to have gone unnoticed.

Analysis of ADVANCE data almost threw the research into crisis. I expected to see a difference in outcome between those who had and had not maintained prosthetic mobility. I was aware of the abandonment and loss of trust many in the veteran community felt towards NHS medical care. Despite this, and in complete contrast to the non-amputee injured cohort, the amputee cohort appeared not to have suffered any psychosocial aftermath. Unlike civilian and US military equivalents, psychosocial outcome was not associated to prosthetic mobility. But rather than upending this research, ADVANCE data pointed to *growth*; the concept of *Human Thriving* came to the fore. This concept recognised the role of character and training as an internal enabler and the importance of challenge and social connection as an extrinsic enabler. It encompassed both clinician and veteran data and provided an explanation why some failed to thrive.

As I review this thesis, I am distinctly uncomfortable on two counts. I recognise my bias towards collaborative teams, non-hierarchical leadership, and these are principal findings of this study. The research process has altered my view of the experiences described. It has explained aspects I found confusing and highlighted those I did not even question. It has altered my views on teamwork and leadership to consider in greater detail the role of culture, systems and above all the characteristics of the setting. The experiences I describe remain etched in time, but my perspective has taken on a dynamic quality as I have wrestled with the research problem. My beliefs and bias are not what they were.

Secondly, I am confronted by the inadequacy of this literary presentation. I have sought to contain and portray a clinical setting into a coherent format to enable the reader to feast on the rich insight I believe this research has yielded. Yet, the reality was that this process was a tangle of data collection, theoretical searching, and theory generation. In part, I might blame the MRC framework, yet this framework was also a vital handrail guiding me through the fog. The presentation of the theoretical construct is the most

significant casualty however, I trust this account provides a glimpse of the way its development was a key iterative feature of the study.

Acknowledgements

I may be named on the front cover, but without those who gave willingly of their time and support, this piece of work would not have happened. First and foremost, my thanks must go to Professor Alison McGregor for her resolute, utterly reliable, and wise mentorship throughout this arduous process. There aren't words enough to thank you for selflessly sharing the journey.

It has been an honour to be part of the Centre for Blast Injury Studies and MSK Labs at Imperial College London. I have only praise for this visionary centre and its leadership under Professor Anthony Bull. I did not expect to be working alongside Dave Henson. I smile at the photos (p56) as I shadow you tackling those concrete steps at DMRC, unknowing that one day you would do the same for me as I tackle this PhD. To Birana, Shruti, Matt and Gemma, I am sad that COVID-19 stopped us meeting, but I thank you for being a constant source of laughter and support in person and on WhatsApp.

There are two people without whom this research would not have happened. First is Emily Mayhew. When we in 2013, you did not know I had given up hope of researching this clinical area. It took us 4 years of effort to convince the powers that be, to release a physio to do this research, throughout which Emily stuck by me and saw me over many hurdles. Lt Col Williams (as ADDR) was also instrumental using the levers of posting and diplomacy to facilitate this process. I particularly thank Lt General (Rtd) Bricknell because it was his personal intervention which removed the final opposition. Despite his pressing commitments, he has also graciously continued to offer me his time, counsel, and wisdom.

The second person I could not have done this without is Dr Steven Keen. I look at the distance I have come because of your friendship, mentorship, your endlessly commitment, giving of your time and talent. You allowed me to squat in my camper on your drive, eat your food and use your 'lecky' for a significant part of the last 12 months. You kept me sane, you were my brother and believed I could complete this when I had lost hope. I don't know how to repay this sacrifice.

My family have endured this journey with me, living through its highs and lows, without knowing why we are high or low. Miriam, your voice of reason and support has been unwavering throughout. Josh and Anna, you make me so proud, and you have been a reminder to me of what is important in life.

The foreword explains my reasoning for doing this research, in part I did this for my colleagues at DMRC and RCDM. There are too many to mention, but their resilience and courage in the face of adversity I have sought to mirror and will continue to do so.

Of course, the principal reason for this research were the combat casualties, the veterans, my patients and now my friends. Your humour and resilience endlessly inspired me. Thanks to this research I understand a little more of the ingredients needed. I hope I can continue to do my part to help other survivors 'kick the arse out of life' [5] as you continue to do. I can't say it better than General Lord Dannatt:

'They have served their country, buried their mates, cheated death itself and now rise above the hurt their enemies thought they had inflicted on them'. General Dannatt ([6] (p12-13))

I am fully aware of the imperfections in this research, and I know it will not change the world, but if just a small part of it can challenge how we deliver rehabilitation, it will be more than I could ask. I long to see rehabilitation as a ceaseless collaboration between specialisms. I long to see the day when our civilian health provision can not only save a life but upholds its sanctity, by enabling the survivor to now live that life to the full. Together, let us continue to strive for that vision.

Abstract

This cohort of combat casualties from Iraq and Afghanistan should not have survived; but they did. Their survival should now be defined by their disability; yet it is not. Using a mixed method research approach underpinned by complexity science and social theory, this study critically examines military rehabilitation post lower limb amputation and key components required to manage their complex needs. Structured around an adapted MRC evaluation framework for complex interventions, perspectives of clinicians, clinical managers and veterans have been captured and verified using the Nominal Group Technique, interviews, and veteran outcome data (ADVANCE).

Clinicians and clinical managers cite the importance of a highly collaborative interdisciplinary team approach where a culture of innovation, creativity, trust, and interdependence is nurtured by leaders. Conversely, the multidisciplinary team structure led to feelings of distrust, inadequacy, isolation, and disempowerment to adapt their circumstance.

Veterans highlight the prosthetic limb as a powerful symbol of autonomy and group membership; social bonds with peers, family and trusted clinicians, and the intensive goal centred, functionally based, rehabilitation process are also prized. These components support veterans to acquire the skills needed to feel connected with others and act autonomously – verified in the literature as extrinsic enablers of human thriving. The ADVANCE cohort presented with a high severity of injury, yet remarkably no psychological or social decline when compared to uninjured controls. However, psychosocial outcomes did not depend on prosthetic mobility as previous research has shown.

Therefore, both qualitative and quantitative data, point to a social dynamic supporting clinicians and patients to achieve their intrinsic motivational needs – to feel connected, competent, autonomous, and thereby, to thrive. Rehabilitation programmes planned around the proposed model of human thriving should promote high levels of social, psychological, and physical recovery. Future research is suggested on factors impeding thriving, mental health, socket comfort and medication.

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Glossary of terms and abbreviations

ADVANCE Study: Armed Services Trauma Rehabilitation Outcome Study

AMPPRO: Amputee Mobility Predictor (with prosthesis)

AT: Adventure Training

BACPAR: British Association of Chartered Physiotherapists in Amputee Care

BLESMA: British Limbless Ex-Services Association (Charity)

BNT: Basic Needs Theory (a sub-theory contained within self-determination theory).

CAS: Complex Adaptive System

CASEVAC: Casualty Evacuation

CAQDAS: Computer Assisted Qualitative Data Analysis Software

CET: Cognitive Evaluation Theory (a sub-theme contained within self-determination theory)

CMC: Computer mediated communication

COIN: Counter-Insurgency Operations

CoP: Communities of Practices

COREQ: Consolidated criteria for reporting qualitative research

COT: Causality Orientation Theory (a sub-theory of self determination theory).

CPN: Community Psychiatric Nurse

CT Rehab: Complex Trauma Rehabilitation Team

CVD: Cardiovascular disease

DCS: Defence Cost Studies

DD: Defence Diplomacy

DMRC: Defence Medical Rehabilitation Centre. The DMRC was located at Headley Court until 2018 when it moved to Stanford Hall

DMS: Defence Medical Services

DMRP: Defence Medical Rehabilitation Plan

DNIB: Disease non-battle injury

EM: Emergency Medicine

ERI: Exercise Rehabilitation Instructor

EWA: Early Walking Aid

GCT: Goal Content Theory (one of 5 sub-theories within SDT)

HD: Hip-disarticulation (whole leg removal) amputation

ICREC: Imperial College Research Ethics Committee

ICU: Intensive Care Unit

IED: Improvised Explosive Device

InterPACT: Interprofessional activity classification tool

ISS: Injury Severity Score

JTTR: Joint Theatre Trauma Register

KD: Knee- disarticulation (through knee) amputation

MCT: Military to Civilian Transition

MDHU: Military of Defence Hospital Unit

MDT: Multi-Disciplinary Team

MEDEVAC: Medical evacuation from point of injury to deployed hospital care.

MERT: Medical Emergency Response Team

MH: Mental Health

MOD: Ministry of Defence

MoDREC: Ministry of Defence Research Ethics Committee

MPK: Micro Processor Knee

MRC: Medical Research Council

MSK: Musculoskeletal

NATO: North-Atlantic Treaty Organisation

NGO: Non-Government Organisation

NGT: Nominal Group Technique

NHS: National Health Service

NICE: National Institute for Care and Excellence

NISS: New Injury Severity Score

OA: Osteo-arthritis

OIT: Organismic Integration Theory

OT: Occupational Therapist

PHEC: Pre-Hospital Emergency Care

PIRR: Periodic Intensive Residential Rehabilitation

PLP: Phantom Limb Pain

PPAM Aid: Pre-Prosthetic Amputee Mobility Aid

PRU: Personnel Recovery Unit

PTG: Post Traumatic Growth

PTSD: Post Traumatic Stress Disorder

PVD: Peripheral Vascular Disease

QoL: Quality of Life

RAF: Royal Air Force

RCDM: Royal Centre for Defence Medicine

RCO: Rehabilitation Coordination Officer

Role 1: Encompasses a forward operational medical facility *'with a set of primary health care capabilities which includes but is not limited to triage, pre-hospital emergency care and essential diagnostics'* [7] (p2-23).

Role 2 / 2E: *'Encompasses a set of military health care capabilities which enhances the resuscitative spectrum of the role 1 by capabilities essential to preserve life, limb, and function and stabilize the patients' condition for further transport and treatment.'* This may include (but not limited to) surgical facilities, critical care and diagnostic specialties. [7] (p2-24).

Role 3: *'...comprises a set of deployable specialist- and hospital care capabilities which at least includes computed tomography (CT) and oxygen production in addition to all the R2 capabilities listed above. R3 capabilities may reduce the need for a repatriation of patients and enable a higher standard of care prior to strategic evacuation.'* [7] (p2-24).

Role 4: *'...comprises the full spectrum of military health care including highly specialized capabilities (such as reconstructive-surgery, prosthetics and rehabilitation) that cannot be deployed ... Role 4 medical support is a national responsibility and normally provided by (military or military contracted civilian) hospitals in the casualty's country of origin or at a regional hub (firm base).'* Defence-concepts-and-doctrine-centre, 2019 #1234] (p2-25).

RRU Regional Rehabilitation Unit

SCS: Socket Comfort Scores

SCT: Social Categorisation Theory (part of a Social Identity Perspective)

SDR: Strategic Defence Review

SDT: Self- Determination Theory

SIGAM: Special Interest Group in Amputee Medicine (amputee assessment measuring agility)

SIP: Social Identity Perspective (Umbrella term referring to both Social Categorisation Theory and Social Identity Theory)

STRATEVAC: Strategic evacuation from Deployed hospital care to Role 4.

SIT: Social Identity Theory (part of Social Identity Perspective)

6MWD(m): Six Minute Walk Distance (Metres)

6MWT: Six Minute Walk Test

TARN: Trauma Audit Research Network

TDT: Transdisciplinary Team

TF: Trans- femoral (above knee) amputation

TT: Trans-tibial (below knee) amputation

UHB: University Hospital Birmingham

Voc OT: Vocational Occupational Therapist

WHO: World Health Organisation

Introduction

The survival of military personnel injured in Afghanistan and Iraq with a severity of injury that previously had been deemed incompatible with life, is remarkable [7]. Achievements of those at the forefront of emergency medicine provoked practice innovations throughout the Defence medical continuum, including rehabilitation [8]. With casualty rates not seen since the Korean war, battle injured soldiers, each with their own unique configuration of injuries, surged through the rehabilitation facilities at Defence Medical Rehabilitation Centre (DMRC), Headley Court [9]. Under the scrutiny of politicians and media, clinicians developed an interdisciplinary process of rehabilitation resulting in outcomes previously thought to be unattainable in such cohorts [4, 10]. The resilience of those who survived caught the attention of the public, their example resulting in the narratives of countless soldiers who had experienced life changing injuries but continued, in the words of Dave Henson (Paralympian), '*...kicking the arse out of life*' [5]. Their inspiration and example to the nation led to the Invictus Games, Help for Heroes, Endeavour fund and numerous localised initiatives. What remains unexplained, is how this happened. How did these unlikely survivors achieve such outcomes? What was it about the rehabilitation provision which enabled them to go beyond previously evidenced limits? Healthcare research investigating systems of care, either centre upon the clinician experience, the patient experience or the organisational dynamic [11, 12]. This is the first known study exploring an interdisciplinary model of care, including an in-depth patient perspective alongside comparative clinician viewpoints *and* an appraisal of organisational process. In doing so, this study seeks to confront the above questions and provide a detailed analysis of DMRC's Complex Trauma Teams rehabilitation provision.

Guided by the Medical Research Councils (MRC) framework evaluation for complex interventions [13], a contextual understanding of the research setting will be provided in Section 1 (chapters 1-3). Chapter 1 will uncover interactional patterns and themes that prove central to understanding the dynamic under investigation [9][14]. Background information required to grasp the wider strategic imperative upon Defence Medical Services (DMS), driven by the growing complexity of geo-political events is also explored. In Chapter 2, the circumstances in Afghanistan and Iraq leading to a complex insurgency are examined. Chapter 3 builds on this contextual background and provides a thorough understanding of the military amputee, their injury presentation and rehabilitation as they take centre stage in this thesis. This chapter also helps define the central research question.

There are three further Sections in the thesis before the concluding chapter. Section 2 (chapters 4-6) provides the epistemological, theoretical, and conceptual underpinning to answer the research question and interpret its findings. Chapter 4 commences with an exploration of complexity and recognises defence

rehabilitation as a complex adaptive system. A complexity science epistemology underlines the whole research approach. In Chapter 5, a theoretical construct is developed to guide the analytical process, including Bourdieu's theory of practice, social identity perspective (SIP) and self-determination theory (SDT). Chapter 6 considers a complexity view of collaboration and concludes by introducing the concept of Communities of Practice (CoP) used later to weave the separate threads of this theoretical approach together.

Section 3 unpacks methodological issues confronting the research question (Chapter 7) before defining the exact design, conduct and analysis of this research (Chapter 8). Section 4 details the findings from each study component of this thesis, separately discussed in relation to the central research question, theoretical construct, and wider literature (Chapters 9-12). Chapter 9 displays key findings from the clinician / clinical managers consultation exercise and Chapter 10 evaluates and discusses these findings. The same pattern is repeated for Chapters 11 and 12 with reference to the veteran group. The end of Section summary draws together both findings and discussion into a coherent whole before final conclusions and implications chapter completes the thesis.

SECTION 1: CONTEXT

Section Introduction

The Medical Research Council's (MRC) evaluation framework for complex interventions will be used to guide this evaluation of military amputee rehabilitation [13]. It emphasises the need for a contextual understanding of the research setting to uncover interactional patterns and themes that prove central to the dynamic under investigation [14, 15].

Complex trauma (CT) rehabilitation is a product of defence rehabilitation and has arisen out of the strategic needs within Defence Medical Services (DMS) and the wider defence organisation [16, 17]. These needs are driven by geo-political events and political responses [18]. The British military, alongside DMS underwent significant change in the decade preceding the invasion of Afghanistan, transforming both the organisational mindset and its structural configuration, permitting an agile and creative organisational response as casualty numbers surged [19].

Equally, the transformation of defence rehabilitation and the creation of the CT team would not have occurred if operational casualties had not survived [17]. Innovation in Emergency Medicine (EM) began a process of radical service-led development throughout United Kingdom (UK) military medicine [20, 21]. Understanding how and why this innovation occurred and its overall impact across DMS provides a contextual understanding of the expectation upon military rehabilitation. This understanding also justifies the central research question defined at the end of section 1.

To reiterate, Section 1 is divided into three chapters. Chapter 1 starts with a broad view of the geopolitical shift occurring from the end of the Cold War in 1991 until 11 September 2001, necessitating a strategic military re-alignment of British Forces. In chapter 2, the operational predicaments and medical responses from both Afghanistan and Iraq conflicts will explain the rehabilitation challenge and reasons for the high number of military amputees. Chapter 3 outlines the medical presentation of the combat casualty, documenting in depth, the rehabilitation provision for this patient group.

Chapter 1 Geo-political and military context: Army of the Rhine to Expeditionary Force

Introduction

This thesis explores the rehabilitation of military combat amputees between 2006-2014. It is suggested that medical and rehabilitation provision during this time was a direct consequence of a radical shift in strategic direction taking place following the end of the Cold War. To illustrate:

'The 1990s opened with the (British) Army configured and based to fight a short, sharp and potentially utterly devastating war on the German Plain and ended with it restructuring so as to be able to conduct defence diplomacy worldwide' Thornton [22], p38

This chapter explores the meaning and implications of this statement upon British Forces and, in particular, the 'peace dividend' [23], increasing military commitments during the 1990s, defence spending reviews and the implications for DMS. It outlines geo-political events that signified a more complex and less well-defined world order. British policy response is also considered and shows how it in turn sought to achieve a more integrated, agile, and expeditionary military strategy. This need for greater integration and agility within British Forces is assessed from a DMS perspective as it sought to reconfigure provision to meet a more complex and unknown threat.

The Army of the Rhine

The fall of the Berlin wall marked the end of the Cold War era (1947-1991) and signified a fundamental shift in global world order [23]. During this era, the United States of America (USA), UK and its allies established the North Atlantic Treaty Organisation (NATO) [22]. The Union of Soviet State Republics (USSR) created the Warsaw Pact [23]. Tension between NATO and the Warsaw Pact led to an armoured standoff on the plains of Germany [23]. Both sides had configured forces for modern, high intensity, 'symmetrical warfare' [24]. Symmetrical warfare refers to the fact that the enemy is *known*, and the conduct of war uses convention in which clearly defined echelons (or tiers) exist, enabling commanders to centrally plan and synchronise force (e.g. air, light infantry, artillery etc) elements within these *known* environments [25]. To illustrate:

'...much faith was placed in well-reconnoitred ground and well-prepared battle positions...warfighting was reduced to implementation of a General Deployment Plan – a stately quadrille which relied on everyone knowing the steps in advance...' (General Kiszely, [25] p 313).

High intensity symmetrical linear warfare aims to destroy the enemy before they destroy you. Strategic doctrine and operational procedures dictate the application of force and prescribe how momentum is achieved. The segmentation of British Forces into specialist units enabled isolated rehearsal and sequencing of each force element [22]. During the Cold War the threat of total destruction kept both sides at bay [23].

Planning assumptions estimated that such intensity of battle could only be sustained for up to 8 days; few casualties would survive [26]. Consequently, the medical role focussed upon triage of likely survivors receiving staged field-based surgical care [26]. Casualty evacuation back to static military hospitals in Germany and the UK would then follow. There was no requirement for deployed critical care or acute nursing as few would need it and those that did would be catered for more effectively in established hospital settings [26, 27]. The short and intensive nature of operations meant that disease non-battle injury (DNBI) rates would be low; there would be little time for illness or injury to have a degrading effect upon the force. In a symmetrical high intensity conflict, the enemy is known, location familiar and rules of engagement predetermined. Medical provision, in common with other attached service arms, could meet service needs through directed lines of communication and a fixed infrastructure [22, 26].

The Peace Dividend

The fall of the Berlin Wall in 1989 changed the political landscape across Europe and led to hopes of a 'peace dividend'. This phrase, popularised by George W Bush and Margaret Thatcher, the leaders of the UK and USA at the time, envisioned a future where reduced defence spending enabled investment in social projects and international aid [28]. Successive Defence Cost Studies (DCS) in the early 1990s were driven by a desire to realise these savings. 'Options for Change' [29], a 'mini review' in 1993, followed immediately by a major

spending review in 1994 called 'Frontline First' (HoC Defence 8th Report) reduced the strength of the Armed Forces by over 107,000 personnel in the following decade [30, 31].

These reviews placed a disproportionately heavy burden upon DMS [18, 32], including cuts to personnel numbers, military hospital closures, reshaping of deployed medical capability and the integration of DMS personnel into the National Health Service (NHS) creating five Ministry of Defence Hospital Units (MDHUs). Such a radical overhaul resulted in an exodus of senior military medical personnel [26, 33]. By 1996 the Parliamentary Defence Committee voiced grave concern that:

'Defence Medical Services are not sufficient to provide proper support to the front line ... and show little prospect of being able to do so in the future.' [32] accessed 07 Apr 2020.

However, the integration of DMS clinicians into the NHS also led to a formal commitment to adopt civilian standards of medical care within operational environments. Recognising future operational requirements as unknown, deployed medical capability broadened to enhance primary, critical and acute nursing services, investigative operational capability and the development of a new specialty, Emergency Medicine (EM) [26, 27, 34]. Yet, the above quotation highlighted a growing tension that politically driven cuts did not consider ongoing and increasing military commitments [25].

A decade of increasing military commitments: Refining the expeditionary model

This tension between Defence and their political masters grew as government strategy fixated upon extracting a peace dividend from Defence spending rather than providing strategic direction [22, 25]. At the same time, overseas commitment had grown as Defence was increasingly used as a tool of Foreign Policy, known as Defence Diplomacy (DD) [22, 23]. As the British military started to exit the Rhine of Northern Germany in 1989, they were almost immediately redeployed to the liberation of Kuwait in 1990. During the next 10 years, commitments in Bosnia, Kosovo, Sierra Leone, East Timor, and Afghanistan followed [23].

As the military became increasingly used for DD, short notice operational commitments could be described as initially small scale [23, 35]. Expeditionary operations, the term used for deployments requiring self-sufficient, agile and integrated units to act at short notice into unfamiliar locations, were trained and equipped to face an 'asymmetric' threat [23].

In contrast to symmetrical warfare, an asymmetric threat refers to an *unknown* enemy or environment in which dynamics are unpredictable or non-linear [35]. Tactics are unconventional and threats often arise and disappear from within local communities, causing confusion and interrupting momentum on the ground. There is no frontline and so all force elements are at equal risk. Asymmetric threats are often localised, with

the perpetrator seeking to achieve impact through its influence upon public opinion, for instance insurgent and/or terrorist action [35].

Each expedition British Forces embarked upon, presented a unique context and challenge, and so required fluid adjustment of capability and strategy [36, 37]. Devoid of clear government direction [22], operational demands forced a tactical and strategic rethink [38]. These operational experiences illustrated the need to train military personnel to move seamlessly between soldier, peacekeeper, diplomat, media presenter and policing roles [23]. Support Arms (such as DMS) needed to develop an equally agile capability in terms of infrastructure, mindset and skill, deploying quickly in modularised formations, within any setting, size or configuration. In asymmetric environments no echelon determined where Support Arms would operate. Instead, they needed to be capable of moving throughout battles spaces and, if applicable, provide services amid combat.

In this era of operationally driven military reconfiguration, overarching political strategic leadership was needed to align this process with wider geopolitical circumstances and assessments of future threats [29, 36, 38]. A change of government in 1997 provided this, causing a departure from previous 'Cost Studies' with the publication of the first Strategic Defence Review (SDR, 1998). This review sought to provide direction in the face of growing geopolitical complexity [22].

SDR 1998: Managing complexity

The SDR (1998) is outlined below because it remains a model of complexity management through its identification of four key themes [39].

1. *Diversity* - Each operational setting contained a complex and evolving threat driven by a need to understand influencing factors. Military engagement could only ever be *part* of any multilateral response [38, 39].
2. *Breadth of capability* - The SDR extended the military role and capability to encompass peace support, humanitarian development and counter-insurgency operations (COIN) as well as warfare [36, 38, 39].
3. *Organisational agility* - Uncertain and complex international stages placed an emphasis upon equipping, training and enabling an agile, flexible, autonomous, expeditionary force rather than predicting future requirements [40].
4. *Connection and collaboration* - Encouragement to achieve greater integration, interoperability and partnership across the Royal Navy, British Army, and Royal Air Force (RAF), between military and civilian settings (in particular, government departments) and with NATO partners formed a key message of the SDR

[22, 38]. Connection, integration and collaboration is suggested to provide organisational resilience, especially in *unknown* settings [41].

SDR 1998: Tactical outcomes for DMS

The SDR (1998) provided three tactical outcomes for DMS: integration, innovation and interdisciplinarity.

1. **Integration.** The SDR completed the process of military integration into civilian medical settings. Establishment of the Royal Centre for Defence Medicine (RCDM) brought about a pivotal military civilian partnership between RCDM, DMRC and the University Hospital Birmingham (UHB), which in time redefined military and civilian trauma care [42].
2. **Practice Innovation.** The expeditionary stance outlined by the SDR, together with operational experience gathered from the end of the Cold War emphasised the need to provide a fully versatile operational medical capability [26, 42, 43]. Field medical facilities capable of modularised and scaled deployment helped re-frame the military medical mindset and gather infrastructure. Yet, logistics and procurement were only part of this task [7, 44]. Institutionalising a purposeful and planned quality improvement mechanism to inform and promote research and audit was needed to meet the changing demands of expeditionary settings [45]. In time, specialities such as Pre-Hospital Emergency Care (PHEC) became exemplars of practice innovation [44, 45].
3. **Interdisciplinary Approach.** The SDR recognised the role of rehabilitation as an occupational ‘force multiplier’, capable of returning personnel with musculoskeletal injury back to frontline duty [46]. However, this provision needed to be regionalised to facilitate access. Regionalisation of rehabilitation services also needed to deliver a breadth of specialist input to speed diagnosis and recovery [46]. Regional rehabilitation units (RRUs), therefore, took on an interdisciplinary approach encouraging joint input from sports medicine, physiotherapy, and exercise rehabilitation specialists. This form of healthcare organisation is discussed in more depth in Chapter 2.

Summary

The geo-political context of the end of the Cold War and an emerging asymmetrical threat forced a transformation of approach and organisation upon British Forces. Successive, politically motivated defence cuts had a profound impact upon the capability of DMS to support fighting forces, but also laid the foundation for a more integrated, collaborative and operationally versatile service. The SDR (1998) brought the three medical services under the Surgeon General and moved defence secondary care into the NHS. The 1990s also witnessed the modularisation of operational medical capability enabling partnership with NATO allies.

Rehabilitation, prioritised as a force multiplier, developed RRUs using an integrated, interdisciplinary, and innovative approach; these three key contextual themes provide an important backdrop for understanding the operational context of, and medical response in, Afghanistan and Iraq. DMS created an expeditionary capability, evolving practice with each exposure to operational settings. Whilst some view this period as a low point in DMS history, it may also be argued that the 1990s laid the foundation for the renaissance of DMS, as explored in the following chapter in relation to Afghanistan and Iraq [18, 26, 33].

Chapter 2 Afghanistan and Iraq: Operational context and medical response

Introduction

When analysing context surrounding military interventions, it is necessary to consider the global events and political goals creating the need for any intervention. Chapter 1 showed how global events led to an increasingly complex international stage [23]. UK government policy sought a strategic shift in military capability to create an agile force able to embark upon small and medium scale expeditionary operations at short notice [38]. The tactical response of DMS was to manage this complexity through greater integration, interdisciplinarity and innovation [26, 45]. The terrorist attack on the World Trade Centre, hereafter referred to as 9/11, also provides the backdrop to military interventions in Afghanistan (2001-2014) and Iraq (2003-2011). Therefore, the following chapter sub-headings enable an appreciation of the operational context of this study:

1. Global events leading to war in Afghanistan and Iraq;
2. Military roles;
3. Political challenges;
4. Medical responses.

The degree to which DMS integration, innovation and interdisciplinarity enabled an effective medical response within Afghanistan and Iraq, two highly complex settings, is also considered.

Global events leading to war in Afghanistan and Iraq

9/11 illustrated the inherent danger of the new age of information sharing and global communication [23]. A globalised world without borders offered a vision of freedom and opportunity to non-state actors (terrorist) and marginalised Nation States [23, 25]. Al-Qaeda created a psychological, political and economic aftershock that revealed the vulnerability of this globalised and technologically connected world [23, 25]. It led directly to the invasion of Afghanistan in 2001 and a 13-year counter insurgency operation (COIN) [23, 25].

In Afghanistan, the removal of the Taliban from government preceded a vigorous 'find and strike' campaign against Al Qaeda [40]. Swift progress towards operational objectives halted as war in Iraq became inevitable [23, 40]. Limited troop numbers left the newly installed interim Afghani government unable to fill the vacuum left by the Taliban [23, 40]. Highly trained in insurgency tactics following years of Russian occupation (1979-89), Al-Qaeda and the Taliban were able to regroup against NATO forces [25]. In Iraq, growing tensions between US and Sadaam Hussain's government had commenced prior to 9/11 and culminated in the March 2003 US-led invasion [40].

These global events, however, did not fundamentally alter UK policy direction set by the SDR (1998).

'...if 11 September did anything to our views, it was to confirm that the direction we took with SDR was the right one...we must be lighter, more focused/precise and more flexible; and leave behind the inertia of the Cold War for good.' [19] p7).

The significance of the events following 9/11 is also captured by the following statement from the Chilcot Inquiry [47]. The UK government simply did not adhere to the policy it had already published [40, 48].

'Since the SDR we have assumed that we should plan to be able to undertake either a single major operation (of a similar scale and duration to our contribution to the Gulf War in 1990-91), or undertake a more extended overseas deployment on a lesser scale (as in the mid-1990s in Bosnia), while retaining the ability to mount a second substantial deployment ... if this were made necessary by a second crisis. We would not, however, expect both deployments to involve war-fighting or to maintain them simultaneously for longer than six months.' [47] (p252)

The substantial rationalisation of personnel numbers over the previous decade, had left British Armed Forces scaled to sustain one division sized campaign (20,000 personnel) or two concurrent Brigade sized (5,000 personnel) deployments for up to 6 months [30, 32]. However, as British forces went into Afghanistan (2001-2014) and then Iraq (2003-2011), it also maintained significant commitments in Kosovo (1999-2008) [37, 40]. These commitments forced the British military to operate substantially beyond its capacity for extended periods [49]. In both Iraq and Afghanistan, the intent was to enable a rapid transition of power to democratically elected governments. But tactical errors, inconsistent political leadership, cultural ignorance

and the removal of local law and order caused both countries to quickly dissolve into protracted insurgencies [23, 37, 40].

Military Roles

Failure to ensure rapid transition of powers meant that British forces became involved in protracted campaigns in foreign lands, within unfamiliar cultures and where the threat was dynamic, unconventional and therefore, asymmetrical [35]. Any exit plan would require peace support, nation building and COIN, otherwise collectively known as 'enduring' operations [50]. To gain the cooperation of external agencies and consent of the community required trust [22, 50]. This would take time and boots on the ground.

'Boots on the ground' is the modern-day expression used to describe the physical presence of soldiers (Oxford Dictionary). In an enduring operation, this presence exists to provide a secure environment from which community life can flourish [51]. For the soldier, this is a complex setting in which they are equipped to deliver lethal force but commanded to demonstrate *courageous restraint* [52]. This setting is equally complex for those in command; they must be adaptable in their approach, partner with external agencies, whilst maintaining leadership. They must also train and empower those on the ground with knowledge of the mission, the skills to gauge atmospherics and the sanction to improvise and problem solve [50, 51].

However, some argue that generations trained in Cold War tactics and the initial success of synchronised high intensity combat operations in Afghanistan (2001) and Iraq (2003) caused many to optimistically rely upon technology for answers, rather than the more laborious approach of relationship building [53, 54]. Protracted insurgency, however, revealed the limitations of this approach. A policy was needed that sought to earn the trust and consent of the local population.

The deteriorating security situation led to open kinetic warfare in Afghanistan and parts of Iraq, causing cessation of community life and any hope of reconstruction and nation building [40]. Operational overstretch compromised military commanders' freedom to exploit opportunities on the ground and to take the initiative [40]. To illustrate:

'Force levels were applied to tactical problems, rather than the tactical problem defining the level of forces required.' [18], p5

Without sufficient boots on the ground the security situation could not be contained and nation building, and peace support could not commence. Clear leadership was also needed to create a spirit of collaboration between military, Non-Governmental Organisations (NGO) and government agencies to enact effective community reconstruction [50, 55, 56].

This situation only changed when the US increased troop numbers by 25,000 in Iraq (2007); and Afghanistan (2009) [57]. British forces then pulled out of Iraq in 2011 to enable a doubling of UK troop numbers in a more condensed area of Helmand Province in Afghanistan. This increase in personnel gave allied commanders the flexibility to respond militarily whilst also supporting multinational efforts in reconstruction, training and mentorship of local security forces [53, 55].

According to commentators, the failure to manage these complex insurgencies was multifactorial [58], however, two stand out. First, was the failure to adequately resource the military solution owing to operational overcommitment of British forces. Second, the SDR (1998) argued that successful connection and collaboration with relevant stakeholders would enable organisational solutions to complex operational scenarios by harnessing a diversity of experience and skill. However, military leadership in Afghanistan and Iraq lacked continuity to build such relationships [40, 58]. This undermined UK partnership and collaboration with NATO allies, NGOs and local governments leading to contradictory directives [55, 58].

Political Challenges

Conflict in Afghanistan and Iraq has been described as a war of volition rather than necessity [18]; UK sovereignty or territory was not at risk. Instead, action was justified in both Afghanistan and Iraq due to the security threat these nations posed to the UK and its allies. Public support in such circumstances can be labile [18]. As the insurgency took hold, casualty numbers increased. Public concern grew at the sacrifice being required of young soldiers serving their country in a foreign land [59].

The importance of public opinion, particularly for a democratic country, was understood on both sides [56, 59]. For insurgents, increasing casualty numbers not only caused the local population to side with them, but it also carried the possibility of forcing the US and UK into making humiliating withdrawals [56]. Greater troop numbers were desperately needed, but this placed more personnel at risk. Heavily criticised due to military equipment failings and under resourcing, UK politicians were reluctant to attract further public critique by committing additional troops, yet a humiliating withdrawal was untenable [40].

In November 2007, the media contained reports of an altercation between members of the public complaining to staff at Leatherhead Swimming Pool about having to share their local swimming pool with injured soldiers conducting their rehabilitation. Headlines appeared across the tabloids:

'Disabled veterans jeered at swimming pool' [60]

Reports galvanised support for the military community from senior military leaders, the Royal family and celebrities [59, 61]. Public contributions financed the building of a swimming pool at DMRC [40, 48]. In turn, this led to the establishment of the charity 'Help for Heroes' [61]; with celebrity support it became a powerful voice for the soldier. This innocuous incident in a local swimming pool started a cascade of events in which

public uncertainty on the war, became a public resolve in support of the injured soldier. The soldier received a 'hero' status due to their commitment and personal sacrifice, as well as their tenacity to continue with life despite their disability [61]. Sociological messaging around the 'hero' concept requires the user of this term to celebrate both the 'hero' and their heroic acts [59, 61]. By celebrating the heroic act, in this case military action in Afghanistan and Iraq, this act also elevated the hero's status [59, 61]. As public support fell behind the soldier, it enabled military leaders to lever what was needed from UK government. For the government, it allowed them to reframe resourcing, to support the nation's military personnel, rather than to fund unpopular wars in foreign lands [59].

It is unlikely that these events would have occurred had the soldiers perished from their injuries. Without their survival, the political will to maintain combat operations in both countries may have evaporated swiftly. Therefore, the effective care and recovery of combat casualties from the point of injury to their rehabilitation was key in harnessing public support for troops and government resourcing [59, 61]. Nevertheless, it placed an operational burden upon the DMS, which will be expounded in the final part of this chapter.

Medical Responses

'...there are people who have enabled survival by standing on the limits of life and death and refused to accept them...'. [62] p5

Despite the operational impetus of the 1990s, casualty rates resulting from combat trauma had been remarkably low. Gulf War I resulted in 45 deaths and between 1992 – 2006 and 72 British military personnel died in the Balkans [63]. In contrast, 632 military personnel were killed in Iraq and Afghanistan [63]. As the insurgency took hold, first in Afghanistan and then in Iraq, not only did fatalities grow, but so did the number of personnel who experienced life-changing injury. Over the course of nearly a decade, casualty numbers in both Iraq and Afghanistan reached levels unseen since the Korean War [9, 64]. Between 2003-2012, the UK Military Joint Theatre Trauma Register (JTTR) reported 2792 personnel suffering trauma, 22% resulting in fatality [9].

Kinetic warfare in Afghanistan exacted a heavy toll on insurgents; the weapon of choice, therefore, became the improvised explosive device (IED) [18, 50]. It could be detonated remotely, was versatile, easily concealed and could be adapted for any location; commonly used to target vehicles or soldiers on foot patrol. As a result, 70% of combat injuries in Iraq and Afghanistan resulted from explosive weapons [9]. The signature injury from this period was limb trauma, often resulting in amputation [65]. However, as each IED was individually made using available materials, composition would alter between devices. Delivery mechanisms and environmental factors could also differ, as could victim proximity. These variances, together

with any protective barriers or equipment being worn, could alter the physical effect of blast upon the human body [66]. As a result, there was little uniformity of injury.

Severity of injury and trauma was unlike anything previously recorded. Trauma scoring is a process used by PHEC to evaluate severity, inform triage and predict survival [7]. The Injury Severity Score (ISS) provides an anatomical score for trauma [67], with a scoring range of 1-75. In the UK, an ISS greater than 15 is classified as major trauma [67]. A score of 75 is considered incompatible with life [7].

ISS	NHS	DMS
16-24	56.5%	26.4%
25-35	35.1%	22.3%
36-75	8.4%	51.3%

Table 2.1 Benchmarking against NHS trauma care: Injury severity score (NHS vs DMS) (adapted from [7] p 178-179.

In 2007, a comparison of ISS scores for admission into the NHS and DMS highlighted the complexity and severity of combat trauma seen in operational medical facilities in Afghanistan and Iraq (table 2.1) [7]. Over half of NHS patients scored between 16-24, whereas 51.3% of military trauma admissions scored in the upper category of severity (36-75) [7]. Between 2006-2008, 75 military personnel survived injuries previously deemed incompatible with life [7], providing an indication of the challenge faced by DMS early in the campaign. The term ‘unexpected survivor’ is derived from this data [68] (p243). The requirement for more boots on the ground increased troop numbers; a commensurate escalation in casualty numbers followed (Figure 2.1). This potential catastrophe was confronted by a service already primed for innovation; examples from Emergency Medicine (EM) and secondary care are described below.

British Casualties in Iraq - MOD Categorised Combat Casualties Monthly Data (April 1 2006 to July 31 2009)

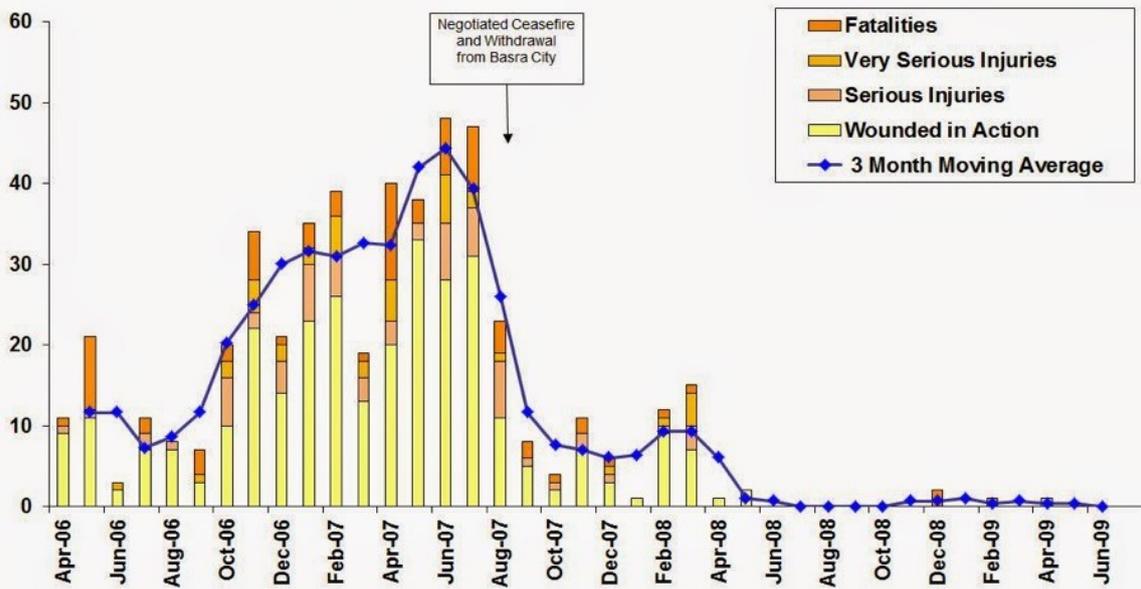


Figure 1: British Casualties in Afghanistan - MOD Categorised Combat Casualties Monthly Data (June 1 2006 to December 31 2011)

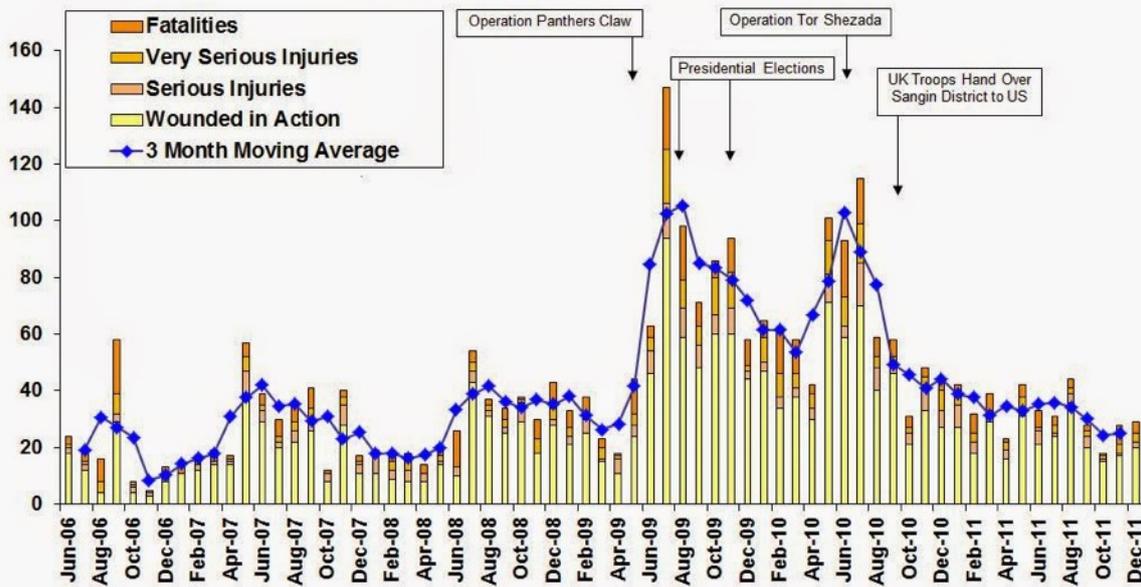


Figure 2-1 British casualties in Iraq and Afghanistan: Iraq (top) (2006-2009) [69], Afghanistan (Bottom) (2006-2011) [70]

Emergency Medicine and Pre-Hospital Emergency Care

Until the end of the Cold War, the defining spirit underpinning military medical delivery was to perform the greatest good to the greatest number of people [71]. This narrative changed with the SDR when military medicine adopted civilian standards of medical care in operational settings [26]. Medical specialties, such as EM welcomed this integration by adopting an active policy of bottom-up interdisciplinary idea generation [7, 72]; The Medical Emergency Response Team (MERT) was a key outcome from this process of data capture, active review, challenge and dissemination [20, 64].

On the battlefield, time is the casualty's ultimate enemy. The golden hour is the concept around which Pre-Hospital Emergency Care (PHEC) was initially framed. Whilst its scientific foundation is lacking [73], association between haemorrhage and combat injury means time to access care is a critical determinant of survival [74]. This realisation spurred a systems approach that sought to find efficiencies at every stage of the pre-hospital journey [21, 34, 68].

The tactics and predominate use of IEDs meant that anatomical disruption leading to catastrophic haemorrhage was the greatest risk to life [18, 75, 76]. Although the percentage of injuries caused by IEDs during Iraq and Afghanistan is comparable with other recent conflicts [9], frequency of vascular injury was up to five times higher because of device construction [75, 77]. A review of operational injury data held on the JTRR showed that 24.3% (n=976) of pre-hospital deaths suffered by US and UK forces between 2001-2011 were potentially survivable if they had received haemorrhage control in the first 10 minutes of injury [78]. Mortality from haemorrhage and, in particular, non-compressible haemorrhage has been shown to rise greatly when time to access PHEC extends beyond 30 min [74]. This evidence developed a concept known as the platinum 10 minutes. Each soldier was equipped with and trained how to use treatment aids e.g. tourniquets and protective equipment; every minute counted for casualty survival [64].

In Iraq and Afghanistan, the key challenge of delivering PHEC and evacuating a casualty to deployed hospital settings lay in the dispersal of a Force across a wide and hostile area. Terrain and distance precluded the use of ground transport. Military personnel involved in each step on the casualty evacuation journey scrutinised their own practice with the aim of achieving incremental gains [34, 44, 79] (Figure 2.2). Transport logistics, procurement of equipment enabling in-flight treatment, communication protocols and hospital assessment procedures attracted equal attention [74]. Capture of outcome data enabled an appraisal of the system and its components [44, 64, 68, 78]. This innovation of equipment, procurements, training and process was purposefully planned, researched and then formalised into an end to end operational care pathway ([Appendix 1](#)) [80]. The collective impact of this purposeful pursuit of progress is one of the principal reasons survivability of combat casualties increased [44, 64, 68, 78].

But when survival exists on a knife edge, secondary care management (surgery, anaesthetics, critical care support, wound care) will also determine casualty survival. Achievements in PHEC initiated practice development in secondary care also.

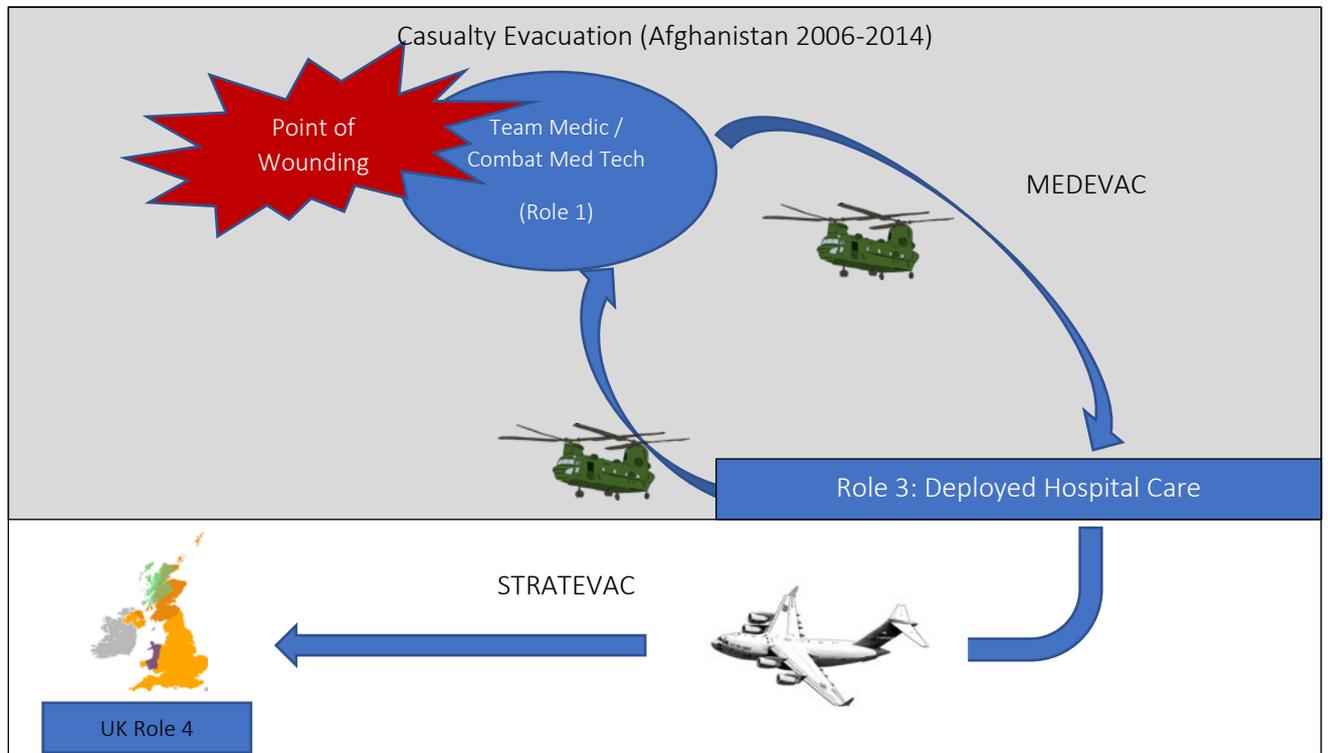


Figure 2-2 Casualty evacuation chain (Afghanistan). MEDEVAC= Medical Evacuation / STRATEVAC=Strategic Evacuation

Secondary Care

The final sub-section of this chapter outlines UK based secondary care provision for those injured in service. A casualty arriving within a deployed healthcare facility was referred to as a *patient* [80]. Accordingly, this thesis will also now refer to the combat casualty as 'patient'. Following injury, strategic evacuation of UK service personnel occurred at the earliest opportunity (Figure 2.2). In most cases, critically injured personnel would be back in the UK within 24 hours following injury. With defence secondary care integrated into the NHS, admission occurred directly into University Hospital Birmingham NHS Trust. The value of exploring the secondary care context is that it offers an opportunity to examine how two organisational cultures came together to manage a complex and evolving circumstance.

Differences in organisational goals and culture

'The primary role of the DMS is to promote, protect and restore the health of the UK armed forces to ensure that they are ready and medically fit to go where they are required in the UK and throughout the world.' [81]

DMS is an occupational health service funded to restore the health and fitness, and therefore deployability of UK armed forces. It is responsible for the entire recovery journey. Ingenuity and innovation of medical practice required to overcome unknown and complex operational challenges, have caused some to place great importance upon the need to equip the military medical organisation with an innovative culture [45]. Such a culture can be actively nurtured, but it requires an emphasis upon organisational agility, creativity, adaptability, integration of effort and a tolerance of risk [82, 83].

In comparison, the NHS exists to provide equitable healthcare for all, delivered according to clinical need [84]. The requirement of healthcare delivery in the NHS is significantly larger than DMS and so its provision is ordered and resourced according to clinical pathways developed from the best available evidence. National bodies such as National Institute for Care and Excellence (NICE) as well as national and local initiatives seek to capture experience and outcome to inform these pathways [85]. A clinical pathway is predictable and linear, facilitating its resourcing and outcome monitoring [85]. Provision is structured around clinical professional departments and their relevant domains. As a healthcare organisation the NHS will deliver these services within an acute setting, working alongside social partners once the patient is discharged home [84]. As a healthcare provider, it does not own the entire patient journey.

SDR 1998 commenced the integration of secondary elements of the DMS within the NHS [32]. When in 2006 significant numbers of injured military personnel were evacuated from an operational setting back into the NHS, their complex combat injuries had a disruptive effect upon linear management systems within the NHS. Competing medical and surgical demands brought about by these devastating injuries required adaptable and integrated approaches which could move at pace with changing circumstances [83]. Whilst achievable in the operational setting which is conditioned for such complexity, in the UK, the demand upon staff and management systems challenged NHS models [86]. Cultural tension between the military and NHS providers erupted across the media [87, 88]. This process was further charged as celebrities, Royalty and politicians turned the media spotlight onto the services and provision in place for the wounded soldier [89, 90].

Deployment of DMS personnel working within NHS settings further disrupted NHS continuity. However, deployment exposed clinical personnel to the reality of the operational setting, its medical challenge, and strategies needed to overcome these [77]. Shared experiences of integrated working, in close proximity within a deployed multinational, high tempo setting abolished traditional professional barriers and hierarchy embodied within civilian practice [91]. These personnel, returning from an operational setting back into the NHS, brought this experience with them. In addition, RCDM, once a training and research unit, now took on

clinical provision as part of its mission. A greater concentration of military clinical personnel working in key clinical areas enabled cultural change as a shared strategy developed to meet the clinical challenge.

Mechanisms employed to support the integration of organisational cultures

Both clinical presentation and aeromedical evacuation mean seriously injured military patients are first admitted to the intensive care unit (ICU). Surgical intervention commences immediately and can continue daily until wounds have been sufficiently debrided, cleaned and closed [92]. Once systemically stable, sedation is withdrawn, to allow them to wake and orientate to their surroundings before moving to a ward. This is important, as for many, their memory is of the incident, or events proceeding it. Part of this orientation is achieved by grouping military patients on the same ward as well as ensuring they receive visits from welfare personnel in uniform. Their unique experiences and injury presentations therefore demand input from multiple specialties, some of whom may be non-clinical, or may not typically work within an acute setting.

During the ward phase, provision of aids, home adaptations and ongoing nursing and rehabilitation care is planned. Further surgical procedures are often needed [8]. Daily routines include specialist assessments and procedures, monitoring by nursing staff, medication reviews, rehabilitation with the physiotherapist and Occupational Therapist (OT), surgical planning and visits from family and friends, military staff, and welfare officers. Passage of information between multiple clinicians located in geographically disparate locations required nominated individuals to provide strategic coordination.

The integration of NHS and military cultures sought to improve coordination across these services supporting both patient and family [8]. Strategic posts, outlined below, were created to ensure communication flow. Cross disciplinary strategic meetings occurred bringing NHS and military personnel together to build a network based around clinical specialisms. A concept known as 'The Military Bubble' was created to articulate the purpose of additional military services brought into the NHS to supplement clinical provision [8, 17]

Strategic Posts.

Three roles proved vital in the coordination of services and the management of information flow:

1. Trauma Ward Sister: The ward sister provided principal oversight of the medical and surgical management of a patient, ensuring continuity between shift changes on the ward [8].
2. Rehabilitation Coordination Officer (RCO): This role liaised with DMRC and ensured discharge information had been passed between secondary care specialties [8]. With their knowledge of military

rehabilitation, they could offer clinical insight on decision-making as well as coordinating specialist assessment and treatment. This role became central in managing ongoing and future care; its significance recognised when adopted by the UK Trauma Network as a core role within regional trauma centres [8, 93].

3. **Military Registrar:** The system of medical training for Foundation year (FY1/2) doctors resulted in frequent changes of staff thereby removing continuity of medical and/or surgical knowledge. The complexity of military cases is beyond the experience of many FY1/2 doctors. Therefore, the role of Military Registrar, posted onto the ward, provided a vital link with surgical teams [8].

The military also sought to augment the clinical team at various pinch points. Rehabilitation was a particular beneficiary of this policy. Occupational therapists liaised between hospital, community services and DMRC to support patients going home. Critical care military physiotherapists enabled outreach to occur from ICU into Burns, Trauma and Neurology Wards. Both roles adopted a networking approach connecting specialists outside of the acute care environment with inpatient therapy teams to meet specialist therapy needs and uplift the skill base of the teams in situ [8].

Strategic Meetings.

Three types of strategic meetings began as communication forums and networking opportunities to form bridges between military and civilian services.

1. **WARD S4 Multi-Disciplinary Team (MDT) Meeting.** The complexity of cases demanded active clinical case management that allowed for cross disciplinary discussion outside of the ward environment. The S4 MDT meeting and ward round brought together surgical, nursing and therapy clinicians from across the MDT, a rehabilitation coordinator and DMRC Consultant to actively discuss plans. From this forum came the S4 MDT Pain round, instrumental in developing protocols and novel use of pain medication across the care continuum [71, 94].
2. **The Bunker.** Concomitant and devastating injuries seen in blast victims are a management challenge in a clinical setting built around specialisation. With so much overlap and multiple wounding concurrent surgical activity was required. As the volume of patients grew, daily stand-up meetings took place in theatres coordinated by a military burns nurse. The Bunker came to represent a surgical planning meeting, but through it, a network of relationships grew leading to the formal integration of Orthopaedics and Plastics, eventually known as Orthoplastics [95].
3. **RCDM Patient Brief.** The extensive military welfare provision brought in to create the 'Military Bubble' and work alongside clinical activity at UHB required coordination. The ward sister and RCO were key members of a daily brief that provided a three-way conversation between clinicians, military admin, and welfare providers. In turn they supported patients and staff, provided a critical link to military units and a point of contact and informational support for the patient's family.

The above developments helped to integrate and connect military and civilian specialist services, providing connections across the larger NHS organisation and bypassing traditional disciplinary boundaries. Recognising the interdependence between clinical professions in such cases, diverse specialities met to collectively formulate plans to enable a creative and agile approach to manage complex cases [8, 62]. Alongside these organisational developments, the 'Military Bubble' arose out of recognition of the Ministry of Defence's (MoD) responsibility to the service family. Required to frequently relocate service families can find themselves dislocated from relatives and community support in times of crisis. In caring for the casualty, DMS needed to ensure the welfare of the patient's family or dependents [18].

Military Bubble.

The stress of deployment upon the family unit is well documented [96], and further compounded when injury and hospitalisation occur. The soldier is frequently hospitalised away from family or dependents creating unique social challenges and welfare needs. Reserve Forces who are attached to regular military units may also have no connection with them beyond deployment and their families will be unknown to unit support structures. Furthermore, recruitment of military personnel from across the Commonwealth as well as social and demographic variance in UK recruitment, means that cultural, social, and educational diversity coexist with this transient geographical complexity. This variance of need and circumstance is further complicated by an acknowledged difference in the quality and scope of unit welfare provision and their unfamiliarity with NHS procedures [17]. Additional layers of administrative and welfare support were therefore provided by RCDM to ensure continuity of knowledge and practice. This was known as the *military bubble* [18].

The 'Military Bubble' sought to provide families with practical, social, psychological, and spiritual support. This included travel, accommodation and a military liaison team providing a single point of contact. Together with defence welfare representatives, mental health nurses and a Padre, the military bubble sought to insulate the families from the unique complexities a military lifestyle can place upon the family unit [97].

Summary

The campaigns in Afghanistan and Iraq proved to be a catalyst in propelling medical understanding and management of combat trauma forwards [18]. Yet, much innovation in Secondary Care centred upon the human challenge as organisations, managers and clinicians sought to find ways to enable effective care delivery. The assertion here, considered in more depth later in this thesis, is that innovation in clinical services occurred because of the networking and interaction across professional specialisms [94]. DMS were

required to work within the constraints of a highly specialised teaching hospital, however, the complex needs of the patient stretched across these specialties. The numbers of patients, severity of their injuries, their media profile, and the need to inject momentum into the NHS medical system to maximise recovery, demanded a different approach. DMS were able to supplement NHS staffing and contract additional services; in so doing they created a biopsychosocial model of inpatient care – the Military Bubble.

This chapter has focused upon the geo-political setting, operational circumstances, medical challenges, and healthcare responses to the wars in Afghanistan and Iraq. The unpredictability and changeability of each setting and the non-linearity of interaction between known and unknown factors are emerging issues. These complex characteristics can be seen in the geo-political shift created by 9/11, emerging insurgencies in Afghanistan and Iraq, medical challenges created by unexpected combat injury survival and the healthcare response seeking to work across organisational and cultural boundaries. Whether it was the strategy brought in to manage the insurgency in Afghanistan or the innovation of healthcare services, clear strategic leadership was needed to empower tactical freedom on the ground. Any solution needed to be properly resourced and integrated, bringing together skills and expertise unencumbered by professional boundaries and hierarchy. Regular and meaningful communication between stakeholders was needed, so that trust and interdependence could enable flexible and agile solutions.

The impact of DMS innovation arguably turned the course of the war in Afghanistan. British military medical support entered Afghanistan in 2002 poorly equipped, having received very little training and with no casualty extraction plan [18]. They left Afghanistan in 2014 with an end-to-end care pathway commencing with a highly trained and proficient MERT [42, 80]. Over these 12 years, a purposeful collaboration of ideas between clinical and military specialties resulted in a transformation of deployed medical training given to both soldiers and clinicians, the development of protective equipment and a comprehensive operational patient care pathway. The lives saved by these efforts provoked the development of practice throughout the rest of the care continuum. And the resilience of those whose lives had been saved caught the attention of the public.

The political need for a solution in Afghanistan and Iraq found its answer in the heroism of the combat casualty. Public and political support for the combat amputee and scrutiny of the services they received created a unique set of challenges to DMS [18]. Whilst these will be considered in the following chapter, those saved lives and the context surrounding them provide the complex backdrop for this unique study on the rehabilitation of military amputees

Chapter 3 The military amputee

Introduction

Military action in Afghanistan and Iraq created casualty numbers unseen in living memory [78]. Yet, out of this crisis emerged a patient care pathway that transformed trauma care in military and civilian sectors, enabling survival thought previously to be unlikely or even impossible [17].

Building on the historical background from chapters 1 and 2, a thorough contextual understanding of the military amputee is critical as they take centre stage in this thesis. This chapter is necessarily large as it focuses on wide-ranging literature covering injury presentation, rehabilitation, and transition to help define the central research question detailed in the Section Summary.

What follows, therefore, is divided into three parts:

Part 1. Injury Presentation;

Part 2. Rehabilitation;

Part 3. Recovery.

Part 1. Injury Presentation

In Part 1, the mechanism of blast leading to amputation will be described. In a military setting, exposure to blast will usually occur on foot or mounted patrol (inside a vehicle). These two distinctions will be explained, and levels of amputation will then be detailed together with an overview of the prosthetic limb.

The mechanism of injury

In civilian society, amputation occurs most commonly because of vascular disease [98, 99]. Congenital deformity, cancer or trauma may also result in limb amputation [100]. Traumatic amputation in civilian life is relatively rare [99, 100]. Within a military context, it is a recognised sequel following exposure to blast, though since the advent of IEDs few survived initially [101]. Little was therefore known about mechanisms of injury, ways to protect the individual, recovery pathways or long-term consequences of such trauma [101, 102]

As the insurgency developed in Afghanistan and Iraq, few were expected to survive traumatic amputation following exposure to IEDs [7]. Yet, as described in the previous chapter innovation in PHEC focussed upon immediate management of catastrophic haemorrhage, swift air evacuation of casualties and a formalised system of information sharing [34, 44]. This led to a cohort of 'unexpected survivors' ([7], p171). Multiple traumatic amputation became the signature injury of these conflicts. Defence statistics report that between 2001 and 2015, 302 military personnel suffered amputation in both Afghanistan and Iraq [63]. The mechanics of this type of injury need to be understood to appreciate the variability of presentation.

Characteristics of blast injury

Exposure to blast is the principal cause of amputation, but amputation rarely occurs in isolation [9]. This section briefly outlines the mechanisms of blast injury, to explain why exposure to blast results in such complex presentations.

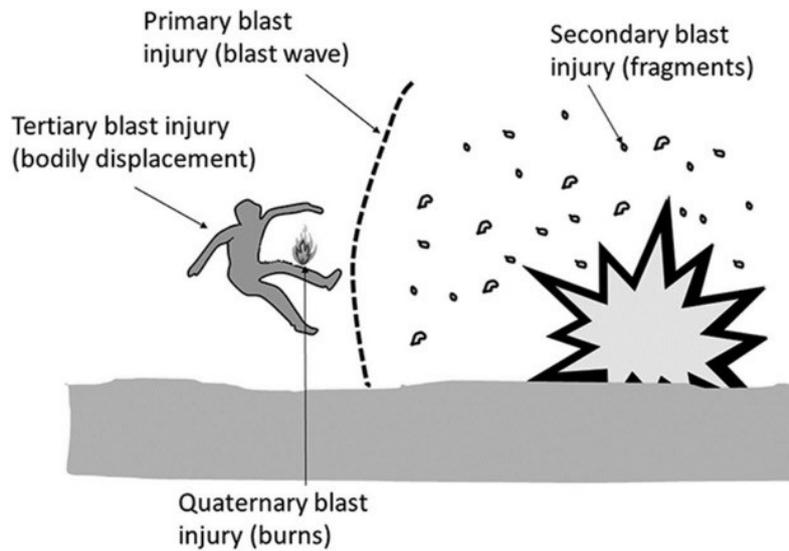


Figure 3-1 Four categories of blast injury (From [103] p e25(2))

Blast injury has been divided into 4 categories (primary, secondary, tertiary and quaternary) which relate to the physical phases of blast following detonation (Figure 3.1). See [Appendix 2](#) for a brief explanation of these 4 categories. The method of explosive delivery, environmental conditions and the nature of protective barriers partitioning the blast from the recipient will influence how the physical phases of blast interact with recipients and determine final injury presentation. The most notable distinction in combat related injuries is between those exposed to blast injury when in a vehicle (mounted patrol) and those on foot (dismounted patrol) [101, 104] (Table 3-1).

Blast Injury – Vehicle (Mounted) Patrol	Blast injury – Foot (Dismounted) Patrol
<ul style="list-style-type: none"> • # right maxilla (jaw) • # right mid humerus (arm) • Right elbow dislocation • # left radius and ulna (arm) • # sternum (chest) • Compression # L2 (spine) • Unstable burst # L3 (spine) • Small right pneumothorax (lung) • Cardiac contusion • # right tibial plateau (lower limb) • # right lateral malleolus (elbow) • # right 3,4,5 MTPs (fingers) • # right calcaneus (foot) • # left 5th MTP (fingers) 	<ul style="list-style-type: none"> • Right hyphaemia (eye) • Left globe disruption with intraocular haemorrhage. (eye) • Complex facial lacerations. • Degloving of left maxilla. (jaw) • Devascularisation of right forearm and hand with brachial artery tear below elbow and ulnar artery division at the wrist. (upper limb vascular injury) • Complex right-hand trauma with loss of P2 thumb, P2 index, open PIPJ ring, and distal pulp loss little finger. • Left orchiectomy. (testicle) • Traumatic left trans-tibial amputation. • Traumatic right trans-femoral amputation.

Table 3.1 Injury presentation comparing exposure to blast in vehicle vs foot patrol [66]

Mounted Patrol. In a mounted patrol, the armour of a vehicle protects inhabitants from projectiles and therefore the effects of secondary blast injury. It does not protect them from the blast wave or the tertiary effects of blast and so the casualty suffers predominately blunt trauma. As the blast wave travels through the floor plate, the impact upon lower limbs and pelvis causes multiple fractures and internal haemorrhage [104]. Head and spinal trauma is possible, especially if the victim is propelled within or out of the vehicle [105, 106]. Internal haemorrhage, particularly involving pelvic and head trauma is highly associated with loss of life [104, 106].

Within a mounted patrol, complex lower limb fractures of the tibia (shin bone), calcaneum (heel bone) and small bones of the feet can have devastating long-term impact [105]. Debate continues about how best to manage these fractures [78]. Limb salvage (treatment of these complex fractures to prevent the need for amputation) results in poor functional outcomes with ongoing chronic pain for many [107]. Most military patients, therefore, elect for amputation. Typically, these cases require trans-tibial amputation and so recovery and ultimate function is good [107].

Dismounted Patrol. The soldier on dismounted patrol is exposed to all four categories of blast injury. Personal protective equipment offers some protection to the torso; later development of this equipment incorporated the perineal region [108]. Peripheries remain exposed to projectiles propelled by the blast [109]. The anatomical disruption to major blood vessels causes extensive deep tissue contamination and soft tissue loss above the point of amputation making wound debridement and closure a lengthy procedure resulting in residual limbs of variable shapes and lengths [9, 101, 109].

Some common presentational characteristics exist, for example, upper limb injuries often combine with lower limb amputation as blast trajectory propel objects upwards towards the rifle arm [110]. However, each presentation is unique to its setting and circumstance. Levels of amputation and the prosthetic limb will now be explained. This contextual knowledge is required before understanding how DMRC rehabilitation services were configured.

Levels of amputation

Extremity injury in a war zone accounts for 50% of injuries [111]. Lower limb amputation became the signature injury in Afghanistan [101]. An amputation refers to the surgical removal of part or all of a limb [112]. An elective amputation is planned, consented to, and occurs as a surgical procedure. In contrast, a traumatic amputation refers to the loss of a limb due to physical trauma. The following terms are used to describe the varying levels of amputation found in Figure 3.2: trans-tibial (TT) (below knee amputation); knee disarticulation (KD) (a through knee amputation); trans-femoral (TF) (an above knee amputation); and hip disarticulation (HD) (removal of the entire leg including the hip joint).

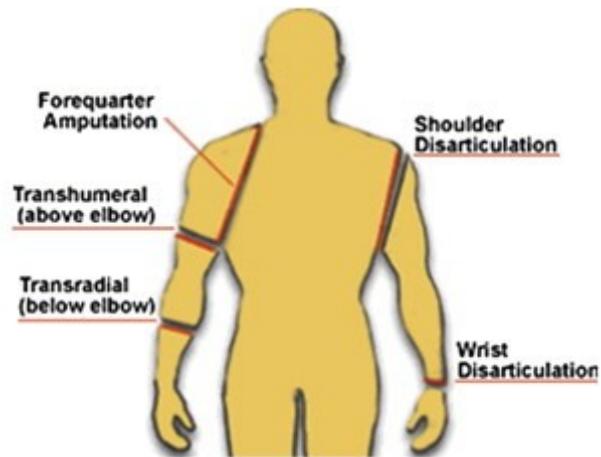


Image of upper limb amputations

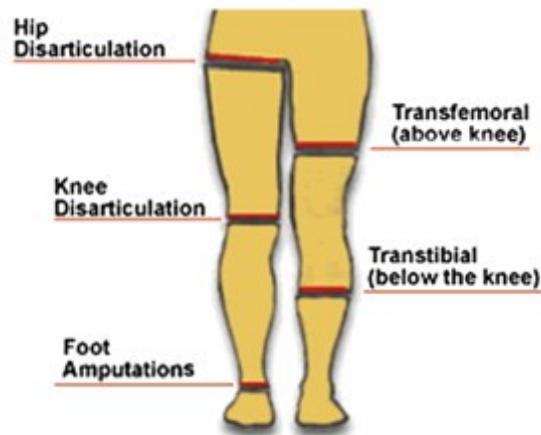


Image of lower limb amputations

Figure 3-2 Levels of upper and lower limb amputation ([113], p200)

Some military amputees experienced upper *and* lower limb amputation; the following terms used throughout the thesis:

- **Triple amputation:** Involvement of both lower limbs and complete loss of one upper limb at the wrist or higher.
- **Bilateral amputation:** Involvement of both lower limbs.
- **Unilateral amputation:** Involvement of one lower limb.
- **Residual limb or Residuum:** Remaining part of the limb on the amputated side.

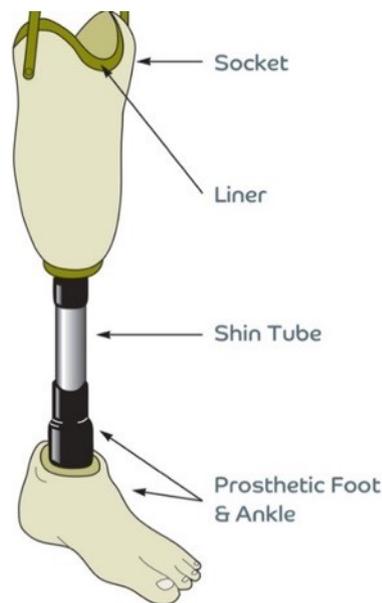


Figure 3-4 Trans-Tibial Prosthetic Limb [1]

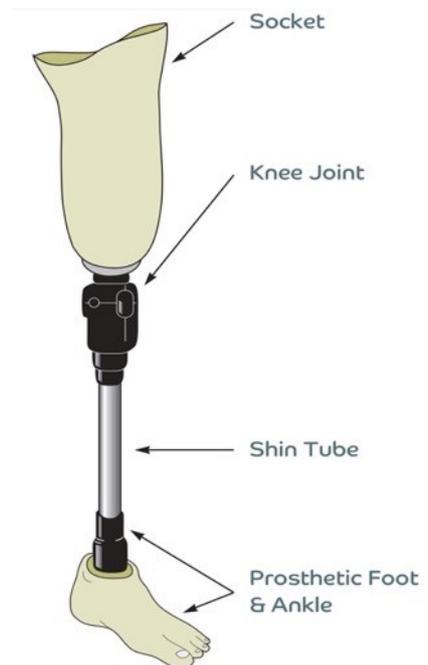


Figure 3-3 Trans-Femoral / Knee Disarticulation Prosthetic Limb (Hydraulic Knee) [1]

The Prosthetic Limb

The key components of an above and below knee prosthesis are shown in Figure 3.3 / 3.4). Every lower limb prosthetic includes an interface between the prosthetic limb and the residual limb. This is known as the socket. Each socket has a method of suspension by which the socket is retained upon the residual limb.

Socket. Manufacture and weightbearing will differ depending on the style of the socket, but a tight fit is required so that it does not slip when forces are applied through it. This allows the user to perform high impact activities and improves control of the whole limb. A socket fit which is either too tight or too loose can cause blistering or skin breakdown. Regular checks to ensure skin health are necessary. For up to 2 years following amputation, the residual limb can fluctuate in size. A consistent fit is difficult to achieve, and regular recasting of the socket is required.

In any lower limb amputation maintaining optimal length is paramount [114]. An elective amputation is a planned procedure and so the residuum is symmetrical with sufficient soft tissue coverage of nerves and bony prominence [115]. In contrast, a traumatic amputation results in a variable loss of limb [101]. In combat injuries, where blast is involved, soft tissue injury above the amputation site may also be apparent [66, 109]. In seeking to maintain the length of the residuum, soft tissue loss is accepted. Damage to soft tissues requires skin grafting or muscle flaps. This creates a residual limb which is uneven, with areas of

potential skin breakdown or pockets where infections can develop. Consequently, prosthetics for most military amputees are time consuming to fit and present a technical challenge to the prosthetist who must shape the socket to relieve pressure where the skin is vulnerable and ensure that soft tissue deficits do not compromise limb attachment [116].



Figure 3-5 Three types of suspension (A) Pila foam socket; (B) Pin liner; (C) Suction liner [117] (p1920)

Method of suspension. The method of socket suspension or attachment to the residual limb is commonly via a liner (Figure 3.5). Either a vacuum seal or a pin attachment is used. Alternatively, a pila (soft foam) sleeve can be used to create a pressure fit.

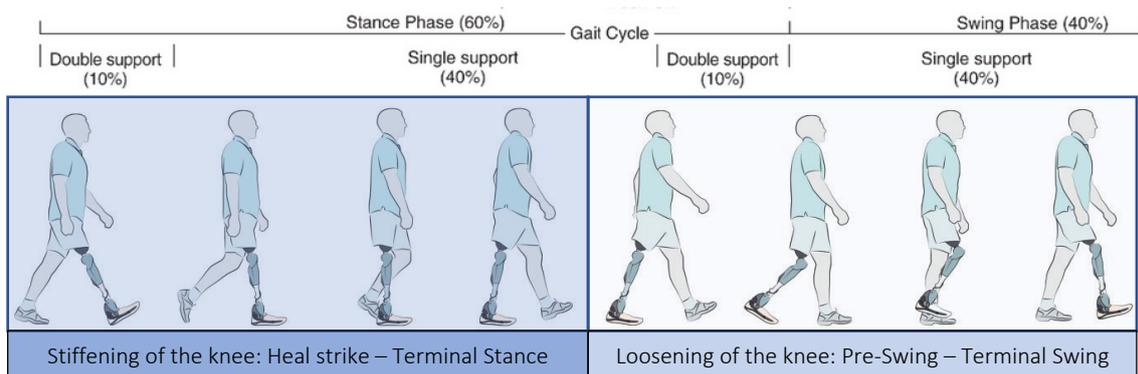


Figure 3-6 Amputee gait cycle and prosthetic stance [118] (p385).

Knee Unit. For both TF and KD amputations the knee joint used by the military patient is known as microprocessor knees (MPK). There is some variance across brands, but generally these units operate by sensing what stage of the gait cycle the user is in. From heel strike to terminal stance (Figure 3.6) the knee stiffens allowing weight to be placed onto it. As weight loads the toe during pre-swing, the knee is released

so it can swing through [119] There are many other features including providing protection from falling and support descending slopes.

Hydraulic knee joints were only initially issued to unilateral amputees at DMRC because they provide less stability than MPKs [119]. Using a 4-bar polycentric action, hydraulic knee flexion occurs within the centre of the joint, as with an anatomical knee. The knee is therefore stable when weight is passed directly through the centre of the joint (as with the remaining anatomical joint). However, the risk of falling is heightened with this hydraulic mechanism, and gait asymmetry can be more pronounced [120]. Although there is risk of later musculoskeletal degeneration with any mechanism, MPKs are associated with improved biomechanics, confidence and satisfaction [121]. Accordingly both UK and US military trans-femoral amputee populations were issued with MPK [120, 122]. Part 2 of this chapter now considers the challenge of rehabilitation, outlining provision within secondary care and progressing to DMRC services.

Part 2. Rehabilitation

The Rehabilitation Challenge

The Defence Medical Rehabilitation Programme (DMRP) established a *philosophy of care* built around a model of sport and exercise medicine [17] and recognised that for any musculoskeletal (MSK) injury, time is the enemy. Time away from training, physical activity and military duty could erode physical and moral capability to fight. Therefore, the DMRP modelled its delivery around five core principles, each seeking to bring momentum to the recovery process [17]:

- Early assessment and treatment
- Cross disciplinary working
- Active case management
- Rapid access to specialist opinion / investigations
- Exercise based rehabilitation.

Although the DMRP was not specifically designed to support the rehabilitation of blast injured patients its focus upon the recovery of function using an exercise philosophy enabled this patient group to return to the life they wished to live. However, recognising that physical decline within secondary care could prolong eventual recovery, military rehabilitation commenced with an active rehabilitation strategy at the point of survival, within the intensive care unit (ICU). Principles embodied within the DMRP, designed for the gym were therefore adapted and deployed within the critical care setting.

Throughout secondary care, prolonged periods of bed rest, mechanical ventilation and sedation have known adverse effects upon physical capacity [123-126]. Reduced oxygen uptake, skeletal, respiratory and cardiac muscle disuse atrophy, postural hypotension resulting from fluid loss, decreased stroke volume, decreased bone density, joint pain and loss of functional range of movement in joints are well documented [27, 123, 126, 127]. In addition, the hypermetabolic response recognised in burns and poly trauma cases further emphasises the systemic impact of diffuse injury upon the body, and the need to provide nutritional support to mitigate this effect [128, 129]. However, where active rehabilitation is pursued within the ICU, civilian research has shown reduced length of hospital stay, improved recovery outcomes and positive quality of life (QoL) [124, 125, 130]. Civilian research has also shown that an active rehabilitation approach can mitigate against losses in physical capacity. Whilst no equivalent military evidence exists, the preservation of function and physical capacity early in recovery, would, it was believed, expedite progress at DMRC and provide military patients with the physical strength, balance and coordination required to commence prosthetic limb

rehabilitation. Appreciating the military mindset, this approach was thought to support their psychosocial normalisation [4, 8, 10, 17].

Applying the DMRP within an acute hospital setting

Despite the high turnover of staff on clinical shift and the multiple procedural activities patients undergo, a consistent early exercise regime on ICU can be achieved when nursing and physiotherapy formally share rehabilitation goals [8]. This cross-disciplinary collaboration became part of an early mobilisation strategy at UHB with a mixed cohort of military and civilian patients [131].

Wound management is another clinical challenge that threatens to delay rehabilitation. Exercise is believed to help wound healing, but with deep tissue deficits and skin grafting common in this patient group, exercise could disrupt wound healing [8, 92]. The development of negative pressure wound dressings became common place. The vacuum within the dressing helped to remove swelling and prevent infection by removing contaminants, encouraging granulation (wound healing), as well as pulling wound edges together [132, 133]. For these reasons, exercise-based rehabilitation could commence almost immediately [8]. Collaboration between tissue viability nurses and physiotherapy needed to ensure application of this dressing to enable rehabilitation. Development of a tissue viability service at DMRC also meant patients could transfer more swiftly from UHB, joining others in a more familiar military setting. This appeared to provide significant psychosocial benefits [8].

These initiatives and the management of these patients through secondary care required active case management. The RCO role, discussed in [Chapter 2](#), was instrumental in co-ordinating information to relevant stakeholders working in two organisationally distinct organisations (DMRC and UHB) [8]. To illustrate, upper limb traumatic amputation often heals before a lower limb; evidence emphasises the need to fit prosthetics early so patients learn to function with upper limb prosthetics [8]. Therefore, DMRC clinicians attended UHB to support this need. Meanwhile, patients at DMRC suffering complications and requiring surgical assessment or revision could be fast tracked back to UHB. Examples like this show forms of collaboration developing, dependent on requirements. Under RCO leadership, the military rehabilitation team embedded within UHB, became accountable for the enactment of DMRP principles. The momentum this brought to military amputee patient prepared them for the physical challenge awaiting them at DMRC.

DMRC (Defence Medical Rehabilitation Centre) Headley Court

Before describing the DMRC rehabilitation process, it is necessary to differentiate between multi-disciplinary and interdisciplinary working, as both terms will be used frequently. A multi-disciplinary team (MDT) is a group of professionals who pursue professionally specific goals in parallel with other disciplines or

specialisms [134]. An interdisciplinary team (IDT) is a mixed team of professionals from different disciplines or specialisms who share and pursue the same goals in collaboration [134].

DMRC Headley Court was the national rehabilitation centre for British Forces. As a specialist residential rehabilitation facility, this Consultant-led, multi-disciplinary service had changed little in structure or role since its establishment after WWII. However, the impact of MSK injury upon deployability required a more responsive and regionally centred solution that led to the establishment of Regional Rehabilitation Units (RRUs). Consequently, DMRC catered for an eminently more complex and chronic patient population. Each department (physiotherapists, occupational therapists, exercise rehabilitation instructors, social workers etc) provided their own structured physical rehabilitation solution defined around their specific roles.

In 2006, operational casualties started to arrive at DMRC. Their complexity and volume overwhelmed this departmental system of provision. Mono-disciplinary departments worked in parallel, coordinated by a lead consultant. Although commonplace across healthcare, there is recognition that such a system is suboptimal in complex care settings [11, 135]. Complex settings require a free flow of ideas and information yet disciplinary boundaries prevented this; repetition and overlap of provision created a confused and poorly coordinated services [12]. Introduction of new services (prosthetics, tissue viability, mental health, dietetics) shifted the cultural dynamic at DMRC, introducing new staff and ways of working. Meanwhile, the patient group had attracted intense political, media and military scrutiny, which in itself introduced a new cultural dimension [136]. An integrated IDT structure, centred upon the patient, was needed.

A new team was created outside of DMRC's departmental system; Complex Trauma (CT). Like PHEC and RRUs, CT adopted an IDT organisational structure. Physiotherapist, prosthetist, Occupational Therapist (OT), clinical administration and other specialists co-located to organise treatments, group therapy, and share assessments. The aim was to create an interdependent team to operate within a complex system with the capability and capacity to interact amidst the unknown [137].

The organisational challenge

Both volume of admissions and presentational complexity exposed the failure of a hierarchical disciplinary led healthcare system to deliver an integrated solution [14]. In 2006, DMRC allocated 4 beds for Complex Trauma (CT) patients; within 6-months this had increased to 20. Increased troop numbers in Afghanistan in 2009 resulted in a surge of casualty numbers [63]; between July – December 2009, CT beds increased from 30 to 60 [17, 18]. At the peak of the conflict in 2011/12, the annual admission rate into DMRC for CT alone was approximately 950 beds; equivalent to the annual number of NHS trauma beds in specialist rehabilitation for the whole of England [18].

These complex circumstances and the success of CT brought about a realisation that this complex system was common to all teams. Consequently, the interdisciplinary CT model became a DMRC strategy. Therapy departments were dissolved to form an IDT centred around specific categories of patient need [62]. Increasing casualty numbers placed unprecedented demand upon UHB [138], requiring patients to be transferred to DMRC more quickly. In response, DMRC needed to enhance its acute nursing capability. Concern for the mental health of these casualties also led to the introduction of a mental health service. However, both capability enhancements at DMRC were governed by professional hierarchies outside of it. This led to two, separate, professionally autonomous MDT departments (mental health and acute nursing) co-existing alongside the IDT, serving the same patient group, in the same location, at the same time.

Regaining Independence

Limb loss requires an individual to acquire the skill of using a prosthetics and *also* adjust to how they perform daily household, self-care and transportation activities [99]. Whilst evidence on amputee rehabilitation existed, the military population differed greatly in nature [139]. The subsequent rehabilitation approach developed by UK and US military [122] based on DMRP principles of occupational health need and developing physical exercise capacity and capability is outlined in the following sub-section [140].

Patient goals are realised as they re-connect with their friends and family and adjust to their circumstance. Critically, it is actively managed or coached by the clinical team. The social dynamic is, therefore, a key part of this component. Building physical capacity necessitates a timely rehabilitation process that seeks to access required medical resources to maintain momentum. It also requires consistent sufficient volume and regularity of input to ensure physiological adaptation. For the patient this philosophy informs prosthetic provision, training, and therapy, centring upon an exercise-based approach and upright ambulation [122]. This rationale is based upon positive associations between mobility and quality of life found in civilian and military studies [141-143].

Exercise-based rehabilitation

The incorporation of exercise rehabilitation within a CT rehabilitation is justifiable owing to known physiological mechanisms of musculoskeletal adaptation, improved strength, endurance, range of motion and balance [144]. The positive influence of exercise upon mood state is also recognised [145]. Narrative accounts from those who have suffered permanent disablement further justify the complex role of sport and exercise within a rehabilitation system, illustrating how it can reorientate motivational goals through social interaction and collective engagement [146]. For those who have suffered traumatic limb loss, upright ambulation is a widely recognised goal in attempting to normalise following trauma [147]. Appreciating the

unknown psychosocial impacts of traumatic limb loss and circumstances surrounding these events, exercise supports physical and biopsychosocial recovery.

In the early stages, exercise focusses upon pre-prosthetic and prosthetic training to enable the wound to withstand shear and prosthetic loading as well as, for example, soft tissue mobilisation and proprioceptive exercises to optimise prosthetic biomechanics [148]. A focus upon optimal biomechanics justifies early definitive (casted to the individual) prosthetic fitting; a departure from civilian models of care [149]

Civilian practice utilises an early walking aid (EWA) as an interim solution to teach prosthetic walking, whilst fluctuations in limb oedema settle [150]. An EWA, such as the PPAM-Aid (See fig.3.7a) is less costly than having to perform recurrent socket recasts as the limb shrinks in size following surgery, and some argue its use enhances outcome [151]; yet, this research compares outcomes in an older less active cohort and between EWAs and wheelchairs. UK and US military practice opted for definitive sockets (fig 3.7b) as soon as wounds permitted to enable normal load bearing through the socket and familiarity with how MPKs operate. This minimised biomechanical adaptation during gait, accentuated when using an EWA [152]. Definitive sockets could be worn for longer, helping to shrink the stump and provide visual and sensory perception of having a leg; shown to reduce phantom limb pain (PLP) [153, 154].

Complex wounding led to more bilateral lower limb amputations and the use of stubbies, prosthetics with a definitive socket and a lower centre of gravity to make mobility easier and safer (fig 3.9a)



(a)



(b)

Figure 3-7 Early Walking Aid and hand casting for a prosthetic socket: (a) PPAM-Aid (Pre-prosthetic amputee mobility aid) [155]. (b) Hand casting for a TT prosthetic socket

Prosthetic fit and comfort

In addition to the residual limb issues noted earlier, fluctuations in limb oedema, common in the early months following amputation, affect prosthetic fit [150]. Skin folds, vulnerable soft tissue and excessive sweating of the residuum can make infection a constant adversary, for which vigilance and hygiene is the only protection. Management of these issues must be learned by each patient. Open access to the military prosthetic service was maintained to encourage patients to highlight issues quickly to prevent more serious

complications arising that required prolonged periods off prosthetic limbs. Close partnership between prosthetics and physiotherapy promoted problem solving and creative resolutions [147]. A description of the prosthetic training programme illustrates how exercise and functional gait training were applied.

Prosthetic Rehabilitation Programme

Prosthetic training (fig 3.8/3.9) developed over time as clinicians refined their practice, eventually resulted in a three phase (beginner, community user, advanced high activity) training programme seeking to build competence, initially using one-to-one core skills training but later applied in a group situation. Progression on prosthetics occurred in consensus between physiotherapist, exercise rehabilitation instructor (ERI) and prosthetic specialist. Patient involvement in these discussions existed to inform progress criteria for self-monitoring purposes. Once a patient was safe walking on full length prosthetics with a free knee, they took an active role determining what they needed to learn.

Training exposure in real life settings was an important part of this phased approach. A fundamental component of *on* prosthetic training, was strength and conditioning work in the gym targeting joint range and muscular control. It is believed this ultimately determines what level of prosthetic function a patient achieves. Prosthetist, physiotherapist, ERI and OT work together to achieve this intervention.

	Phase 1: Beginner	Phase 2: Community User	Phase 3: Advanced High Activity
CORE	<ul style="list-style-type: none"> • One to one: Physio, ERI & OT • Group Exercises Classes: ERI • Individual Exercise Programme: ERI & physio • Community Access Programme (work & leisure): OT, recreational therapist 		
GROUP THERAPY	Stubbies Class (bilateral skills) (physio) (Figure 3.9a)	<ul style="list-style-type: none"> • Long Legs Class (beginner bilateral prosthetic knees) (physio & prosthetist) (Figure 3.9b and c) • Boot Camp Class (advanced bilateral prosthetic knees) (physio & prosthetist) • Unilateral Class (Unilateral skills) (physio) • Pre-running/impact skills (physio & ERI) 	<ul style="list-style-type: none"> • Running Skills Class (physio & ERI) • Boot Camp Week (Advanced bilateral skills/endurance) (physio & prosthetist) (Fig 3.9d) • High Activity Group (Advanced unilateral sport/endurance) (physio, prosthetist & ERI)
PROGRESSION	If using stubbies for 4 hours + per day, progress to community user (phase 2)	Once able to use long legs prosthetics for a whole day driving, shopping, community activity in and out of the home – progress to Phase 3 (Advance High Activity).	

Figure 3-8 Phases of DMRC Prosthetic Rehabilitation [66]



a. Stubbies train early mobility/balance



b. Early teaching unaided slope control on grass



c. Progressing to slope training on tarmac



d. Advanced unaided steps – no handrail

Figure 3-9 Examples of skills taught during prosthetic training.

Adaptable Holistic Approach: Real world training.

Emphasis upon a functional training approach meant rehabilitation moved quickly into the real world. Delivered principally in group therapy sessions, it sought to encourage skill sharing between peers and clinician instruction. Its purpose was to provide meaning to the rehabilitation task and broaden environments and activities the amputee had exposure to. Optional sessions were offered, for instance, in aquatic therapy, yoga, mindfulness, relaxation, wheelchair skills and horticultural therapy. An example of a typical week's provision is found in fig 3.10.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
0815-0830	Parade	Parade	Parade	Breakfast Club 08.00-09.00	Parade
0830-0900	Physio / Prosthetics	IP Team B	Physio		IP Team B
0900-0930					
0930-1000		Prosthetics			OT
1000-1030	Glutes & Core			Horticulture	
1030-1100			Yoga		
1100-1130	Driving				
1130-1200	Assessment		CPN	SW	
1200-1230	Lunch	Lunch	Lunch	Lunch	Lunch
1230-1300	Lunch	Lunch	Lunch	Lunch	Lunch
1300-1330	Lunch	Lunch	Lunch	Lunch	Lunch
1330-1400	Long Leg Class	Hydro	OT	Physio / Prosthetics	
1400-1430					
1430-1500	Wheelchair skills class		Ward Round		
1500-1530		Physio		ERI 1:1	
1530-1600	ERI 1:1	Rec Therapy	IP Team B	Rec Therapy	
1600-1630					
1630-1700					

Figure 3-10 Example of a patient timetable when admitted for PIRR

Rehabilitation sessions were supported by non-clinical activity providers. Battle Back, is a charity supporting injured personnel seeking to access adaptive sport and adventure. Run by military and ex-military sport and adventure training instructors it quickly formed links with DMRC. This sporting programme had a positive impact upon mental and physical health outcomes as it provided patients with focused goals and challenges. Activities included winter sports, water sports, cycling, ironman, shooting, fishing, and climbing. Using sport as a skill-based training has been shown to facilitate a narrative of assimilation and positive accommodation within their recovery [146]. Together these narratives provide a mastery experience, enhanced relationships, helping them to re-capture life meanings around an athletic identity [146, 156]. Interest based activities developed skills they may not have had before, overcoming personal challenges in a mutually supportive environment in which peers unwittingly shared how they adapted to life with disability. These social bonds enabled 'proactive coping' ([157], p5) a phenomena where individuals can vent, use humour and find acceptance amongst peers. This social process is reliant on connection with others and it is inversely related to the development of post-traumatic stress (PTSD) [157]. This together with the recapture of previously held identities are seen as examples of post-traumatic growth (PTG) [146]

Research exploring processes involved in PTSD and PTG observed 20 tsunami relief workers in which proactive coping, coexisted with social connection, life appreciation and exploration of new possibilities [158]. Whilst debate exists over how these social processes and observable outlooks are best captured, consistent findings reported in individuals recovering from natural disaster, terrorist incident, personal attack, devastating medical diagnoses provide evidence for the importance of PTG [159]. A survey of 1400 UK military personnel engaged in combat operations provides further support for the role of group cohesion in providing resilience during crisis [160].

Whilst Battle Back and other similar initiatives may appear an unnecessary risk to the process of recovery, the group nature of these activities provide a cohesive effect by clustering those who have endured a common experience. In both clinical and non-clinical settings, they acquire new skills and interests gaining a collective story of experience to be shared between themselves or beyond that social context. Social identification and cohesion together with a narrative of assimilation, allows the individual to identify around a pre-existing story and thereby consider new opportunities based upon ability rather than disability [146].

Group therapy: Peer Support

Military training by its very nature is orientated around team culture [161]. Military rehabilitation capitalised upon this and developed the concept of 'group therapy' using clusters of patients with similar abilities or needs [66]. Each group (Fig 3.8) focussed on a specific component of gait or function with the aim of building confidence, tolerance, and muscular control. More advanced classes applied the same aims using

higher load activities. Group sessions allowed opportunities for clinicians and patients to share experiences and tips. The relative mix of patient ability also provided valuable mentorship within the amputee cohort; providing a connection between patients through humour, competition and mutual learning [162]. Participant quotes from Neal [162] exemplify this.

You got a lot off your mates as well. Everyone's in the same boat here, like (name), he was in the same incident as me. So, it's ...good that me and him are together 'cause it means I have someone to talk to. (T8)

When we're together the worse injured guys I've ever met and we have a laugh about it (eh) it doesn't bother us.. (T7)

...guys motivate each other or...If he can do it, well why shouldn't somebody else. At least here you know that other lads have had wounds which were horrendous and have finally healed up. Neal [162] (p i67)

Connection also takes different forms. Patients find understanding, know they are not alone, are motivated by others who have come through the issues they face, using humour [162]. Group therapy was an efficient way to teach and practice skills through community learning, but these quotes evidence proactive coping, emerging as a product of this group process [159].

Periodic Intensive Residential Rehabilitation (PIRR):

Rehabilitation conducted in residential blocks of time, allowed space for prosthetic recasting, resolving any fitting or activity issues and the support of more complex social or psychological presentations. Admission lengths varied dependent upon need. The intent of this design was to create intensive blocks of activity, allowing consolidation of skill and physiological overload from intensive exercise followed by home leave. This rhythm of rehabilitation mimicked the concept of periodisation used in elite sport training [163, 164]. Periodisation is a concept that allows the athletic trainer to manipulate training parameters to maximise physiological adaptation around fitness components needed by the athlete [165]. For example, periods of initial admission emphasise endurance, flexibility, and dynamic stability. As endurance develops, the focus changes to strength and power. Prosthetic training and intensive exercise rehabilitation could have invoked exercise overload, however, periods of active rest at home provided recovery [165]. Periodic training provided a structure and purpose to sessions, targeting strength, technique, and endurance. However, it also formalised periods of active rest, facilitating physiological mechanisms of muscular adaption [165] and the reality that this patient group may still have had elevated metabolism from trauma. Patients could return home to consolidate skills in real life settings. Confronting the reality and challenge of prosthetic use at home and in public spaces thereby informed future therapy goals. Intensive residential blocks also provided time for clinicians to work together with patients, and so community between patient and clinician developed alongside peer group support [162].

Complex Trauma Rehabilitation Outcomes

The mean duration of rehabilitation for military patients is 34 (± 14) months (Unilateral: 39 (± 15) months; Bilateral: 33 (± 10) months; Triple 44 (± 9) month) [4]. The frequently stated aim of military rehabilitation is to support a level of recovery enabling a high quality of life (QoL) [140]. To achieve this aim it is important to understand from research how amputation and its functional challenge affects perceived QoL.

In a 28-year outcome study on Vietnam war veterans suffering TT amputation, those sustaining an isolated TT amputation went on to lead normal productive lives not dissimilar to a uninjured population [166-170]. Veterans in the same study sustaining multiple injuries, in addition to a TT amputation, were found to have a significantly lower QoL [143, 170]. A comparison of Vietnam veterans with US veterans from conflicts in Iraq and Afghanistan also found little difference in QoL reports between cohorts, and notable declines in function and wellbeing with age [169, 171]. A systematic meta-analysis investigating US and UK outcome data following combat related lower limb amputation confirmed findings reporting greater long-term health consequences as a result of more extensive wounding and a higher amputation [143]. Civilian research shows a similar pattern, with QoL having an inverse relationship with severity of injury [114]. Substantial differences in rehabilitation provision between military and civilian populations make direct comparison of outcome difficult. Nevertheless, all these studies show that a TT amputation increases the likelihood the individual will achieve independent prosthetic mobility, return to employment, enjoy high activity levels and so report a higher QoL [143]. Whilst mobility is seen as the key factor in QoL for those with limb loss, a study of PTG shows the influence of social or psychological factors upon QoL [172]. For instance, financial provision offered to seriously injured personnel with a TF amputation, might remove the need for employment, but consequently isolate the individual, whilst TT amputees remain in employment, reporting a higher QoL due to ongoing social engagement and not mobility.

QoL scores provide an idea of outcome but a comparison of scoring in each domain enables greater scrutiny of influential factors [172]. In younger civilian amputee cohorts, the physical domain is principally affected [173]. Those reporting higher QoL scores are the most active and proficient prosthetic limb users [173]. These studies compare amputees who had suffered loss of limb because of bone cancer; younger subjects achieved high functional capacity on prosthetics and reported a high QoL – older subjects reported lower activity, a raised perception of disability and lower QoL. Although activity level and self-reported QoL are associated in most studies, it is not possible to confirm that activity level determines QoL [114, 143, 174]. Cohorts of combat injured military personnel are generally more homogenous in terms of cause of amputation, age and demographics when compared to civilian research [141]. A recent systematic review notes the importance of physical activity and social connection upon QoL in veteran populations, the authors noting similarities with civilian research [122, 141]. However, the interaction between physical and social

factors upon QoL is unclear. Social connection either encouraged purposeful daily activity or physical activity enabled social connection, elevating QoL [141].

Sample variance (age, cause of amputation, comorbidities) in civilian studies and the multifactorial nature of QoL make interpretation difficult. In a cross-sectional study of 437 patients, mobility and residuum pain are shown to be the most important determinants of QoL when using SF36 [175]. However, pain and particularly PLP, is a multifactorial issue; it is not possible to ascertain if researchers controlled for co-existing influential biopsychosocial factors [175]. In a survey of 415 unilateral amputees, Asano [176] reported that depression explains 30% of the variance in QoL, followed by mobility (6%) and social support (2%) [176]. Elsewhere, social connection is reported to have a greater influence upon QoL than mobility [173]. The difficulty is that sample variance and the multidimensional interactions between psychological, physical and social factors create a complex non-linear research setting, which a conventional linear research design can only partially address [11]. A complexity informed research design adopting a mixed method strategy can overcome this issue to provide a context specific understanding of how systems form and interact [11, 135].

Time is also an important factor when comparing outcomes. QoL appears to diminish greatly following amputation, but recovers as an individual psychologically adjusts [176]. For the traumatic amputee and those who suffer major trauma, the psychological impact and adjustment pattern is similar, as neither group have prepared for their loss [176, 177]. Long term physical function in civilian populations who suffer traumatic amputation appears to be consistently poor [114, 178, 179], with one study reporting that after seven years, only a third of participants were able to match the physical outcomes of a healthy population [179]. Whilst recognising improved outcomes achieved where intensive physical rehabilitation strategies have been employed [180], there is a general lack of clarity around what, if any, formal rehabilitation has been provided.

Sociodemographic and personal factors are significantly associated with outcome. For instance, non-white, older, female subjects and those from economically disadvantaged backgrounds are less likely to optimally recover [179]. Whilst younger individuals with strong family and significant other bonds and the ability to maintain or improve economic status are reported as strong indicators of a growth mindset leading to positive recovery [141, 159, 177]. It must not be assumed, therefore, that traumatic amputation results in poor outcome. The influences of clinical, personal, and contextual mediators upon engagement within the rehabilitation process, demands that this process is personalised. Intervention must be designed for the individual, rather than predefining a formal care pathway within which the individual must fit [122, 148].

Within CT rehabilitation, the characteristics of the patient informed care philosophy but not its specific content. The military patient is young, active and a risk taker, their training emphasising resilience, perseverance, initiative, and teamwork. Their cultural identity emphasises adventure, travel, freedom,

family and belonging, [161]. A context offering to fulfil this identity, will attract the soldier, offering the opportunity to fulfil this identity [161]. In this scenario, mobility would support their psychosocial need for belonging, freedom and adventure. How they seek to achieve their identity, is specific to the individual, and so patient centred goals provide the vehicle for identity fulfilment [146]. Reported variance in QoL reports may occur because of differences in how individuals interpret their identity and their ability to fulfil these identity needs [176]. However, their memory of the incident may interrupt this process of identity fulfilment and opportunity recognition owing to guilt, flashbacks or impact upon sleep [157, 159]. Psychosocial influences may directly impact engagement in rehabilitation and QoL outcome as much as physical attainment [181]. However, this psychosocial component is complicated. Responses may determine individual appraisal of role, group identity and belonging [182]:

'...the whole experience of being wounded you're going through this transition. I think the hardest thing is family life, trying to get back into family life. Re-assuming the role you had before because everyone treats you differently and they still do, they can't help it and (err) the public persona, people looking at you differently ... (T2).' [162] p66)

This realisation and sense of disempowerment is reported in biographical accounts written by wounded service personnel during their recovery [183, 184]. In his ethnographic study Neal [162] interviewed 10 military amputees prior to medical discharge to explore the impact of wound complications upon rehabilitation. The study narrative and analysis casts much broader light upon military rehabilitation, and the journey faced by the military amputee.

... You kind of like climb a mountain in rehabilitation...where I have gained or regained some independence...being quite proud... that you are becoming an independent person. When you're on the battlefield...in a war...fighting someone, you're absolutely at the top of your game. So when you're injured and it slams you right down to the bottom ...you climb your way back up. (T1) (Participant quote from [162] p66)

This quote recognises the pursuit of independence or autonomy from the constraints of injury and pride in recognising their achievement. An earlier [quotation](#) identifies that this individual effort is empowered collectively and facilitated by the residential style of rehabilitation at DMRC. Junger [185] calls this a *suffering community*, in which proactive coping is enabled by empathy. Neal [162] sees community formed around social learning, a concept known as a Community of Practice (CoP). This concept will be discussed in Section 2. Therefore, whilst CT rehabilitation started with a heavy emphasis upon physical and functional outcome, it evolved into a partnership between physical, social, and psychological components of care. The exact composition of these elements was determined by each individual patient.

Measuring Outcome

The measurement of outcome informed this evolution. A basket of outcome measures provided DMRC staff with assessments of physical, social, and psychological progress, as well as QoL (Table 3.2).

Outcome measure	Purpose
Generalised Anxiety Disorder– 7 (GAD-7) Assessment [186]	Self-administered Screening and severity measure for generalised anxiety
Patient Health Questionnaire – 9 (PHQ-9) [187]	Self-administered Monitors depression severity
Special Interest Group Amputee Medicine (SIGAM) [188]	Self-administered Mobility grading
Amputee Mobility Predictor – Wearing a Prosthetic AMPPRO [189]	Therapist administered Functional status +/- prosthesis
6-minute walk test (6MWT) [190, 191]	Therapist administered Performance based measure of functional exercise capacity
EuroQol 5 dimension (5Q-5D-5L [192]	Self-administered Quality of Life score including the following domains: mobility, self-care, usual activities, pain/discomfort, anxiety/depression

Table 3.2 Outcome measures used at DMRC with military patients who had suffered limb loss (adopted from [66])

The outcomes derived were a mix of physical measures and questionnaire-based assessment. Six-minute walk test (6MWT) performed on a flat indoor surface requires participants to walk 20m, pivot around a cone and return. The number of metres walked in 6 minutes provides an indication of indoor endurance, balance, prosthetic skill and fit [191]. Some researchers use a quadrant configuration [193], requiring less pivoting and so distances walked tend to be greater.

Using these outcome measures, a group of UK military amputees were tested at the end of their military rehabilitation [4]. An uninjured age matched control achieved six-minute walk distance (6MWD) of 459-738m. On completion of rehabilitation, 78% of unilateral amputees, 52% of bilateral amputees and 33% of triple amputees completed an equivalent distance [4]. Whilst acknowledging the considerable variation in published mobility outcomes, civilian amputees suffering traumatic amputation appear to walk more slowly and use more energy even when using similar prosthetics [121, 180]. A later study compared kinematics and metabolic expenditure during straight line walking in the gait laboratory. Military amputees (Unilateral TT n=10; unilateral TF n=10; bilateral TF n=10) were compared with an age matched uninjured control group (n=10) [4]. Spatial, temporal and metabolic parameters of gait were significantly more efficient in the military cohort than in any known published study, even when compared to age and prosthetically matched civilian amputee groups [121, 180]. A more symmetrical gait, with narrower stride and a greater step length meant that self-selected walking speed was higher than comparable studies [121, 180]. Greater efficiency of

gait, meant oxygen capacity was also lower than any study had previously shown, indicating that the physiological demand of walking was less in this patient group [121, 180].

AMPPRO is a measure of observed functional ability when wearing a prosthetic. A series of balance tests are performed assessing transfers, sitting, standing and gait. It has been shown to have test-retest reliability and interrater reliability [189, 194]. Data from British and US military amputees is comparable for unilateral and bilateral amputees with mean scores between 41-46 [4, 195]; a non-amputee community walker would achieve a score between 37-42. An active adult or athlete would achieve a score between 43-47. In Ladlow's [4] study of 54 military amputees, 91% achieved a score equivalent with a community walker, and 75% achieved AMPPRO scores equivalent to an active adult.

SIGAM provides a validated self-reported mobility grade that enables comparison between people with amputations [188]. The measure is graded A-F, with F being achieved by those who report they can walk anywhere, in any weather without aid. Ladlow [4] graded 91% of military amputees as F (unilateral = 100%, bilateral = 91% and Triple = 63%). The British Association of Chartered Physiotherapists in Amputee Care (BACPAR) recognise that SIGAM has good reliability, but insufficient research exists to validate this measure [194]; nevertheless it is used widely in military rehabilitation [196].

Mental health outcomes were measured using PHQ-9 (Depression) and GAD-7 (Anxiety). Military populations are expected to be at greater risk of anxiety and depression [4, 197, 198]. Ladlow [4] found no difference in PHQ-9 and GAD-7 scores when comparing the amputee cohort with controls. Over familiarity with these measures due to recurrent testing at DMRC may have caused under-reporting. This study was also conducted when patients were admitted to DMRC and may be reflective of their mental health whilst co-located with their peers, engaged in an active rehabilitation setting. Further clarification is needed, as these findings differ significantly to both military and civilian studies [199].

Collectively, this research illustrates significant achievements made by many military patients on both sides of the Atlantic. However, these studies suffer from selection bias, attracting volunteers already independent on prosthetics. More comprehensive sampling across the military amputee population is needed if an accurate assessment of physical and functional outcomes is to be achieved [4, 180]. These trials took place before military personnel who had suffered injury in Iraq and Afghanistan had transitioned into civilian life. Part 2 of this chapter reports that in both military and civilian populations who have suffered limb loss, QoL and physical function are associated, although the primacy of this association is unclear. Physical, social, and psychological factors interact and thereby influence QoL, but the determinants of this interaction are unclear. This early research, whilst informative, is limited in both scope and application.

Kinematic data from this military amputee cohort raise further questions. In seeking to explain her findings, Jarvis [180] matched a military cohort with an age and prosthetically matched civilian population. The military cohort remained significantly more efficient and functional on prosthetics. This would suggest either group characteristics or the intensive nature of the military rehabilitation were influential [180]. A deeper understanding of the military rehabilitation service, and the characteristics of this cohort is needed. Given the significance of aging for this population, an examination of physical, social, and psychological outcomes is required to provide a more conclusive picture of their ongoing need as they transition from soldier to veteran.

Part 3 Transition: Journey from soldier to veteran.

In this thesis, rehabilitation represents the activity which enables the restoration of function following injury. *Recovery* represents a broader more holistic concept as defined by the Recovery Science Research Collaborative (RSRC):

“Recovery is an individualized, intentional, dynamic, and relational process involving sustained efforts to improve wellness.” [200], p183

This definition captures the complex psychosocial adjustment which is relational and involves identity and social role [200]. On-going military service is often not possible following extensive trauma, resulting in medical discharge and transition back to civilian life. Military to civilian transition (MCT) in this context has been defined as the process of ending a military career and reintegrating back into civilian life [201, 202]. Transition is a necessary part of the recovery process, confronting the individual with a loss of career, military identity, accommodation, and connection with peers [203]. MCT exerts a profound change, to which the individual must intentionally seek to adjust. Understanding MCT contextualises the veteran accounts in this thesis and illustrates how this process can be supported without interrupting recovery [203].

A Historical View of the Military Transition Process

Since 2010, the organisational process managing MCT, has been centralised and became a distinct entity. Prior to this, it was managed at unit level. Where rehabilitation was involved, vocational Occupational Therapists (Voc OT) would actively engage to support injured soldiers to align rehabilitation with employment and training. However, there was no uniformity of provision, and as casualty numbers increased notable gaps in welfare provision became apparent [201].

In 2008, defence wide convalescent centres, known as Personnel Recovery Units (PRUs) were created to help manage injured personnel. Those unable to return to duty were transferred to PRUs to manage discharge and transition. Contracted career transition advice and training facilitated their exit. But the on-going operational impetus undermined continuity of staff and support to personnel and their families. The segmentation of this service from defence rehabilitation meant that transition plans were made by a contracted provider without specialist medical or rehabilitation input [204]. All the veterans participating in this thesis transitioned prior to the 2010 system [203].

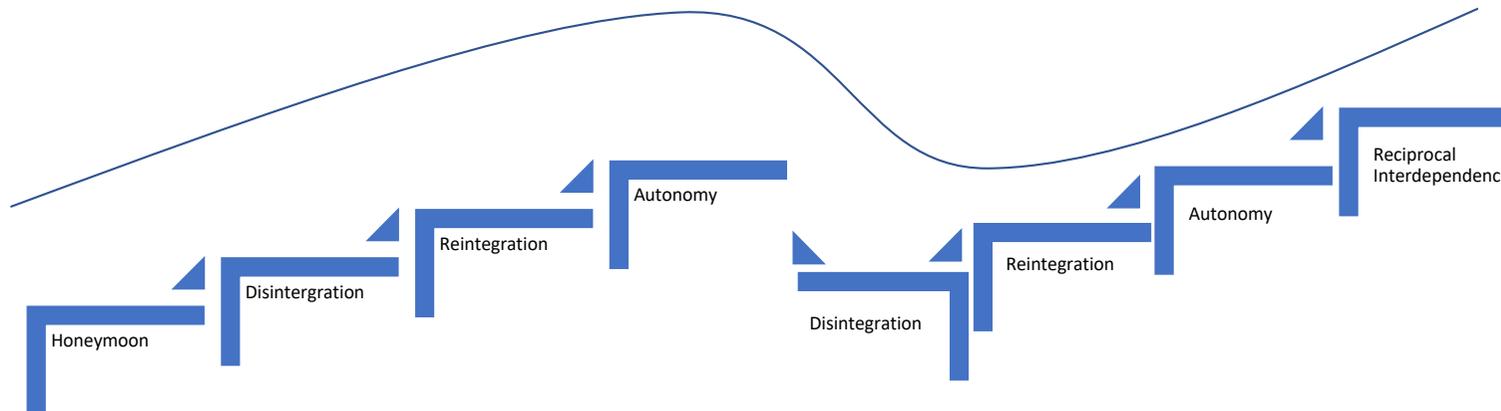
This process also brought to attention on-going prosthetic support needs for the transitioning patient who had suffered service-attributable amputation [205]. The MoD had an annual prosthetic budget of £20,000 per patient in contrast to the NHS's £900 per patient [205]. NHS Prosthetic services are largely run by locally

contracted providers [205]. In 2006, (as military casualties started to arrive in significant numbers), trauma only accounted for 7% of admissions, with peripheral vascular disease making up 72% [206]. A funding shortfall, together with national variation across contracted providers, catering for a distinctly different cohort, caused concern about whether NHS providers could support this growing veteran community. The Murrison Report was commissioned in response, to investigate potential options to bridge gaps between defence and NHS provision [205].

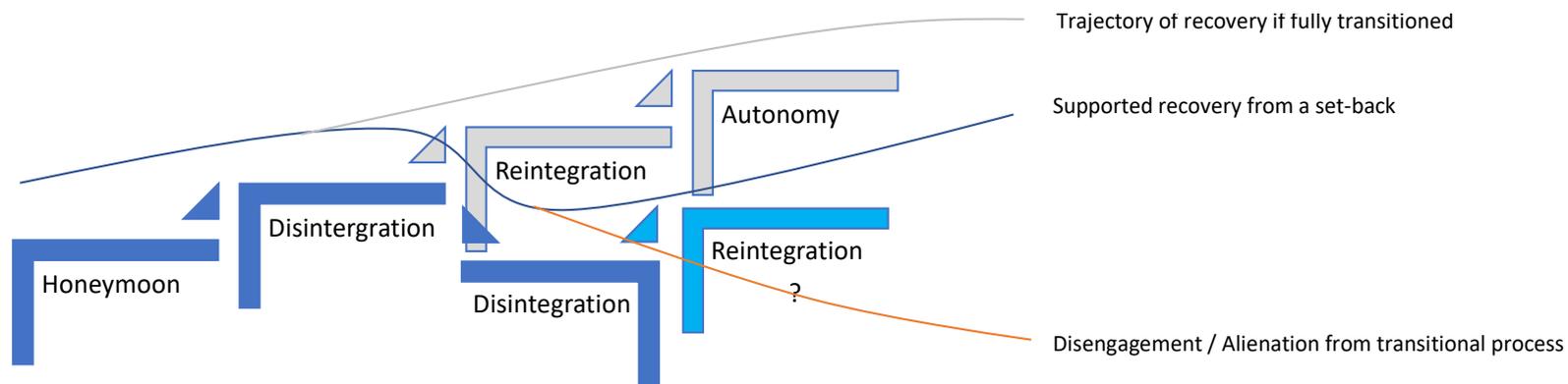
All 12 recommendations made by Murrison [205] were accepted by the government [207]. Specialist centres (n=9) were proposed across the UK offering prosthetic and rehabilitation support to veterans. Key among the recommendations was the need for a greater exchange of prosthetic knowledge and adapted working practices between military and NHS facilities. A Veteran Prosthetic Panel (funded by the MoD) was established to fund prosthetic parts and approve new prosthetic componentry as health needs emerged [208]. Comment on additionally funded rehabilitation was lost within the detail of the report and the opportunity to integrate prosthetic provision with mental health and surgical services were also never realised [207]. Nevertheless, enhancement of NHS prosthetic services for the veteran offered a more consistent transitional journey and a promise of future provision.

Transition: The Individual Impact

Little evidence exists in the literature relating to MCT. This part of the chapter, therefore, relies on applying theory and findings from related social groups. An understanding of transition commences with an acceptance that military culture is distinct from civilian life, and recruits will undergo a process of socialisation during training. Sociological theory can therefore shape an understanding of MCT, as the reversal of this process which commenced for the individual as a recruit [156, 161, 209]. How personnel approach transition depends on their background, experience and contextual understanding [156, 161, 209, 210].



a. Theoretical model of transition using 5-Stage model of culture shock, showing the impact of a set-back having fully transitioned (Bergman 2014)



b. Model of transition using 5-Stage model of culture shock, showing the impact of a set-back having not fully transitioned and theoretical trajectories of subsequent recovery (Bergman 2014)

Figure 3-11 Modelling transition using Bergmans [211] synthesis of theoretical models of culture shock

Social identity theory, explained more fully in Section 2, has been used to explain the formation of camaraderie and cohesion during recruit training and in operational military units [212-214]. As recruits seek to embed a military social identity within their personal identity, they start to display cultural and ritualistic behaviour to gain approval and membership of this social group [215, 216]. Transformative acts such as acquiring military skills supports identity formation. Proving their proficiency in military skills also has high symbolic value [217]. Military culture, having distinct language, behaviour, and beliefs centred upon a masculine model, becomes embedded within a soldier's behaviour and identity [217].

As a veteran moves back into civilian life this process happens in reverse [211] (Figure 3.11). Using Pendersen's stages of culture shock [218], Bergman [211] illustrates the transition challenge, showing how disintegration can occur as the individual adjusts their military frame of reference to civilian cultural norms. As they accommodate to civilian requirements, a process of reintegration occurs. This theory warns that those who have not completed their adjustment into one culture, and who suffer a set-back or concurrent change in their life (e.g. a relationship breakdown or amputation) may experience greater disorientation as serial episodes of change have a cumulative effect (Fig 3.11b) [211]. The stage of reintegration is a period of both growth and adjustment, during which friendships are formed, but resentment and anger can also occur [211]. As an individual gains a sense of self and identity within the new culture they move into a place of autonomy.

Personnel suffering limb loss require adjustment from being able-bodied to disabled [156]. MCT adds further change around employment, role, and abode. For these individuals, the civilian life they are transitioning to will be very different from their pre-military able-bodied experience; this may be disruptive [219]. Their journey of transition started on the day they were injured and so the cumulative impact of relentless change may well have major individual impact [219]. The aim of the recovery process is to support the individual until they reach the final stage of Pendersen's model, *reciprocal interdependence*. At this stage the individual moves beyond autonomy and can seamlessly operate between cultural settings showing flexibility of mind [211]; an individual who has reached a place of acceptance of their disability. However, to support this process, an understanding of the challenges they face is needed.

Due to their injury state and a reliance upon civilian services, transition also requires adjusting to the NHS culture which is based upon equitable provision driven by clinical need [84]. Different process, language and access rights must therefore be understood. One qualitative study illustrates the difficulty of transition and maintenance for a group of 32 veteran amputees (aged 44-95) interviewed using semi-structure interviews; three key themes relating to their transition experience emerge [219]. The first, *barriers to transition*, described their need to find employment and a related sense of independence and well-being to cushion them from the impact of transition [219]. Equally, difficulties finding employment impacted their sense of

self-worth [219]. They reported grief at the loss of their military identity, including losses of connection, network, employment, and career. The second theme, *disparity of care*, highlighted their frustrations with the variable quality of prosthetics; they felt isolated, compounded by the lack of continuity they experienced across NHS services [219]. The final theme covered the challenge of limb loss. Participants communicated their struggle to maintain physical capability with limbs that did not fit or caused them pain. In such cases, they reported feeling trapped at home, physically isolated and unable to be the person they knew they could be.

This study did not compare its findings with an equivalent civilian cohort or a comparative younger veteran population, so it is unclear if these findings can be applied to veterans from Afghanistan and Iraq. It is also unclear what characteristics if any, differentiate those whose experience was positive compared to those who reported ongoing negative issues. Nevertheless, they do broadly support the application of Bergman's [211] synthesis of Culture Shock theory to MCT. Figure 3.11b compares the theoretical trajectory of recovery where an individual has adjusted fully, progressing beyond autonomy with those who suffer a setback whilst adjusting to their life change. A military patient who is progressing in their rehabilitation may then suffer complications requiring further surgery and recuperation; a veteran with limb loss, having transitioned into civilian life may experience ongoing prosthetic issues affecting their mobility. In both examples, the individual has not completed their transition and so the disintegration caused by a setback may lead them to reject support causing a sense of isolation [211]. Equally, trusted, and timely support during a setback, may move them onto a more positive trajectory of transition. Understanding these possible trajectories and what trusted, timely support looks like, informs clinicians, policy makers and individuals.

In McGill's [219] study, participants report that their loss of mobility compromised their sense of autonomy and independence. Is this also the experience of veterans from Afghanistan and Iraq? What is their story, and how can we learn from their positive and negative accounts? What support is needed to confront the challenge of transition, and is current provision sufficient to maintain their function, aid social integration and overall QoL? Acknowledging these uncertainties, the Murrison Report recommended that policy developments seeking to maintain and support veterans suffering amputation should sit alongside longitudinal research, in the form of the ADVANCE (Armed Services Trauma and Rehabilitation Outcome) study [205, 220]]. This study would monitor outcomes from this cohort providing clinicians and policy makers with a greater understanding of the long-term consequences of major trauma.

The ADVANCE Study

The ADVANCE Study is linked to this thesis. The questions raised in this chapter illustrate the need for ongoing research into outcomes achieved across the population of combat injured personnel. ADVANCE was

set up to investigate the long-term medical and psychosocial health consequences of severe combat related trauma [196]. Previous outcome studies following conflicts in Vietnam, Korea and World War II have focussed on one health component, for example, MSK health or cardiovascular disease (CVD) [122, 141, 156, 196]. They were often retrospective, had low participant numbers and rarely offered a longitudinal viewpoint [196].

ADVANCE has been designed to capture prospective data on CVD and CVD risk factors, MSK disease, mental health, functional and social outcomes, QoL, employment and mortality [196]. As a prospective cohort study investigating 1200 male UK military personnel and veterans who deployed to Afghanistan (600 injured personnel, 600 uninjured controls), it seeks to capture data at intervals (0, 3, 6, 10, 15 and 20 years) to establish health changes within the above parameters. ADVANCE provides outcome data for all combat casualties, but also enables the data specifically attributed to the amputee cohort to be extracted for separate analysis. Outcome data from ADVANCE will form part of the data analysis in Section 4 of this thesis. ADVANCE is unable, however, to shed light on what it was about the rehabilitation provision that enabled military amputees to achieve such successful outcomes.

Summary

Injuries sustained by military amputees from Iraq and Afghanistan are complex [92]. Despite injury severity, often described as incompatible with life, physical outcomes following military rehabilitation surpass comparable age and prosthetically matched civilian populations [4, 180]. The variable appearing to differentiate these groups is the intensive periodic rehabilitation received [121].

The complexity of cases and uncertainty of outcome required a broad and diverse clinical approach. Rehabilitation content drew upon the established approach at DMRC, utilising scientific principles of exercise training in group therapy settings. Delivery emphasised interdisciplinary collaboration between clinical specialists. This shift in organisational process removed professional discipline boundaries and placed the patient at the centre. From this, therapeutic communities of practice developed between therapists and patient groups, situating collective learning through formal and informal means. The progress made by this patient group transformed rehabilitation services informing an innovative spirit from which further service development continued.

The system of medical discharge and transition has undergone considerable upheaval and created much confusion for patients and clinicians alike. Although transition from military to civilian life has been outlined in this chapter, questions specific to the military amputee remain and it is unclear if current provision is sufficient to meet their unique needs. This uncertainty has been used to justify the ADVANCE study; it will

provide a longitudinal understanding of outcome in this profoundly injured veteran cohort, but it will not answer many of the questions relating to the rehabilitation enabling their recovery thus far.

Section 1 Summary

Section 1 has provided the geo-political backdrop for this thesis exploring how an increasingly complex and unpredictable international and strategic geo-political picture caused British Forces to adopt an expeditionary, agile, and integrated organisation. This analysis shows how complexity forced integration and collaboration between the three British military services and NATO allies to enable a cross fertilisation of skills and practical knowledge, enhancing the military effect. As joint military doctrine emerged, partnerships between military and civil organisations such as the NHS developed [38].

A contextual view of the war in both Afghanistan and Iraq furthers an understanding of both complexity and the circumstances leading to the casualties upon which this thesis is based. In both countries, nation building, and the trust of the local population were undermined by discontinuity between military, NGO and government agencies [50]. A failure to resource COIN with sufficient troop numbers resulted in a complex insurgency and unstable civic life [50]. Only when NATO forces sufficiently resourced operational settings could an effective response resume [55]. Troop presence improved security and enabled relationship building between agencies and local communities, whilst continuity of leadership improved collaboration between international allies, government, and NGOs. Yet, greater troop numbers exposed military personnel to devastating insurgent tactics [51].

Exposure to blast causes unpredictable injury patterns and asymmetric tactics inflicted catastrophic injuries upon military personnel; swift medical responses were required. The interface between the casualty and definitive medical care is PHEC [44]. Chapter 2 recognised complex challenges faced by PHEC clinicians in extracting unknown numbers of injured personnel from locations in which insurgents operated freely, leading to the development of lifesaving inflight interdisciplinary care [21]. This innovation arose as a bottom-up solution evolved by medics who were prepared to break with tradition and blur the boundaries of practice. Feedback from each mission enabled formal and informal practice development. Lessons learned communicated to a strategic network ensured this knowledge informed procurement, military, medical and tactical training [7]. Medical practice and infantry tactics responded as contexts evolved.

The term *unexpected survivor* aptly describes military amputees from Iraq and Afghanistan [78]. Yet these unexpected survivors will be the expected survivors of the next conflict, and so it is critical for us to establish outcomes for this cohort, and to understand their process of recovery [107]. Rehabilitation is often centred upon physical consequences, but the circumstances of an injury, coping strategies developed from childhood, social background and cultural expectations create a biopsychosocial injury response which is as important as physical recovery [170]. The rehabilitation response must therefore tailor provision to each individual according to their dominant physical, psychological and/or social needs [146, 159, 177]. Defence rehabilitation adopted an interdisciplinary model, improving clinical collaboration, enabling a holistic, coherent, and responsive approach through creative and innovative practice.

Although ADVANCE offers an opportunity to track these outcomes across a wider population it will not further understanding of the rehabilitation process nor its role in facilitating recovery. A retrospective analysis of military rehabilitation for the lower limb amputee is proposed to uncover critical elements of this process. The central research question may, therefore, be written as follows:

Research Question: What are the key components required to manage the complex rehabilitation needs of military lower limb amputees?

Research aims and objectives

From the research question three aims were identified.

1. Understand the complex rehabilitation needs of the soldier who has suffered lower limb amputation.
2. Define the key components of rehabilitation, required to satisfy these needs
3. Establish the principles needed to support the effective management of these needs?

Table S1-1 lists the aims and objectives of this research and points to where they are met in this thesis. Broadly, Section 1 has provided an understanding of the military setting, the soldier and their injury mechanism, their clinical presentation and the process of patient management they underwent. Three key points have been emphasised and these will be addressed in Section 2. First, complexity lies at the heart of the context; a theoretical appreciation of what it is and how it can be managed is, therefore, necessary. Second, the rehabilitation setting is a social dynamic that needs to be understood in terms of the individual and group. And finally, situated social learning lies at the heart of rehabilitation, especially when individuals suffer life changing injuries [162]. This concept needs to be understood as it may offer an explanatory framework for group and interpersonal dynamics within treatment settings. Section 2 will address these three areas in greater depth to provide an epistemological and theoretical foundation to underpin the answering of the central research question.

1. Understand the complex rehabilitation needs of the soldier who has suffered lower limb amputation.		
Objectives	Construct a clear narrative portraying the geopolitical influence upon the military operational context and its configuration. Define how these factors influence the role of the soldier, their training and the wider military culture	Section 1: Chapter 1 and 2
	Present the military casualty who has suffered lower limb amputation, providing a comprehensive understanding of the injury mechanism and resulting clinical presentation in order to justify the clinical requirement.	Section 1 Chapter 2 and 3
	Define complexity and establish the implications when researching a complex setting. Justify the epistemological and ontological underpinning informed by this complexity view.	Section 2: Chapter 4 Section 3: Chapter 7
	Produce a research method which considers the question, setting and subjects.	Section 3: Chapter 7 and 8
2. Define the key components of rehabilitation, required to satisfy these needs.		
Objectives	Using descriptions of the clinical requirement, present how patients were managed and the system of rehabilitation experienced by participants.	Section 1: Chapter 2 and 3 Section 2: Chapter 6
	Provide a theoretical view of interpersonal dynamics which underpin rehabilitation and influence perception of need.	Section 2: Chapter 5 and 6
	Explore experiential accounts from clinicians and patients, thematically classifying data to map the interaction between components of rehabilitation and patient need.	Section 4: Chapter 9 and 10 (Clinicians) Section 4: Chapter 11 and 12 (Veterans)
	Collect the perceived value clinicians and patients placed upon components of rehabilitation in order to identify those of central importance.	Section 2: Chapter 5 and 6 Section 4 Chapter 10 and 12
3. Establish the principles needed to support the effective management of these needs?		
Objectives	Produce an overview of the outcomes achieved by the ADVANCE amputee cohort.	Section 4: Chapter 11 and 12
	Using accounts from patients and clinicians, the conceptual map of interactions and participants value statements, devise an account showing key requirements for this patient group and how these compare with established theory.	Section 4: Chapter 9 and 10 (Clinicians) Section 4: Chapter 11 and 12 (Veterans)
	Triangulate this qualitative account with quantitative outcomes from ADVANCE and where possible compare this with similar published outcome studies.	Section 4: Chapter 10 (Clinicians) Section 4: Chapter 12 (Veterans)

Table S1-1: Research aims and objectives and their thesis location

Section 2: Epistemological, Theoretical and Conceptual Underpinning.

‘What are the key components required to manage the complex rehabilitation needs of military lower limb amputees?’

Section Introduction

Rehabilitation of the military patient who has suffered limb loss is viewed as a complex intervention [221]. As a result, the Medical Research Council (MRC) framework has been adopted to guide this process evaluation and to answer the central research question above (Figure S2-1 [13]).

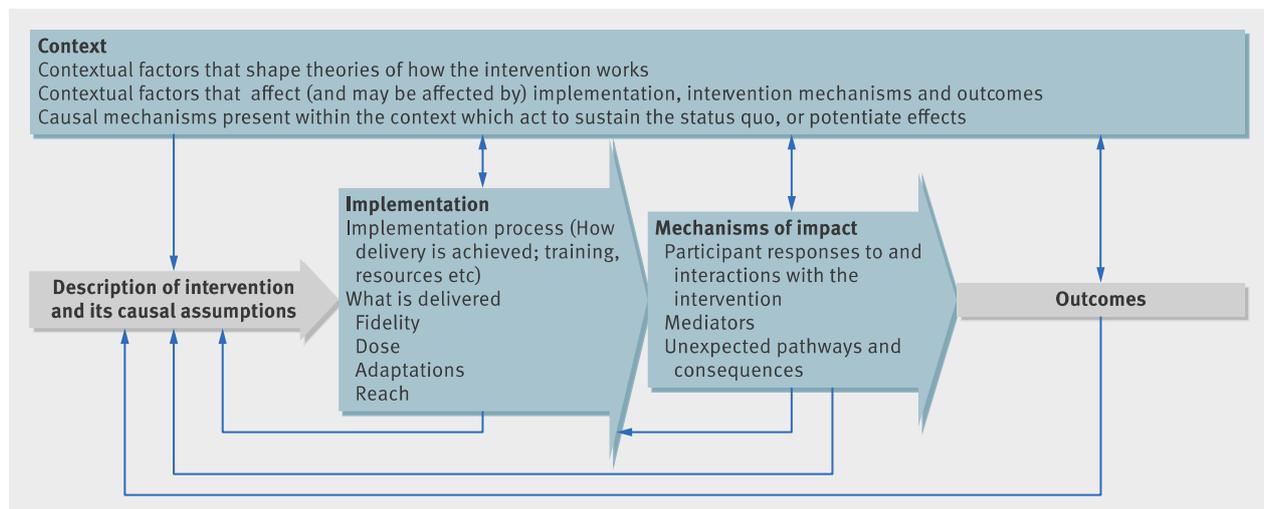


Figure S2-1: MRC Framework. Grey boxes contain key components of the process evaluation. These components are shaped by the intervention description, whilst each component will also influence the eventual outcome [13](p2).

Clarke [222] contends that when researching a complex intervention, the method must acknowledge the breadth of its parts and the interactional properties these parts may perform in isolation, in combination or as a whole. This method is based upon philosophical assumptions about the nature of reality (ontology) and our knowledge of that reality (epistemology) [223]. The purpose of Section 2, therefore, is to establish the epistemological, theoretical, and conceptual foundations for this study, upon which methodological approach and method will be based.

The contextual background detailed in Section 1 took a broad historical view of events, charting the growing geopolitical complexity and implications upon military strategy and organisation. For Defence Medical Services (DMS) this strategic shift, embodied in the Strategic Defence Review (SDR) (1998), established many of the structures from which the complex trauma (CT) team emerged. In line with the MRC framework, Section 1 also presented *a description of the intervention*. This included the medical challenge, rehabilitation solution and service developments supporting this cohort. From this analysis of context and intervention two key dynamics emerge:

1. Complexity: how is it recognised and what are its characteristics?
2. The human element: human interactional patterns in groups and individual motivation.

A greater understanding of these dynamics is needed. Hence, this section is divided into three chapters covering complexity and complexity theory as the epistemological basis of this study; social theory underpinning a theoretical construct; and Communities of Practice (CoP).

Chapter 4. Complexity is defined in this chapter as are key features of complex settings and components of social, complex, adaptive settings. Justification for using a complexity view to determine this study's scientific approach is also presented. A critical review and adaption of the MRC process concludes the chapter.

Chapter 5: In Chapter 5, the theoretical construct to guide analytic processes is justified and includes the following theories:

- Bourdieu's Theory of Practice.
- Social Identity Perspective.
- Self Determination Theory (SDT).

Chapter 6: This chapter completes Section 2 by acknowledging the organisational influences that affect responses to complexity. The concept of Communities of Practice (CoP) will be used to weave together the separate threads making up the theoretical construct and to place it amidst this study's complex context. Finally, the conditions needed to facilitate CoP will be outlined and applied to the collaborative and teamwork arrangements at Defence Medical Rehabilitation Centre (DMRC) Headley Court.

CHAPTER 4 : Complexity

Introduction

The words ‘*complex*’ or ‘*complexity*’ have been used throughout Section 1 to describe various contexts and events. Complexity is a rarely defined term despite its frequent usage [14]. To provide a definition pertinent to the context of this study, descriptors of complexity found within Section 1 have been free listed. Free listing is a recognised method allowing rapid data extraction [224]. From this listing a definition of complexity is suggested and compared with published literature. A widely used tool known as the Cynefin framework is also introduced. Based upon complexity theory, it describes the characteristics of ordered and unordered settings. Appreciating the characteristics of complex settings will inform the research process and its epistemological foundation.

Towards a definition of complexity

Cohn [225] defines complexity as:

‘...a dynamic and constantly emerging set of processes and objects that not only interact with each other but come to be defined by those interactions’ [225] (p42).

1 Complexity in Context	2 Approaches in response to complexity	3 Outcome
Multiple interactions = multiple possibilities Asymmetric + Lacking central command = does not conform to known rules Evolving = Adaptable Unstable = unpredictable / uncertain	Agile Flexible Empowered / Expeditionary Resourced Integrated / Joint / Interdisciplinary Partnership / Collaboration / Inclusive Communication / Network Continuity	Responsive Needs based / Tailored Creative solutions Local solution / Trust Innovation Multi-dimensional solution Versatile skills Feedback / Evolving response / coherent

Table 4.1 Free listing of words found in Section 1 associated with complexity. Blue bold text are words used to craft the definition.

However, this definition appears to lack breadth and the characteristics of complexity seen in the simple free-listing analysis (Table 4.1). Column 1 lists words associated with the complexity being faced. Columns 2

and 3 show the approach taken to manage complexity and the expected outcome respectively. A definition of complexity emerges (using blue bold type taken from Table 4.1):

Complexity is unpredictable and dynamic; leading to multiple outcomes from a range of interactions and ongoing adaptation, where there are no defined rules of engagement.

A complex setting is not without rules or order, yet some authors argue that chaos and disorder are described as part of it [12]. This paradox means that uncertainty and tension exist in every complex system [11, 12]. Self-organisation is a characteristic of such a system suggesting there are inherent rules within it [226]. These rules are not centrally controlled and can be difficult to predict, but it means that failure in one part of the system does not affect the entire process. This creates a robust system to manage disruption to areas within it, whilst other elements continue to operate or evolve [226]. Interactions have, therefore, been referred to as non-linear by some [14], although this is debated by others who note examples of linear complex systems, such as computer programming [226]. A complex system is nevertheless unpredictable. For interactions to occur, many elements must exist and be able to interact with one another [227]. These interactions result in outcomes that are not necessarily the sum of predictable parts, but over time these outcomes can be viewed in retrospect enabling meaning to emerge [14]. *Emergence* is a recognised feature of complex systems, emphasising that meaning only emerges when retrospectively viewing interactions [227]. Within each complex system, interactions and their results contain a form of internal feedback, enabling the system to self-organise, correct errors, evolve and/or adjust in response, hence the unpredictability of the system [228].

Recognition of a complex setting is the challenge. One heuristic tool, widely researched and applied for this purpose, is the Cynefin framework [229] (Figure 4.1 / 4.2). Using complexity, systems and network theories, this conceptual framework initially informed decision making at IBM [230]. It contrasts a setting into domains of order, unordered or disorder [229, 231, 232]. Figure 4.1 presents ordered domains as *clear and complicated*, where cause and effect structure the problem. In unordered (*complex* and *chaotic*) domains the problem requires a more exploratory approach seeking to determine patterns of interaction. This is only possible with hindsight [229, 231, 232]. The Cynefin framework categorises CT rehabilitation as a complex setting (Figure 4.3).

Use of the tool allows managers to contextualise behaviour and make decisions [233]. For instance, in a *clear* setting where cause and effect are obvious, a best practice protocols will provide clear direction (Figure 4.1). If a setting is unpredictable, the Cynefin framework classifies it as complex or chaotic. Emergent ideas, exploration, and an emphasis on learning and/or practice development are recommended. This framework has been widely used in business, government and medicine [232, 234]. It creates a common language between those who assume the setting is ordered and predictable and others e.g. clinicians who view the

setting as complex and need to explore patterns as they look back in order to see the way forwards [235]. In this way, it can be an effective collaborative tool [236].

	Predictability	Leaders Role	Strategy	Clinical setting
Clear	Stable and predictable recognised by all Known knows Clear cause and effect	Ensure proper processes are in place. Communicate clearly. Delegate. Extensive interaction is not needed.	Sense Categorise Respond	One right answer. Best practice protocols are essential. Challenge orthodoxy
Complicated	Stable and predictable, recognised by experts. Cause and effect discernible with analysis. More than one option. Known unknowns	Create panel of experts. Listen to conflicting perspectives.	Sense Analyse Respond	Several right answers. Best practice guidelines helpful.
Complex	In flux / Unpredictable. Cause and effect understood in retrospect Competing ideas Innovation / creativity is needed. Unknown unknowns	Facilitate idea generation, high level of interaction, encourage dissent, diversity, and experimentation.	Probe Sense Respond	No right answers Emergent practice. Protocols unlikely to work. Data capture, analysis of outcome and responsive changes to practice are needed.
Chaotic	Highly Turbulent. Too turbulent and changeable to consider cause and effect. Unknowables	Look for what works, re-establish order through command and control. Provide clear direct communication	Act Sense Respond	No time to search for answers. Act to gain control, protocol no help. Take action to shift context from chaotic to complex

Figure 4-1 Summary of Cynefin Framework in healthcare (Adapted from [235] (p260), and [231](p7))

Research investigating complexity in healthcare settings highlight the adaptive elements, for instance, policy change, knowledge acquisition, personnel change and patient characteristics, all of which interact with themselves and one another [235, 236]. Cohn’s [225] definition lacks direct reference to this adaptive dynamic but it is this adaptation in response to unknown influences that makes complexity unpredictable and resilient, and any outcomes unknown. This has led some to refer to complex systems as Complex Adaptive Systems (CAS) [227].

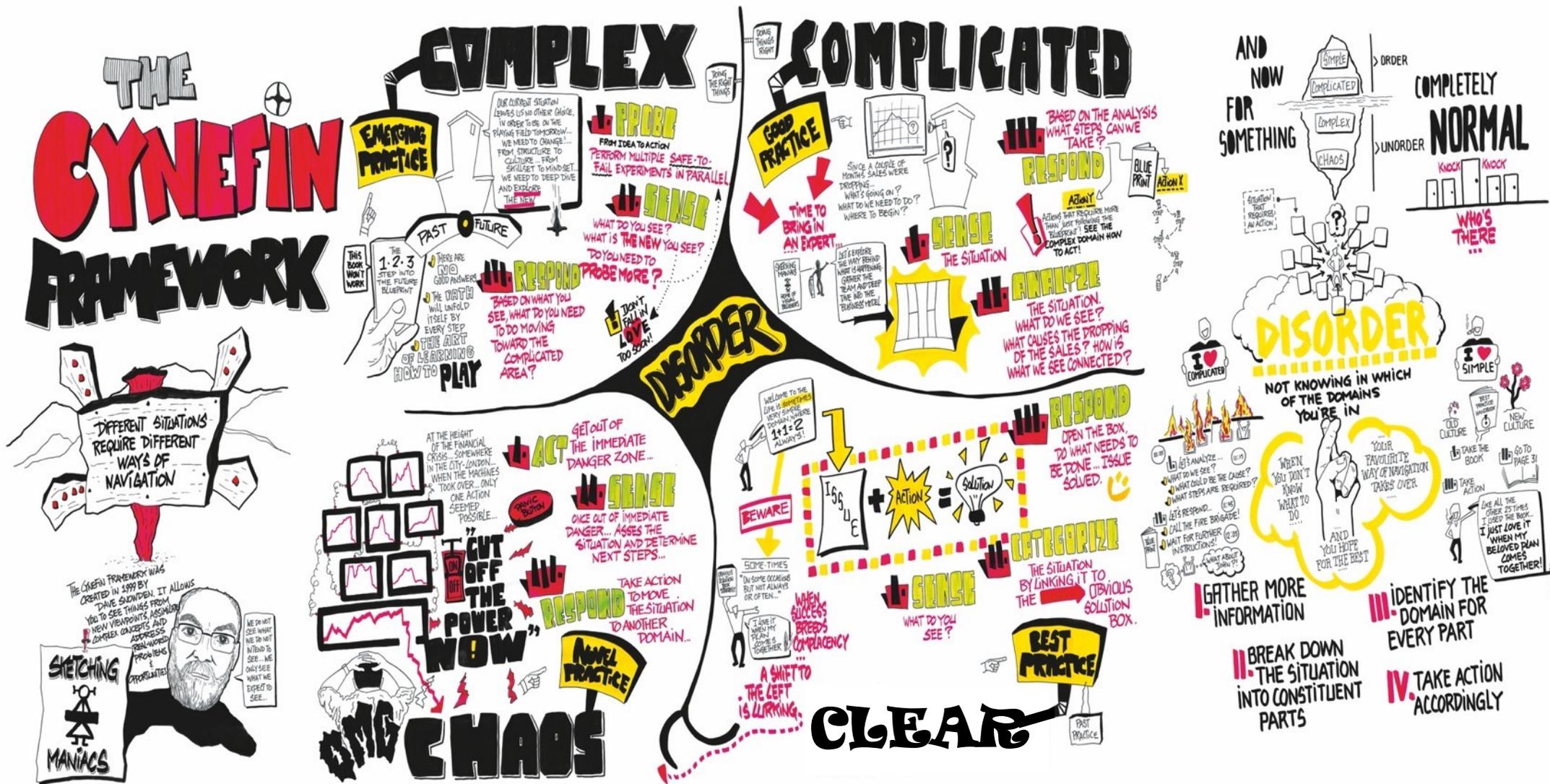


Figure 4-2 The Cynefin Framework (From www.sketchingmaniacs.nl) Together with Figure 4.1, Figure 4.2 provides a graphic overview of the Cynefin Framework. The focus of this thesis is upon the complex domain. This has been enlarged in Figure 4.3.

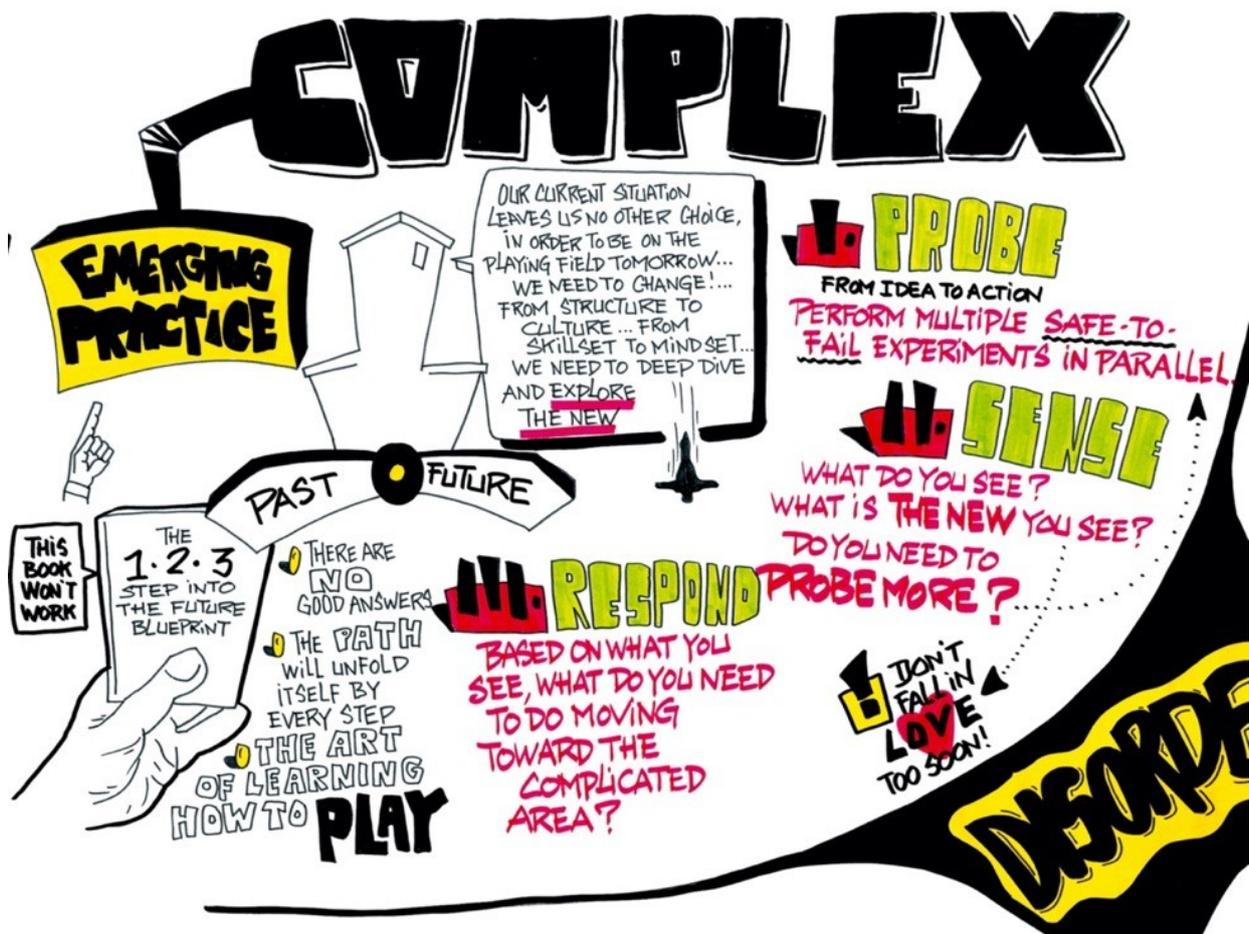


Figure 4-3 Complexity according to the Cynefin Framework [231]

Complex Adaptive Systems in Healthcare

CAS are defined as *dynamic settings, embedded within a wider context, in which interaction between people, processes, objects and the context are interconnected, resulting in an adaptive response, thereby making the setting unpredictable* [222, 225]. For instance, military rehabilitation is embedded within military and National Health Service (NHS) contexts. Other CAS co-exist within the same context, for example, in the deployed medical setting, military rehabilitation exists alongside Pre-Hospital Emergency Care (PHEC). Interaction within and between CAS create varying and uncertain outcomes. The surge of combat casualties outlined in Section 1 caused PHEC to innovate practice; this innovation saved lives. As casualties moved through the medical pathway, they presented a challenge to service provision.

The quandary in healthcare between managerial, policy and clinical approach is stark [237]. Healthcare commissioning and management systems fragment services into distinct segments, placing contractual barriers in the way of collaboration, whilst seeking to simplify delivery by establishing evidence based linear delivery model [238-240]. However, social factors, advancing technology and knowledge mean system complexity continues to grow. Figure 4.3, taken from the Cynefin framework illustrates the importance of

casting aside the rule book and instituting systematic experimentation [231]. Hierarchical and linear management processes simply cannot manage complexity, but instead introduce further complexity [240]. A complexity response requires organisations to be viewed as networks, in which those at the point of delivery are empowered to configure their network according to need [227, 239]. The focus of leadership moves from directing process to enablement of innovation, largely achieved through nurturing collaboration and trust between specialties. It appears that where management systems are not aligned to contextual needs, a clinician's ability to deliver effective care is undermined, leaving them demoralised, setting back patient recovery and potentially increasing health and social costs to society [237, 239, 240]. Despite an increasing body of evidence and case examples where these principles have been successfully implemented in other sectors, healthcare organisations have not fully grasped what is required [229, 237, 239, 240]. Even DMS policy continues to maintain a reductionist approach and fails to acknowledge or manage the dominant feature within the military context – its complexity. Policy makers and management, it is argued, prefer a linear paradigm as it is easier to communicate, understand, control and fund [222]. Declaring a system of healthcare as a CAS requires a knowledge of complexity theory which has a profound implications upon system design [222].

Complexity science or complexity theory is the cross disciplinary, systematic study of complexity and CAS. It seeks to provide understanding of how system components interact and ultimately how complexity might be managed [226, 228, 241]. Identifying CT rehabilitation as a CAS has implications for the investigative process of this thesis. The paradigm of complexity science is, therefore, adopted, as the epistemological foundation for this exploration of CT rehabilitation. Three further implications upon the theoretical underpinning of analytical methods will now be outlined and expanded upon in subsequent chapters.

1. The Social CAS: A process evaluation of a complex intervention.

The classical approach within complexity theory encourages researchers to establish rules to determine the interaction and behaviours of agents involved [242]. This approach has its roots in the mathematical origins of complexity science where complex numerical formulae are used to model settings and predict future outcomes [242]. Healthcare outcomes have historically proven difficult to predict due to the human element within them [237]. The human factor adds a psychosocial dimension that cannot be explained using a formulaic approach. Greenhalgh [11] calls for 'conjunctive theorising' (p4); generating rich descriptions of the research context from multiple data sources. She argues that such an approach requires an open-world ontology; not simplifying interactions, but capturing the breadth of their influence [11, 223].

Implications. CT rehabilitation is a social CAS, requiring it to be viewed and investigated as a whole system. This investigation must capture perspectives of all groups illustrating their social interactions. A mixed

method approach [243-245] should enable triangulation of views. The MRC framework must be adapted to capture this interactive social dynamic.

2. The Social CAS: Relational sociological analysis

Healthcare is a highly complex social setting made up of several CAS nested together [227, 232]. Section 1 presented the integration and demarcation between military and civilian health systems. DMS, DMRC and CT rehabilitation provide further layers of complexity. In addition, the political context influenced by media and public perception has been shown to exert external influence upon each of these CAS. A theoretical view is needed to interpret how this influence may cause adaptation within this context [242].

Implications: Analysis of the interrelationships between CAS and contextual features needs to be performed using relational sociological analysis [14, 237]. This will bring understanding of cultural patterns and power dynamics within and between groups and organisational structures. A Bourdieusian approach provides versatile theoretical insight, applicable to cultural, organisational and individual settings [210, 246].

3. The Social CAS: Group dynamics and individual motivation.

In social CAS, decision-making or agency is the product of cognitive, motivational and emotional factors [242, 247]. Military rehabilitation, in part, is a product of interaction between patients, clinician and managers. A theoretical understanding of the social, motivational and cognitive factors, inherent within human agency, will provide a basis upon which to analyse accounts and actions in this study [242].

Implications. Social dynamics in group settings and cognitive, motivational, and emotional factors will be analysed using social identity, categorisation, and determination theories. Self-determination theory provides a motivational view of human agency [248]. Developing Neal's [162] observations, the conceptual view of learning contained within CoP will also be considered as a figurative explanation of how social, cognitive and motivational theories interact within social CAS [249, 250]

Adaptation of the MRC Framework

The MRC framework needs to capture an interactive social dynamic. The research question asks, '*what are the key components...*'. The MRC framework is a *process evaluation*. The attribution of importance in the research question and the MRC framework risks distilling a complex setting into a linear hierarchy to produce a recipe for success [222]. This is contrary to the epistemological position of this study, which seeks to

understand complexity in context. Others believe the MRC framework is too linear and prescriptive [11, 222].

After reviewing the historical and contextual elements shaping the service and service personnel within it, *social* and *adaptive* qualities of CT rehabilitation are key elements to be captured. Two changes have, therefore, been made (Figure 4.4). First, *implementation* and *mechanism of impact* are now presented as a continuum of events and effects. These interact with one another and the outcome. *Outcome* appears as a cycle of events, its influence permeating throughout the framework. Second, specific mention of *people* is made in the implementation/impact cycle, to emphasise social elements as a principle interactive influence (Figure 4.3). Mapping these interactions and recognising patterns is only possible by taking a retrospective view of the setting [231, 233]. Multiple layers and levels of analysis in this framework support triangulation of data from different sources [11].

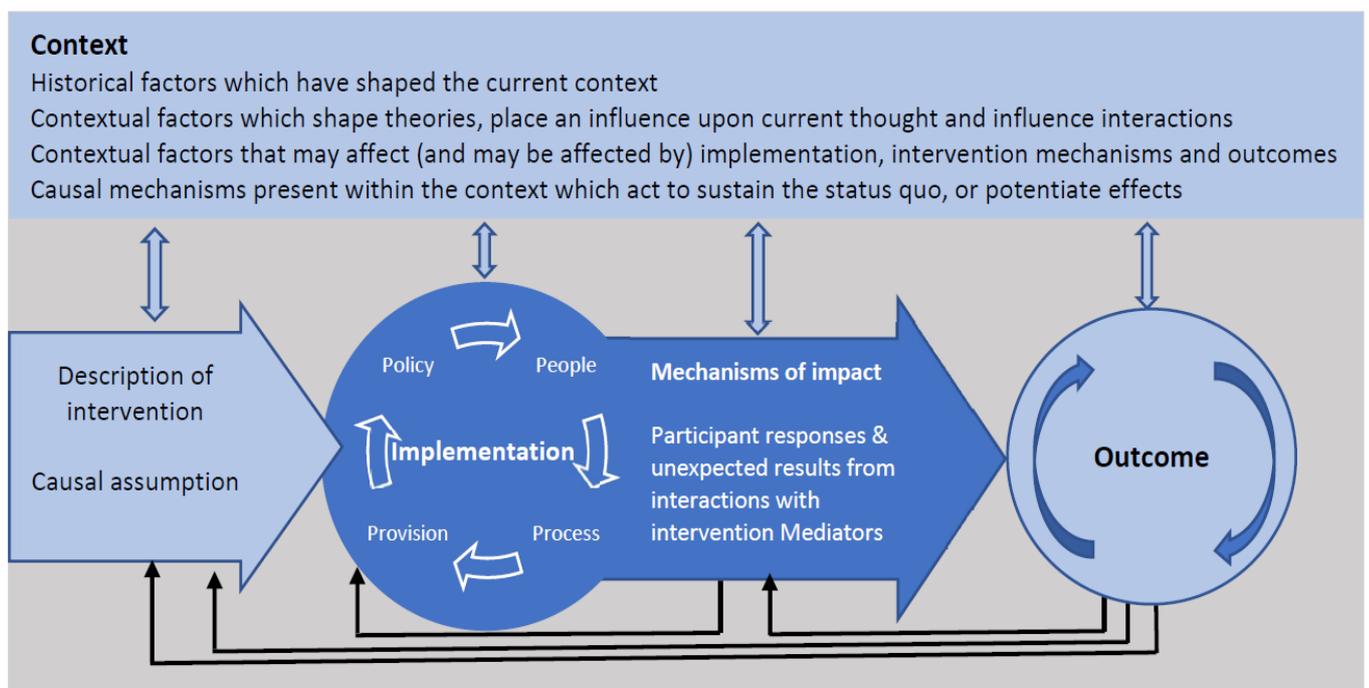


Figure 4-4 Adapted MRC Framework for complex interventions. *Implementation and mechanism of impact are a highly interactive and adaptive part of the framework and so it is shaded differently.*

Summary

Complexity is defined in this chapter as *unpredictable and dynamic; leading to multiple outcomes from a range of interactions and ongoing adaptation, where there are no defined rules of engagement*. This definition is congruent with the published literature [225]. The Cynefin framework helps distinguish complex settings from those classed as simple, complicated or chaotic [231]. Using this framework, the complexity of

CT rehabilitation is confirmed. However, labelling this service as a CAS fails to acknowledge a social component, a critical element within any healthcare setting. CT rehabilitation is classified as *social* CAS.

A complexity science view demands a research approach capable of embracing multiple perspectives to achieve a rich description and explanation of interactional patterns and outcome [11]. The MRC framework, adjusted to emphasise social and adaptive qualities, is suggested as an effective way of guiding such an evaluation. To appreciate the social element and its influence, an understanding of human social interaction, cognitive and motivational drive, and emotional needs is required. Research methodology and method must be underpinned by a theoretical construct capable of interpreting the interaction of human factors within a social CAS. The following chapter, therefore, focuses on Bourdieusian analysis, self-identity perspective and self-determination theory.

CHAPTER 5 Theoretical underpinning

Introduction

The evaluation of social CAS should emphasise how human cognitive, motivational, and emotional components influence outcomes. The following three theory-based approaches will be outlined in this chapter, illustrating how they underpin and have influenced the analytical process:

1. Bourdieusian Analysis.
2. Social Identity Perspective (SIP).
3. Self Determination Theory (SDT).

The overarching theoretical construct is presented at the end of the chapter.

Bourdieusian Analysis

When analysing inter-relationships at global or national political levels or between military and civilian cultural systems, as well as social interactions between groups and individuals in treatment settings, there can be tension between structuralist approaches (emphasising system dominance over human agency) and approaches emphasising human agency (freedom of choice) [251]. A complexity view does not embrace this dichotomy. Instead, it views interactions between nested social CAS as a continuum between two extremes, arguing that system action and interaction (CAS to CAS) is the product of agent to agent (human to human) and agent to system action, interaction and reaction [251]. Hence, a theoretical paradigm is needed to offer an explanatory view of power and interaction along such a continuum.

Complexity theory is an offshoot of systems theory [227]; the two have much in common. Systems theory brings together the social and natural world as it seeks to offer an interdisciplinary view of system formation, organisation, and process. Social science has led the way in developing an empirical view of structures and culture, providing explanatory views of their role over human action [252]. Sociologist Talcott Parsons developed the orthodox theories of Weber and Durkheim to create a structural view of society as a complex framework of parts working together [253]. From Parsons' work came a form of systems theory that he termed social action theory [253, 254]. In social action theory, an individual and their actions with others are seen to shape their identity and that of wider society [254]. Whilst it encompasses human choice alongside

structural elements within a social setting, it subjugates the human element as a reaction to three systems (personality, culture, and the social systems) rather than allowing for free choice (agency). Much debate exists around whether human behaviour is shaped by structures within the social world or whether human action has freedom of choice [255]. Parsons' work has been criticised by some for being conceptualised outside of the social setting rather than from empirical observation [246]. Nevertheless, it is one of the foundational pillars of systems theory [246].

Pierre Bourdieu (1930-2002) was an anthropologist and sociologist who sought to find a way through this debate. Rather than generating a theory from within sociology, he instead sought to transcend disciplinary boundaries by adopting what is known as a meta-sociological approach [246]. This approach allowed him to form theory relevant to each observation, pragmatically synthesising his ideas and observations of the social world [256, 257]. He rejected the dichotomy found in orthodox social theory believing that these opposing views each offered partial insight. For example, rather than attributing human action to an external cause (structuralist view) such as culture or claiming human action arises from internal need (rationalised or intended action), he proposed a dialectical relationship in which both occur [246]. His theory of practice interlaced views of action, culture and power in which practice was not entirely a result of structures or power, nor was it the result of human agency, instead practice was the outcome of varying influences acting upon each other [256, 257]. The first sociologist to place this debate of human action at the centre of his work, he pursued a pragmatic theory of practice, its theoretical versatility aligning with complexity view [246]. His work has been used to analyse: healthcare, particularly around recent choice initiatives [256-258]; power relationships between professional groups; and military to civilian transition [161, 210, 246] settings. Bourdieu developed the concepts of habitus, capital and field to explain interaction between structure and agency in the social world [259].

Field, Capital and Habitus

Field is a term attributed to a social space or network of relations [256]. A field will exist in relation to other fields, but they are always contested spaces [256, 257]. Bourdieu refers to a *field of struggle* [260] characterised by position taking; social actors deploy capital (influence) to secure their place or to demonstrate social dominance. It assumes economic trade earns power or is acquired as an individual or group gains capital relevant to the field [256, 258]. Some fields may attract an individual depending on past experiences. From an assessment of likely success in a particular field they may choose to partake or avoid it. [256, 258]

Capital is 'the deployment of power' as an individual interacts in a specific field [256] (p117). It can include economic, social or cultural capital or resources [256, 261]. Capital is not a new sociological concept, but

Bourdieu's use of this term departed from conventional Marxist theory that saw interaction as having mercantile property to maximise profit [246]. Coleman [262] views the concept of capital as a descriptive asset or a passive resource essential for success. Yet, Bourdieu believed that capital gave the holder power or capacity to act, thus influencing the field they were in [210]. In this way capital takes on an interactive element. Cultural capital may be acquired over time and can include knowledge, skills and title [210]. Symbolic capital may include honour or prestige earned from action, position, or reputation. Economic capital includes material or financial power [261].

Habitus is 'the subjective element of practice' [256] (p117). It is an individual's instinctive or subconscious way of responding in a social situation, generated from experience and background. Responses to situations are embedded below consciousness and considered durable [263]. New experiences are then sorted according to experience, so habitus in a new situation is shaped by previous experience. There is scope for individuals to make choices and develop strategies as they move between different fields or trade different forms of capital.

Application

This conceptual trio of habitus, field and capital should be applied in a dynamic and interrelated manner [259]. Their application allows for consideration of both micro and macro level factors when forming explanatory accounts of an interaction. Of the three, field is relatively neglected in the literature, reflective of the preference for the subjective world over structural analysis [256]. Bourdieu would argue that each field is a distinct microcosm with its own rules and capital [259]. Multiple levels of a field can exist. For example, if the hospital is the field, its departments would be sub-fields or layers. A field determines the forms of capital that are valued and can be earned from participation within it. Habitus (human action) will respond to structural elements within the field or setting as capital and structural elements interact and demand a response from individuals. By retaining this conceptual trio, an interest in individual and subjective choice is balanced against structural components of the social world [246]. This process will be described using a practical example.

Bourdieuian analysis has been used with some success to describe military transition back into civilian life [209, 210]. The military setting is viewed as a distinct field with its own cultural rules, identity formation and language. Recruits entering military training bring their own habits of acting or reacting (habitus) into this cultural setting, but they also seek to understand the setting, its rules, and ways they can gain influence (capital) to ensure success. Military training provides recruits with cultural capital as military skill training is completed; social capital is acquired as language and rules of interaction are learned from one another. If prized, an individual will adapt their habitus causing them to act spontaneously to situations in an acceptable

way to earn further capital and position within the military field [161, 210]. Bourdieu refers to pushes and pulls; or aspects that will pull or push an individual into it. In their MoTiVe model of transition, Cooper [210] shows how various life events can either push or pull a soldier from a military to a civilian field. Bourdieu's theory of practice is shown in reverse causing individuals to adjust how they operate according to new civilian rules [210]. It is argued that military habitus may not conform to civilian rules and the capital needed in civilian fields might not be the same as in military fields [161]. This analysis exemplifies the way in which Bourdieu intended his theory to be applied, demonstrating cultural distinctions between fields, the way in which power can be transacted, how habitus transforms in response to field and capital and how capital may have value in one field but not another. Of course, this process is voluntary. Individual may choose not to conform with rules in a particular field or even move into it. In the case of military transition, there may be no choice if circumstances cause an individual to be *pushed*, rather than *pulled* back into civilian life. Such a push would include injury and medical discharge.

Across healthcare Bourdieusian analysis has been used to investigate the distribution of power in nursing practice [264], policy and managerial control [258], the health professional [265], health inequalities [266] and the role of agency in health choices [267]. Whilst these studies generally acknowledge the concept of field, they all miss the opportunity to explore the interrelationship between power dynamics and field. One health related paper has explored an imposed cultural change upon the Finnish healthcare sector as it moved from a state to market-based control mechanism [268]. This paper makes full use of Bourdieu's conceptual approach, exploring shifts in power and how this affected language, communication between professionals, mechanisms for teamwork and clinical output [268]. Kurunmäki [268] shows how structural change within a field (moving from public to private healthcare control) altered individual action (language, attitude, decision making) and influenced a systems response (teamwork relationships, leadership style, referral systems). The breadth and value of Bourdieu's theory of practice can be seen in these works and their application to micro and macro settings. The relevance of this theory will now be tested and applied to two contexts from Section 1.

1. Multi-Disciplinary Team (MDT) to Interdisciplinary Team (IDT) Transition. At DMRC, the move from MDT to IDT structure was imposed by executive management, brought about because of structural challenges DMRC faced with increased numbers of complex casualties. This change in team structure removed monodisciplinary clinical departments and created mixed clinical teams centred around the patient, realigning power dynamics. The field of military rehabilitation at DMRC, rather than being defined around clinical profession, was now defined around patient presentation. Inter-professional rivalry amongst clinicians held no value as it did when the field was constructed along professional lines. Instead, interdisciplinary collaboration focussing upon patient goals was the new capital; this altered the actions (or habitus) of those operating.

2. **Embedded military roles within the NHS.** In secondary care, military clinical roles were created to capture NHS information flow and steer it to where it needed to go within military systems. These positions acted as network links, connecting military and civilian clinicians. Personnel needed to be equipped with the capital to operate in both military and NHS fields. When this occurred successfully, their role as a network link and position at junctional points of information flow helped to bypass cultural and political differences. In this way, communication went directly to where it needed to go and proximity between clinicians in both organisations was achieved. These roles not only enhanced communication and information sharing between both fields but also caused the fields to alter as cultural gaps were lessened [221].

The alignment of Bourdieu's theory of practice with the epistemological stance of this study enables explanatory accounts of contextual observation to be generated. Hence, this process evaluation will adopt a Bourdieusian lens to draw meaning from the interaction between actors (patient, clinician and manager) and the setting's contextual features (history, politics, current day trends, systems of management and health care governance) [13]. The setting becomes the field, and the conditions or rules within the field must be understood. The field determines capital used to gain position and this capital must be identified and verified in the evaluation process. An actor's behaviour (their habitus) will be a summation of past experiences and inner drive, but also their interpretation of the field and their place within it. However, what Bourdieu does not offer is a detailed view of how an individual's background, inner beliefs and training form their habitus and what social and psychological influences affect their desire to interact within the rehabilitation field or partake in the group dynamic. The following section builds on this theoretical position and considers theories of social identity before moving to individual motivation.

Social Identity Perspective (SIP)

Within Section 1, the example of [group therapy](#) illustrated the influence of military field upon clinical structures [269]. This social dynamic and the mechanisms used to generate allegiance and cohesion is widely researched within a military context [270]. Within healthcare literature, social relationships, networks and identity as recognised determinants of health-related practice remain a growth area [271]. Within social CAS it is the human factor that makes outcome highly unpredictable [227]. The adapted MRC framework makes explicit reference to the social dynamic as a causal mechanism of impact (Figure 4.4, p80). A theoretical perspective is needed from which observations can be interpreted. SIP is the collective name for two social theories: social identity theory (SIT) and social categorisation theory (SCT) [272]. Both theories have a robust empirical basis [272, 273]. What follows illustrates how a SIP is consistent with the epistemological stance of this study and can be applied to the CT rehabilitation setting.

Interest in group activity first gained traction in Darwin's writings [274] as he developed the concept of group and multi-level group selection.

'When two tribes of primeval man, living in the same country, came into competition, if (other circumstances being equal) the one tribe included a great number of courageous, sympathetic and faithful members, who were always ready to warn each other of danger, to aid and defend each other, this tribe would succeed better and conquer the other.' [274] (p134)

It is argued that humans succeeded when they embraced the power of the collective group. Wilhelm Wundt (1832-1920), oft credited as the founder of psychology and Emile Durkheim (1858-1917), attributed as one of the principal architects of modern-day social science, both shared an interest in this collective phenomena believing that the action and output of a group could not be explained by the sum of the individuals within it [275]. McDougall [276] progressed these ideas to develop a *group mind* concept in which group interactions generate a collective consciousness distinct from an individual's psychology [276]. Yet, this shared social science perspective started to diverge on disciplinary and geographical grounds. Gordon Allport (1897-1967), an American psychologist, argued that the psychology of groups could only be understood by analysing the psychology of the individual [277]. The sociological view retained a collectivist stance, believing that the outcome or resultant action of a group could not be understood by only focussing on the individual [275].

Group dynamics was a term first used by Kurt Lewin (1880-1947) as he sought to understand social and psychological dynamics enabling both acts of altruism as well as atrocities seen during the WW11 [278] (p40). Lewin's work and those who followed focussed on the individual, excluding the study of large social categories, the collective self or intergroup interaction [279]. This reflected the dominance of American individualistic thought as opposed to a more group centric European view [277].

In the 1970s and 80s increased academic collaboration challenged views on group dynamics. Tajfel [280, 281], whilst studying discrimination and intergroup behaviour, randomly allocated individuals to an *in* and *out* group. He was able to manipulate ingroup behaviour by generating perceived differences with the outgroup. From these observations Tajfel [281] believed that the current cognitive individualistic focus was insufficient to explain his findings. Instead, he argued that individual cognitive processes and emotion could not be fully understood without an understanding of groups and an individual's perceived place in society [282]. This approach became known as SIT and explained intergroup (between groups) dynamics, bridging the gap between individualist and collectivist extremes [273] (p205). SIT did not explicitly confront differences in behaviour *within* groups, so later work by Turner [282] explored this intragroup dynamic developing it into what is now known as Social Categorisation Theory (SCT). SIT and SCT sit side by side to provide a SIP [273]; offering sufficient theoretical latitude and substantial cross-disciplinary evidence to justify adopting it as an analytical tool within this study. To illustrate the compatibility of this perspective and

the analytical contribution it could make to the process evaluation, SIT and SCT will now be described in more detail.

Social Identity Theory and Social Categorisation Theory

SIT provides understanding on an individual's sense of place within society [283]. The process of gaining social identity has three stages: social categorisation; social identity; and social comparison [272].

Social categorisation is the process an individual uses to define themselves, according to the categories available to them (for example gender, nationalities, religion, profession etc). In this way they also categorise others. Categorisation of others allows an individual to assess who shares similarities, which groups they can identify with and on what grounds. Through this categorisation process of an individual gains understanding of group norms, rules and distinctive features making up group identity [272]. As group identity becomes clear, an individual chooses whether to adopt these identities (i.e., modes of behaviour, language or symbolic modes). Should they do so they will mimic group identities such as forms of dress and behavioural traits [273]. As the individual identifies with the group, they will also start to make comparisons with others. This process is known as **social comparison** [273].

For a **social identity** to become internalised and form part of an individual's self-concept, they will start to make value judgements between groups about their social membership and the distinctive qualities of their social group and its status [283]. Initially, this process determines the extent they wish to identify with a group. As social identity becomes internalised, this process of comparison is self-enhancing and exists to uphold a favourable comparison with other groups, in support of positive social identity and self-concept [282].

SIT offers a view on how intergroup dynamics work by drawing upon cognitive, motivational and social contextual factors, but it does not explain intragroup dynamics [273]. Why might commitment to a group differ between members? Why are some members seen as in and others out? What determines an individual's sense of belonging to the group? These and other questions led Turner [284], an understudy of Tajfel, to revisit social categorisation and intragroup dynamics to develop SCT [284]. Many report these theories in isolation, however, SCT and SIT should be viewed together as a SIP [275]. Although what follows will now explore SCT in more depth, reference in this thesis towards a SIP reflects SIT and SCT.

SCT aims to explain cognitive aspects of intragroup social identity [273]. An individual's sense of self-concept determines their inclusiveness and whether they seek a social identity. For example, an individual whose focus is on *personal* identity (or I), will not engage in a group process; equally an individual who possesses a *human* identity will only see one group – that of being human. Neither of these extremes see the need to

socially categorise [282]. Those owning a *social* identity recognise different groups exist, causing an individual to enter a self-categorisation process to find their place.

Assuming an individual has a formed social identity, the self-categorisation process helps them to assess similarities and differences in the group, as well as the value or risk of engagement. There may be occasions when an individual places such importance in their membership to the group that they place this above any aspect of self. Turner calls this a *de-personalised* position [215], but not as a dehumanised process. De-personalised refers to a re-framing of *self* to adopt the collective group, defined around prototypes [215]. Prototypes are symbols, characteristics, or group norms around which the group identifies [215]. For example, a military amputee may adopt a de-personalised position by internalising their war casualty social identity. Prototypes might include allowing limb loss to remain on show and wearing identifiable clothes to conform to recognised group norms.

However, their *perceived readiness* to engage relies on a cognitive assessment of previous experience, education, socialisation and present expectations [285] (p5). For instance, a military amputee may be bitter about limb loss and blame the military. Past experiences, grievances and assessment of events might cause the individual to assess their *fit* within the group [285] (p5). *Normative fit* refers to whether an individual exhibits stereotypical group behaviour [285]. A soldier, for example, may be expected to be physically fit, confident and have a robust manner [285]. *Comparative fit* refers to the degree a potential member may exhibit group norms. This dynamic may explain why some exhibit elevated status in a group and others appear on the periphery [285].

SCT, therefore, contains several components that can be searched for in data to evidence particular explanations. However, some have criticised a SIP as dogmatic and without sufficient flexibility; others claim it is over-simplified [273]. Yet its simplicity is what makes it compatible with the theoretical construct of this thesis; its application across the social sciences [237, 272] supports its use within a complexity model.

'At a time when theories are becoming increasingly 'micro' in their scope, the social identity approach is a rare beast, a meta-theory that is ambitious in scope but ultimately rests on simple, elegant, testable, and usable principles.' [273] (p217)

Application

Both Bourdieu and SIP view interaction between and within groups as social and cognitive processes designed to gain influence. Influence leads to the control of resources and this control provides an individual or group with power. A SIP recognises that hierarchy exists between groups, and individuals will seek a way to promote their group above others. Within groups, social categorisation illustrates how an individual may come to embody the prototype of the group and thereby gain position and influence [273]. Whilst terminology differs, Bourdieu illustrates this same dynamic, citing how organisations and individuals acquire

capital, deploying it to gain influence. The internalisation of behaviours developed to promote the acquisition of capital will also transform an individual's habits (their subconscious forms of behaviour and beliefs). A Bourdieusian perspective has been described as a form of cognitive sociology [286]. But whilst it offers a sociological perspective on human agency in a group setting and illuminates the power dynamics within it, it does not provide the depth of explanation or refinement found in a SIP [272]. The two theories provide complementary perspectives albeit from different vantage points, as illustrated below.

1. Attribution of Hero. The attribution of *hero* upon military casualties arguably served a political purpose [59], but also provided the patient group with a powerful label to exert influence. This raises several questions around the impact of this labelling, to be explored later. Could the outcomes seen have resulted from the capital this label offered the patient community? Could their functional success come from the expectation of this label? Does the capital of being a *hero* have value in a civilian setting, as the patient transitions to veteran? From a Bourdieusian view, this labelling maybe attractive, providing a pull for the military amputee to identify with *heroes*. It provides an engagement mechanism but does not explain why some engage fully and others do not.

Turner's [282] concept of social categorisation and *fit*, encourages social identity to be viewed as a continuum and to question why some experience it and others do not. For instance, the media labelled the military amputee as a *hero* [61]. This message was reinforced by images showing Military personnel walking or achieving extraordinary feats on prosthetics. Yet there were those who, for various reasons, could not use prosthetics [162]. Public interest could therefore be divisive, causing some to question their normative or comparative fit with these *hero's* due to their own appraisal of prosthetic ability. Self-exclusion from this peer group could thereby limit the rewards social affiliation might offer. SIP therefore provides empirically based theoretical framework through which we can view narrative accounts of the social dynamic.

2. Familiarity in a sea of uncertainty. Biographies written by military patients report a familiarity and comfort with military camaraderie and an emphasis on the DMRC gym [183, 184]. This military field of rehabilitation mirrors the rules and norms within wider military culture so little adjustment is required. This might not be the case during periods of home leave, as they confront the challenge their disability presents. At DMRC they group with others in similar situations. Knowledge gained by adjusting and finding solutions becomes valuable cultural capital. This capital offers influence and position to some and motivation to others. Turner [282] refers to *identity salience*; where an individual's need to serve self-esteem causes them at times of uncertainty to base personal identity entirely on group membership [282]. Where an individual identifies with a group (e.g. military, amputee, casualty) they face uncertainty together, reducing individual uncertainty [282]. Applying Bourdieu's view and a SIP to descriptions of the rehabilitation setting in Section

1, illustrates how this social dynamic may serve as significant support an individual's psychological adjustment and resilience.

Combining these theoretical views creates a *meta-theory* to underpin a biopsychosocial theoretical construct of analysis. The same narrative account can therefore be viewed from alternative perspectives, providing a more granular assessment of causal mechanisms. The hero example presents a quandary for the rehabilitation clinician as to why some engage fully, and others do not. The literature on resilience and post-traumatic growth illustrates how social bonds with family and peers support greater resilience and normative adjustment following trauma [159, 177, 287]. A SIP also offers some insight, but the action of engagement is embedded within intrinsic motivation. SDT deepens understanding of motivational factors determining involvement within social CAS.

Self Determination Theory

How is recovery facilitated? What persuaded patients and clinicians to pursue outcomes many thought were unattainable [62, 183]? CT clinicians found themselves working in very different ways with injury patterns they had never seen, under scrutiny few would tolerate. Patients confronted the realities of life changing, career ending injuries. As such, behaviour and agency are driven by the setting, group dynamic, prior experience, and an individual's cognitive appraisal of social setting value. The final part of this chapter will focus this cognitive attribution of value or motivation, defined as:

'...the process whereby goal-directed activities are instigated and sustained' [288](p5).

Motivation is viewed as a social cognitive process [289]. It is dynamic and targets a purposeful activity, acquisition or accomplishment [255]. Activities must benefit the self-esteem of the pursuant, *'instigated and sustained'* by interaction between an individual's cognitive thought and social context [255] (p2). Goal orientation, expectancy value, social cognitive, attribution and self-determination theories all contribute to a view of motivation [290]:

'Countless theories have been proposed to explain human motivation... each sheds light on specific aspects of motivation, each of necessity neglects others. The diversity of theories creates confusion because most have areas of conceptual overlap and disagreement, and many employ an idiosyncratic vocabulary using different words for the same concept and the same word for different concepts.'
[290] (p998)

SDT is distinct, as it recognises motivation taking two forms: intrinsic and extrinsic [248]. Intrinsic motivation is innate and encompasses human instinct seeking to grow, evolve and create. The degree to which this

instinct can be expressed is mediated by cognitive, social and cultural factors classified as extrinsic [291]. Adopting this theory within the theoretical construct is justified by the likely importance of both these forms of motivation. External factors motivate participation in an activity, yet it is argued that fulfilment can only be achieved when the drive comes internally [292]. Habits or actions driven by inner needs are more likely to become stable patterns of living [291]. If the goal of CT rehabilitation is a high quality of life, part of the task is to help a patient take ownership of this goal. If habits and behaviours fulfil this inner need, it is logical to assume these actions will be sustained beyond any intervention.

The MRC framework does not distinguish between internal and external motivational factors [13]. Bourdieu focuses upon individual action mediated by external forces acting within the field and on external reward via capital. The concept of habitus recognises an intrinsic response arising from the inner self [286]. SIP similarly recognises that group membership, attained by adopting group prototypes, may reflect the inner self [285]. Turner allows room within SCT for recognition of the inner self and its role in determining degrees of group involvement and engagement [285]. And SDT recognises that external factors have a motivational pull upon an individual, yet, would argue that QoL or wellness is achieved when behaviour is intrinsically driven [248]. It is this distinction, together with a more refined view of intrinsic drive which justifies the inclusion of SDT within the theoretical construct.

SDT has been empirically validated across different cultures, demographics and occupational contexts [293, 294]. It has been utilised in healthcare, particularly where an understanding of patient engagement and behaviour patterns is sought; health promotion, exercise, obesity management [295], sport involvement [296] and technological solutions [297]. The focus on interactions between inner needs and social cultural contexts provides an applicable framework through which data can be analysed. A diagrammatic overview of SDT is displayed as Figure 5.1 and referred to as its constituents are explained below.

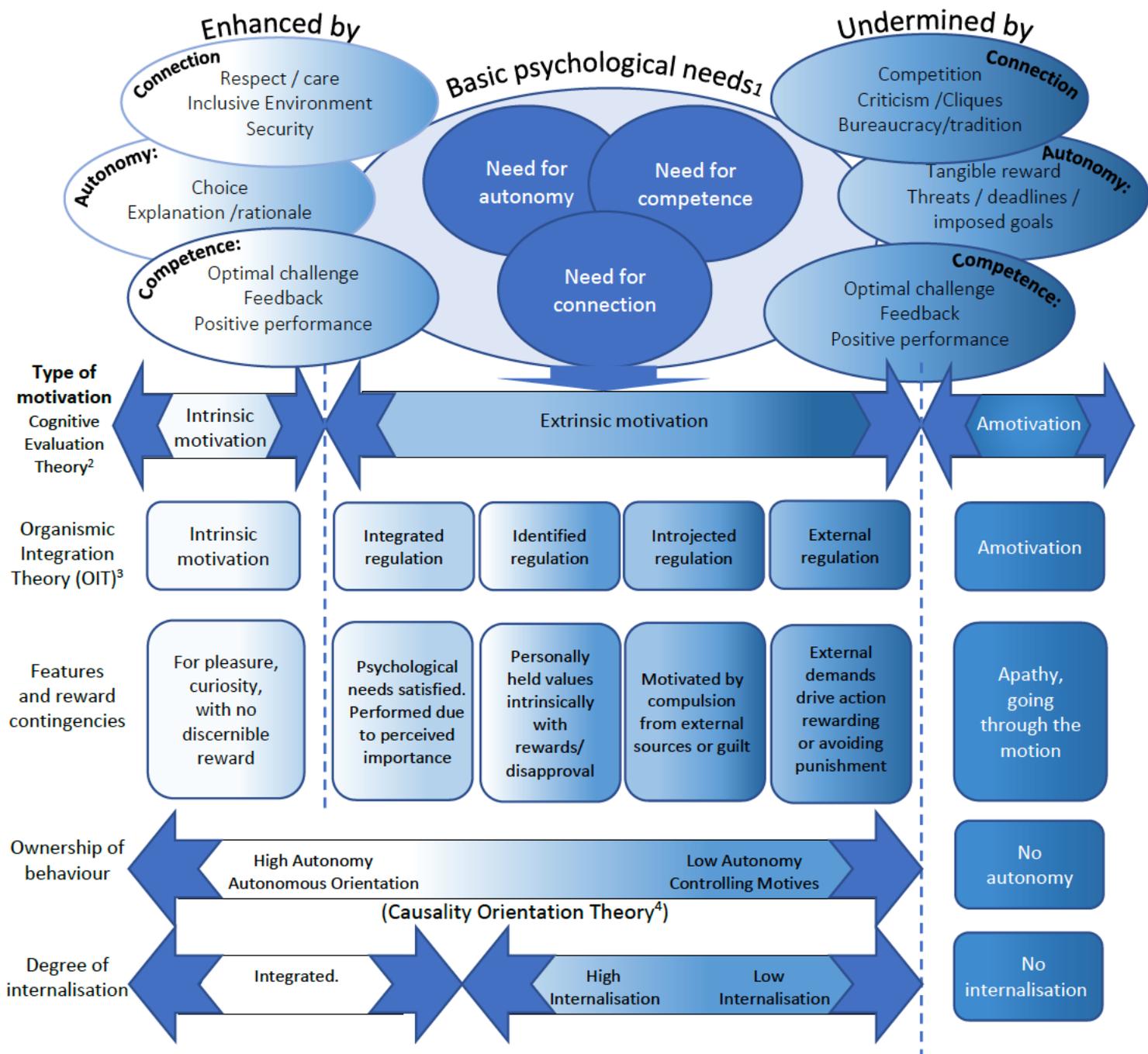


Figure 5-1 Self-determination theory as a metatheory. Diagram is developed from [296] (p2) and [41] (p1010) incorporating four micro-theories contained within SDT.

¹ Basic Needs Theory: Basic psychological needs presenting factors which enhance or undermine needs.

² Cognitive Evaluation Theory presents three main motivation types: intrinsic motivation (white), extrinsic motivation (light blue to dark blue) amotivation (lack of motivation) (dark blue).

³ Organismic Integration Theory (OIT) and their defining features of reward illustrates a continuum of internalisation in response to internal or external regulation

⁴ Causality orientation theory represents different motivational orientation (or internalisation) depending on need satisfaction resulting in differences in ownership of behaviour.

Ryan & Deci [298] first proposed SDT using an epistemological framework known as an *Organismic Metatheory* (Figure 5.1). This view assumes that humans innately pursue autonomy, growth, skill acquisition and creativity [298]. For this natural drive to flourish, *social* nourishment and support are required [292,

299]. Three inner needs (autonomy, competence and relatedness), if present, foster a spirit of growth and help construct personal well-being [299].

Autonomy: This does not refer to independence or individualism but volition in action [293], also known as authenticity (the author of our actions) [293] (p326)

Competence: Belief in an individual's capacity to attain a goal or execute an action [293] (p326)

Relatedness: Affiliation or belonging to those an individual wishes to be connected to [293] (p326)

An intrinsic pursuit of growth can be quashed if an individual is deprived of social nourishment. Extrinsic sources of motivation that routinely exist in society have been shown to undermine this process [291]. When rewards, persuasion, manipulation and/or punishment take precedent over innate motivation, ill-being may result [293]. From the development of the Organismic Metatheory, laboratory and field research highlight five sub-theories to explain the various components of human motivation [300] described below.

Cognitive Evaluation Theory (CET) (Figure 5.1²) focuses on the dynamic interaction between social and contextual influences (extrinsic motivation) and an individual's inner drive for fulfilment and/or interest (intrinsic motivation). As described above, the psychosocial needs of autonomy, competence and relatedness must be fulfilled to achieve psychological well-being. CET offers a cognitive explanation of how these psychosocial needs can be fostered or thwarted.

Basic Needs Theory (BNT) ((Figure 5.1¹) explores the needs of autonomy, competence, and relatedness in greater depth. As noted, external motivators and reward systems can undermine inner needs thereby compromising intrinsic motivation. Autonomy is undermined by threats, rewards, imposed control or goals [300]. Criticism and over-challenge will undermine competence, whilst competition, exclusivity or criticism can weaken any sense of relatedness [248]. BNT adds three social dimensions, explained below, that support the accomplishment of these needs. If used to inform social contexts, they can support basic needs to enhance well-being and resilience [300]:

1. **Autonomy-supportive contexts:** Social environments in which individuals actively promote the volition of those within it will support self-initiation and therefore autonomy.
2. **Well-structured contexts:** This refers to clear and evident social norms that, it is argued, support goal attainment. For structure not to limit autonomy, a rules-based system must operate in an autonomy-supportive manner; this structure creates clarity.
3. **Interpersonal support** is widely recognised as a means of supporting social connection and relatedness.

CET and BNT illustrate the interaction between social context and intrinsic needs. The following three theories, causality orientation, organismic integration and goal content consider the outcome of this interaction upon individual orientation.

Causality Orientation Theory (COT) (Fig 5.1⁴) recognises that individual differences occur, but rather than seeing these differences originating from individual needs, they declare humans have the same three needs (autonomy, competence, relatedness) [248, 300]. COT proposes that each person has a different motivational orientation depending on the degree to which these needs are satisfied. A de-motivated orientation (apathy, lack of volition) results from all three needs (autonomy, competence, relatedness) being thwarted. Controlled orientation (reliance upon external rewards) results from partial fulfilment of inner needs but the thwarting of autonomy. Autonomous orientation (self-initiated action out of enjoyment and/or curiosity) results from complete need satisfaction.

Organismic Integration Theory (OIT) addresses the effect of social context upon motivation [300]. OIT re-frames extrinsic motivation from a unitary feature into a continuum towards internalisation [300]. Figure 5.1³ presents the four phases along extrinsic continuum, with intrinsic motivation (motivated by pleasure) and amotivation (lack of intention) as extreme of this continuum. This theory is a useful concept in health research, providing a theoretical basis through which patients can start to internalise health behaviour [293]. A patient might initially start at *external regulation*, requiring external rewards to maintain health behaviours, eventually transitioning towards *integrated regulation* at which point internalised values and goals now form part of their identity. Eventually the patient comes to '*internalise and integrate*' health behaviours thereby intrinsically regulating their conduct [293] (p328).

Goal Content Theory (GCT) looks at whether an individual's life goals are intrinsic (personal development, community involvement, close relationships) or extrinsic (fame, popularity, fortune). GCT sees the orientation of life goals as an indication of whether needs have been thwarted or fostered [248]. Extrinsic life goals are viewed as a substitute for those thwarted needs. Empirical evidence within SDT shows that those who pursue extrinsic goals are unable to fulfil basic needs in this way, whilst those who pursue intrinsic goals present with greater well-being and health [291].

Although SDT is a widely researched theory some criticise its distinction between intrinsic and extrinsic forms of motivation, noting that human actions rarely fall into such clear categories [290]. A person may be intrinsically motivated in one area of life, but reliant upon rewards in another. OIT does allay this criticism by offering a continuum and recognition of individual differences, and COT acknowledges social and situational

influences upon motivation. Appreciating the role of these mini-theories within the overall theory, SDT allows for different components of life to hold different places on the continuum [299, 300].

Application

The goal of CT rehabilitation is to enable patients to achieve a high QoL following life changing injuries. The theoretical construct underpinning the analytical approach of this study assumes the patient will engage in action leading to involvement or withdrawal. Both Bourdieu and SIP emphasise the role of personal identity and self-concept within their cognitive theories of action. But neither provide a complex view informing an individual's drive to determine why they may engage or withdraw.

SDT, therefore, provides a theoretical lens through which patients' actions may be interpreted. This metatheory will illustrate how causal assumption and contextual features of rehabilitation act upon intrinsic need fulfilment [294]. Outcome literature assumes the military patient is driven to restore upright ambulation [107], but it is unclear if they are intrinsically motivated or driven by external factors, such as their reputation as a soldier, interest from the media, or competition with fellow patients. If rehabilitation outcome is driven by extrinsic motivators, health actions will theoretically cease when external control (punishment, reward, expectation) is removed. [296] However, military amputee patient accounts describing medical setbacks would suggest that prosthetic use is a highly internalised skill [162].

This theoretical stance also has application for the clinician. Workplace studies reveal an association between the fulfilment of basic psychological needs and resilience, especially when the setting is highly unpredictable [301]. Equally where needs remain unfulfilled, burnout and stress has been reported [301]. The inclusion of SDT within the theoretical construct alters the analytical emphasis. Bourdieu and a SIP propose that the individual acquires influence, and therefore power, to support their self-concept. Both theories see this process requiring the individual to forgo aspects of self to gain group favour and influence. In so doing, they exchange self- for group identity. SDT does not deny this process exists, but power is considered an external reward and its acquisition will not fulfil inner need satisfaction or well-being. Instead, SDT adds a focus on a human relational need to achieve connection as an intrinsic motivator. The identification of internal and external motivators provides a more refined explanatory account to capture transactional interactions as well as relational influences [292] .

Furthermore, a highly collaborative, versatile, creative strategy will help manage features of complexity [231]. These verbs, describing a response within a complex setting can be clustered around the intrinsic needs expressed within SDT:

- *Collaborative = connected*
- *Versatile, creative = competent*

- *Resourced and empowered = autonomous*

It can be argued that the intrinsic needs of a human, as outlined within SDT, equips an individual and group with tools to manage complexity. Deci [302] has proposed such an association. Studies of the workplace, education and other complex settings show an association between an individual's sense of autonomy, competence, and connection and their sense of well-being and resilience in unpredictable and stressful settings [301-303]. Identifying basic need fulfilment and its role within the group dynamic in CT rehabilitation setting appears to be of central importance to clinician and patient.

Summary: Proposing a Theoretical Construct

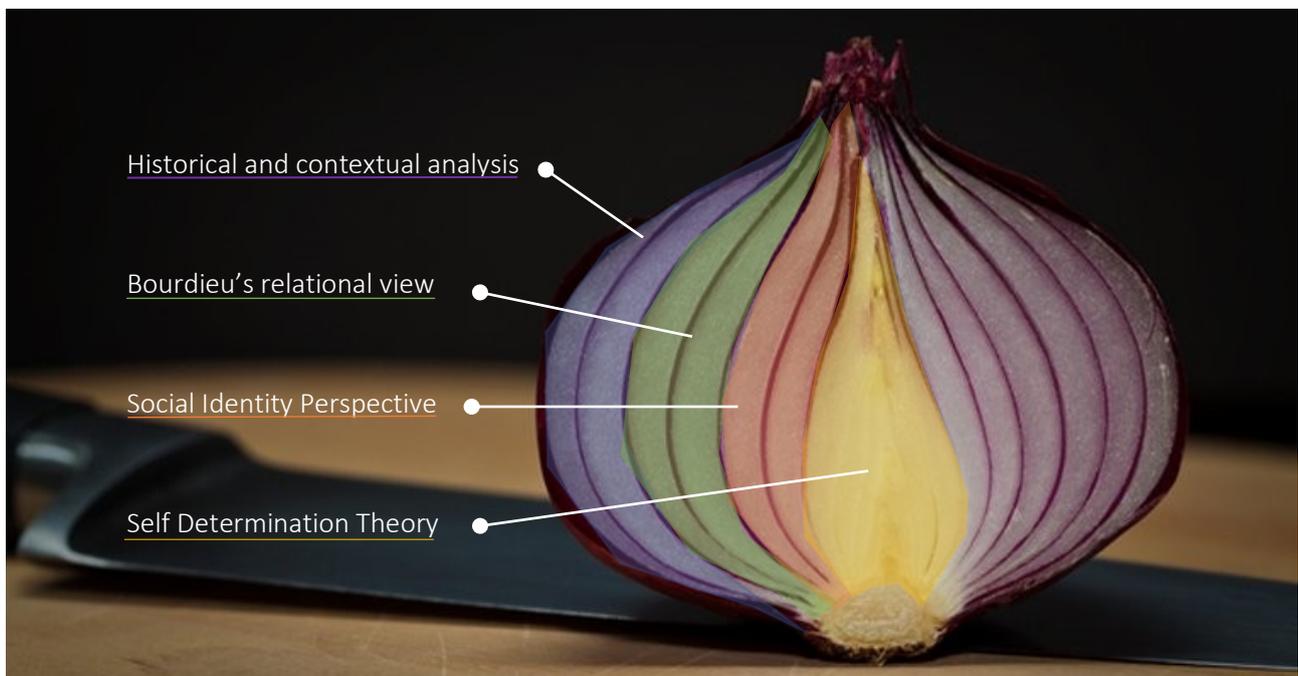


Figure 5-2 Proposed theoretical construct

Having outlined the rehabilitation process in chapter 3 and explored the nature of complexity in chapter 4, the importance of the social dynamic is now apparent as a key influential factor in the defence rehabilitation setting. Three theories have been presented in this chapter, with previous reference to historical and contextual analysis in chapter 1. This approach provides layers of insight into human social interaction, cognitive and motivational drive, and psychological need. The emerging theoretical construct, informed by Section 1's historical and contextual analysis, is represented in Figure 5.2 as layers of onion.

Bourdieu's relational view of power and symbolic capital offers explanation for both historical and contextual influences as well as group and individual dynamics. By defining military rehabilitation as a field, individual action and interaction within this field is determined by the rules of the setting and individual habitus.

A SIP explores the group dynamic within the field and provides a mechanism for how group identity is formed, and capital is used to support group membership. A SIP of the rehabilitation setting explains how organisational, cultural, and structural features interact with the social needs of patient and clinician. Each layer in the construct acknowledges that individual participation and engagement is a choice. The decision to engage is driven by an appraisal of the setting and the likelihood that an individual will achieve their basic psychological need to feel competent, autonomous, and connected. For this reason, SDT is placed at the centre of the construct informing analysis at every layer. The social dynamic is viewed using different theoretical perspectives. This structure provides an analytical lens through which data can be analysed to identify key actions, events or decisions influencing development of the rehabilitation setting and an individual's ability to fulfil or forgo their basic psychological needs.

The process of rehabilitation as a social dynamic supports a process of restoration; learning is central to this process. Through this learning, an individual can restore their independence and capacity for life. In the following chapter, this theoretical construct is placed within a social learning context. It is within this context that the theoretical parts of this construct interact and collectively reveal the dynamic under investigation.

CHAPTER 6 Social learning, collaboration, and teamwork

Introduction

In social CAS, system parts are individually and collectively human, and work alongside structural features. All three theories (Bourdieu, SIP and SDT) in the previous chapter emphasise the way an individual might learn from and adapt to their setting. The goal of rehabilitation is to instruct, teach and enable patients to learn ways to adapt and restore their lives (i.e., *re-habitation*). Social learning is the concept that brings the social element, adaptive need and situational goals together [304]. However, there are elements within any organisation facilitating or inhibiting effective social responses in complex settings. In complex settings, creativity and innovation is the appropriate organisational response [231]. In Section 1, the SDR sought to provide the strategic levers to enable such a military organisational culture. The example of PHEC illustrates the creative potential when an organisation's cultural practice dovetails with a social dynamic where learning is central [249]. In this chapter, a model of organisational creativity will be presented that recognises the importance of social learning. A system of social learning known as Communities of Practice (CoP) will be discussed to weave together the three theories within the theoretical construct. Organisational creativity and CoP recognise the importance of a non-hierarchical collaborative setting within which these social processes can be nurtured. Section 1 has already documented the reorganisation of clinical services at DMRC towards an interdisciplinary delivery model. To understand this relevance further, a complexity view of collaboration and teamwork is presented to argue that an organisational culture harnessing creativity, community learning and collaboration will thrive within a complex setting.

A culture of creativity and innovation

The Cynefin framework identified there is a social *and* organisational response when managing complexity [231]. Schein [305] recognises that the creativity and innovation demanded in such a setting may be hampered by organisational culture [306]. Schein [306] argues that organisational behaviour stems from basic assumptions (unconscious norms), espoused values (professional culture / mission) and artifacts (visible organisational attributes), which influence how workers perform tasks. A complexity view, however, places equal weight on system and social influences. In a widely referenced paper, Martins [82] draws upon systems theory and Schein's [305, 306] work to provide a model of organisational cultural influence upon creativity and innovation [82] ([Appendix 3](#)). It provides a holistic view of organisational culture encompassing the role of leadership (within strategy), structural features encouraging flexibility, autonomy and collaboration and allocation of resources, time, and personnel (support mechanisms). Martins [82] identifies how learning and exploration is encouraged through risk taking, idea generation and mistake

handling. Behaviour facilitating learning and experimentation involves the management of the social dynamic, for instance, conflict, trust, communication, and information flow. This model combines the social features previously discussed that incentivise social identification, and implicitly identifies the leader as a principal facilitator [307], however both Schein [306] and Martins [82] model this process in a linear fashion. For the purposes of this thesis a complexity view has been developed combining Martins [82] work with Schein's [306] model of organisational culture. illustrating a two-way interaction between system (embedding values and norms, organisational traditions and artifacts) and social processes [307] (Figure 6.1).

In the following sub-section, the concept of CoP will be proposed as a social learning mechanism to incorporate features of SIP and SDT. The conditions to facilitate any social dynamic, creative process or collaborative ethos will be heavily influenced by organisational culture, leadership and embedded values [307].

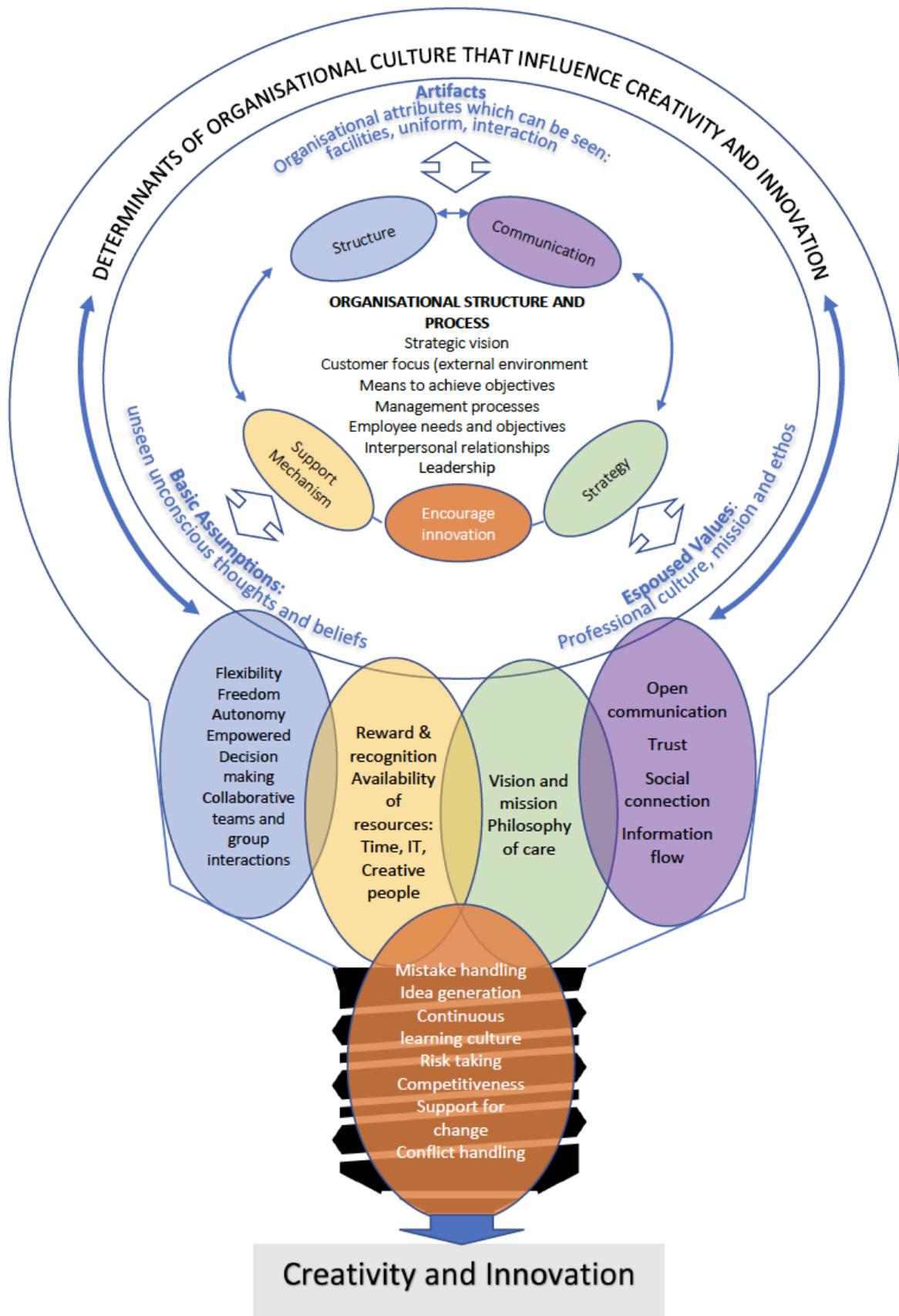


Figure 6-1 Light Bulb Model of Innovation & Creativity: Developed from Martins [82] (p70) and Schein [306]. Organisational structure and process (centre of the light bulb) results from interaction between features of organisational culture (artifacts, basic assumptions, espoused values) and social processes inherent within Structure, Communication, Strategy, Support mechanism. Each social process is colour coded and is linked to a matching colour coded oval. In these ovals are listed cultural characteristics. When social processes encourage these cultural characteristics, innovation and creativity will result.

Communities of Practice (CoP)

CoP is a social learning system [250] based on learning theory. Anthropologists Jean Lave and Etienne Wenger observed patterns of learning amongst apprentices, identifying how learning and practice became a dynamic curriculum as apprentices exchanged ideas with more experienced peers [304]. These patterns of learning have also been reported amongst military amputees [162] and observed in numerous other sectors e.g. business [308], healthcare [309], education [310] as well as being used as a forum to support transdisciplinary projects.

'...communities of practice are everywhere....so familiar perhaps that it often escapes our attention. Yet when it is given a name and brought into focus, it becomes a perspective that can help us understand our world better. In particular, it allows us to see past more obvious formal structures such as organizations, classrooms, or nations, and perceive the structures defined by engagement in practice and the informal learning that comes with it.' [311] (p3)

CoP articulate a social dimension within human learning, but does not claim to be a comprehensive social theory nor a formalised systems approach [250]. Instead, it is a concept compatible with theoretical paradigms across the social sciences, allowing it to be combined in plug and play fashion [250]. A learning community can occur across any organisation where its participants work in parallel but collaborate with one another, for example, within different departments or specialist areas. It also operates within a team where participants pursue shared daily goals [312, 313]. The common use of the terms 'community' and 'practice', as well as potential breadth of application of this concept led Wenger and Lave to propose criteria and definitions to ensure accurate identification and application [250]. Not all communities are CoP [304]. To help differentiate CoP from other forms of community and learning processes, they are defined as:

'...groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.' [311](p1)

This definition underscores characteristics of CoP in which three interrelated social processes are evident:

1. **Domain.** This characteristic mirrors Bourdieu's concept of a field, outlining boundaries that differentiate membership from non-membership [162].
2. **Community.** This creates social structure, with shared rules, norms and goals to govern social identity, social categorisation and interaction, language and ultimately learning [249].
3. **Practice.** This is the endeavour, skill or knowledge the community and individuals within it seek to develop and share. [304]

CoP views learning as the product of a relationship between the world and one another as represented in Figure 6.2. As the concept develops, three interrelated features of CoP are presented: mutual engagement, joint enterprise and shared repertoire [314].

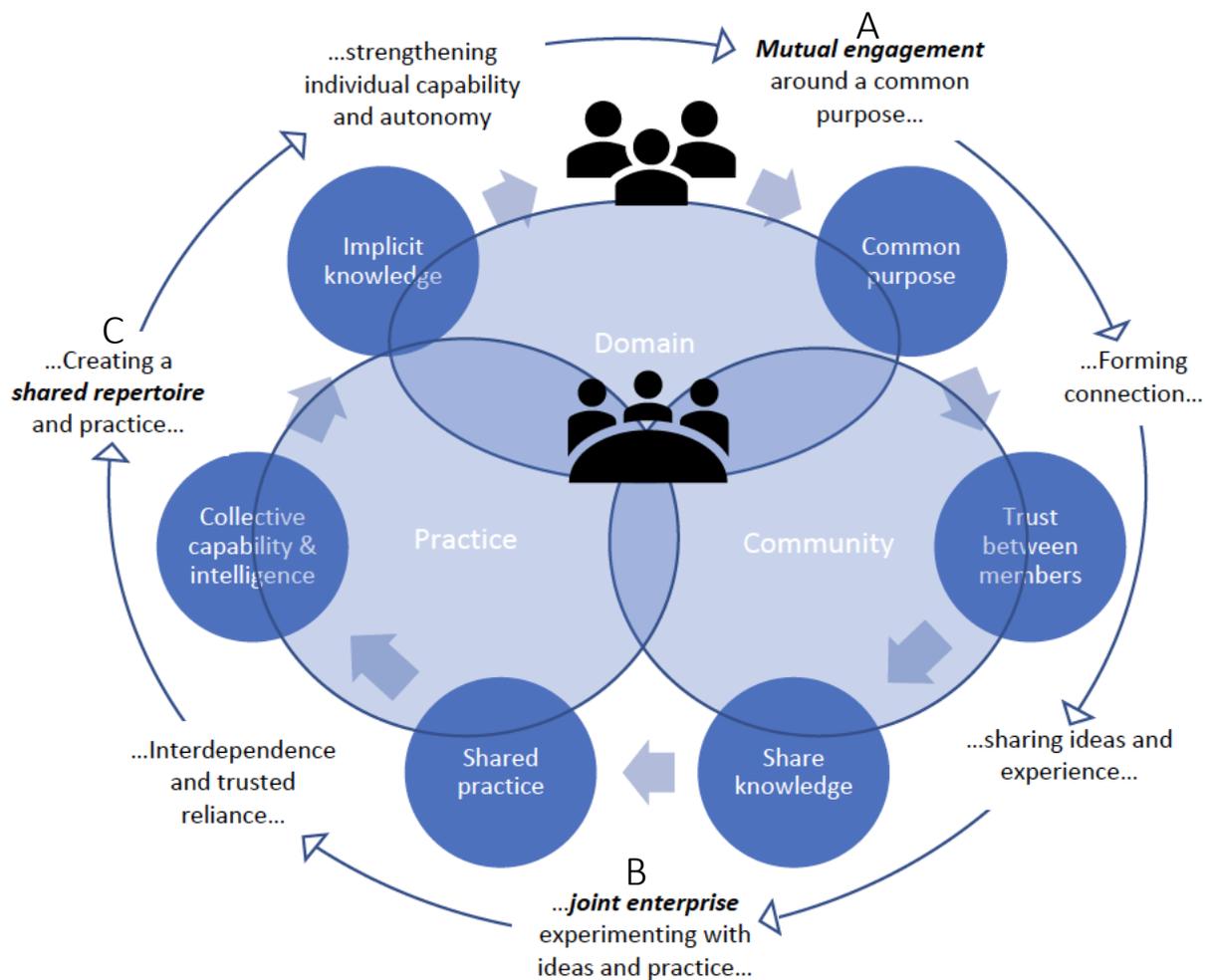


Figure 6-2 Communities of Practice Representation of the three characteristics and interrelated features of CoP, starting with mutual engagement around a common purpose (A); leading to joint enterprise (B) developing a shared repertoire (C).

A. Mutual engagement: Emphasises a social process arising from participation and leading to the development of shared meaning [249]. This shared meaning includes a negotiated competence around what learning takes place. An individual's level of mutual engagement will depend upon the degree to which their identity is enmeshed within the community. Participants new to CoP have been shown to remain on the periphery as they observe and assess the group, the rewards of involvement and their likely capacity to interact successfully within it [249]. There are clear parallels here with Bourdieu's theory of action, and the concept of capital requirements within different social settings. In addition, using a SIP, the potential participant is engaged in a social identification and categorisation process to determine their future involvement.

B. **Joint Enterprise:** CoP are centred around *practice*; a task or practical skill – meaning that *learning* will co-exist with *doing*. Participants share a common purpose, work activity or common goal [315]. A boundary or limit to the scope of the enterprise is required, not dissimilar to Bourdieu's concept of field. This limit enables the community to establish the competence that differentiates between membership and non-membership.

C. **Shared Repertoire:** Shared language or terminology, resources, forms of identity and skills, all create similarities that support the development of meaning and the formation of identity [315]. This modulation of identity with the community creates mutual accountability and relatedness which is particularly valuable where the community is made up those from a diverse background [315].

These features place an emphasis upon the individual as a social participant; the formation of their identity within this community is a critical part of the learning process [250]. As the individual freely chooses (autonomy) to pursue learning around a particular practice within a community, they adopt the shared repertoire of their chosen group to find a place within it (relatedness). In this dynamic, the outcome is unpredictable but essential if the practice gained is to be meaningful (competence). CoP are clearly compatible with SDT in recognising that collective learning can facilitate well-being. The application of the CoP concept to this study is now considered.

Application: The Military Patient

This section utilises CoP as a plug and play concept of learning, illustrating how it can be used to bring the proposed theoretical approaches together [316, 317]. Terms specific to each theory (e.g., field and Bourdieu) will be used throughout what follows without specific reference to the theory. In this way, the intention is to present a combined theoretical explanation centred around the CoP concept.

Neal's [162] ethnographic study of soldier rehabilitation noted the description of a culture in which they principally learned from one another. Although a small sample (n=10) they were selected owing to wound complications. This cohort had to learn skills to manage these wounds. The military rehabilitation setting is the *domain*. Shared language inherent within military culture and strong identifiers such as amputation and the shared experience of war and injury meant that the pre-requisites of a *community* existed too. For those newly admitted patients, social categorisation enabled close identity with this community. For the amputee, the *practice* is prosthetic gait training.

CT rehabilitation adopted a group therapy approach and applied it to prosthetic gait training. These groups are examples of *mutual engagement*, where patients are bonded by a similar pursuit. Neal [162] documents how some remained on the group periphery until they had established what they could do and what the nature of the activity involved. Medical setbacks also had this function indicating a possible negative self-categorisation process and group distancing for those experiencing delays in progress and medical complications.

Group therapy sessions harness what Wenger & Lave [318] refer to as *situated learning*. Situated learning is when learning and practice go together, characterised by interplay between experienced and inexperienced learners and more formally qualified tutors (clinicians in the case of this thesis). This situated learning has been observed in many forums since and forms the backbone of CoP [313, 316, 317]. Where the setting is supportive and unthreatening and the tasks attainable, this learning environment has been shown to help reinforce practical skills through practical application and immediate feedback [313, 316, 317]. In the case of Neal's [162] sample, prosthetic training became the *joint enterprise*. A *shared repertoire* around prosthetic componentry, movement terminology and military humour gave members of the community identity. Those unable to use prosthetics or did not do so with the same ease and agility might have avoided this community. If a military amputee identifies with this patient group yet is unable to achieve the same competence on prosthetics, it may undermine their sense of relatedness to the group, their freedom or autonomy to live life and ultimately their intrinsic sense of well-being. Here, application to the military patient is clear. There are implications in terms of the messaging provided to patient groups and its power to influence how an individual socially categorises and views their similarities with the wider group and assesses their comparative fit within the community. This could have profound implications on their social identity, sense of belonging and connection with other military patients.

Application: The Clinician

Although, systematic reviews consistently show the breadth of application CoP has within healthcare, education and business [313, 316, 317] primary research demonstrating the benefits CoP has to offer in healthcare is somewhat lacking [313]. It is suggested this is for three reasons:

i. **Social Setting.** Healthcare appears to adopt CoP in more formalised social settings, for example, journal clubs, in-service training, research collaborations and special interest groups [319]. The focus tends to be on tasks of learning rather than social components [99]. The use of virtual CoP exemplifies this. This innovation has extended the reach of learning in healthcare, bypassing geographical and professional boundaries, whilst facilitating knowledge sharing [320]. However, a virtual setting may only encourage peripheral engagement, allowing for little social discourse beyond the purpose of meeting [320]. Consequently, group identity does

not develop, and trust is difficult to generate [320]. Face to face social settings are less efficient in delivering learning, but informal interaction enables group members to categorise and identify with one another to generate social connections that go beyond the learning environment, thereby attaining trust [320].

ii. **Research Method.** CoP research within healthcare has suffered from the appropriation of a reductionist approach in seeking validation [313]. A research method that can evaluate complex social dynamics in healthcare is needed [313]. A more recent focus on mixed methods and the triangulation of findings has proven fruitful [317].

iii. **Hierarchy and professional boundaries.** The difficulty of introducing CoP within a healthcare setting where hierarchy, professional boundaries and commissioning structures prevent cross-disciplinary working has been noted [250]. Wenger [250] admits that CoP do not sit easily within hierarchical settings. When investigating an MDT environment, attainable CoP benefits were not realised due to the parallel nature in which professional groups interacted within the MDT, undermining interdisciplinary contact and idea exchange [321]. Other case examples show how CoP may encourage interagency work across professional specialisms and so blur sector boundaries [309, 315, 316]). One mixed method study explored the use of CoP as a collaborative initiative in a low resource setting where complex health needs were impacting maternal mortality [322]. The initiative sought to enable more responsive and informed real-world policy making through knowledge sharing between policy makers, researchers and clinicians [322]. Reportedly it improved the interface between health care providers and policy makers and enabled a flow of tacit information (inherent knowledge, ground truths), ordinarily unreported, adding considerable value to a real-world view. A similar approach in the field of global oncofertility programmes introduced a multinational CoP to improve networking and liaison between professional groups as well as across international boundaries [309]. The capacity building made possible through this CoP strengthened research and clinical programmes and brought greater diversity of views into the programme [309]. The complex nature of these interventions makes it difficult to capture resultant outcomes [309, 322].

Partitioned teams risk becoming strongly associated with themselves [250]. Fostering interdisciplinary networks introduces challenge into the learning process [315]. Learning does not necessarily take place because participants agree or share similar backgrounds (Wenger 2011). Instead, diverse perspectives offer new alternatives. Recognising this value generates trust between learners (Wenger 2011). This has been seen most notably within the business sector. Highly complex business environments, particularly amongst technology companies, employ a bottom up, non-hierarchical micro-team ethos to enable innovation and responsive market-based solutions. Such a structure, however, risks fragmenting a business if these small innovative teams are not also connected to wider business networks [323]. CoP have been used to

introduce networks across such organisations [323]. In a recent Spotify case study, an online music application, the use of special interest groups encouraged cross fertilisation of ideas, productive informal networks between teams, and individuals to further their own personal interests – some lying outside their immediate team-based activity [324].

A Complexity View of Collaboration and Teamwork

Collaboration is widely considered by contemporary authors as a key team attribute to managing complex non-linear problems [52, 325]. In the scientific literature the picture is somewhat hampered by a quagmire of terminology resulting from a litany of definitions and terms. Studies, therefore, lack conceptual clarity on what collaboration is, alongside a failure to distinguish between collaboration and teamwork [326]. This has hindered the development of a robust evidence base for this social phenomenon [326]. Given its importance within CAS, collaboration will now be explored in three ways in terms of characteristics, and its relationship to teamwork and complexity view, proposing it exists as a continuum, rather than a hierarchical model of team organisation.

Collaboration

‘Collaboration occurs when a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain.’ [327] 1991 p146

Collaboration results when individuals actively choose to adopt a shared approach [327]. Ciemens [328] used in-depth interviews to explore the experiences of clinicians working in a highly collaborative palliative care setting. Patient-clinician relationships were described by the palliative care team as close and mutually supportive. Positive outcomes of collaboration included a spirit of enquiry, trust, shared purpose, holistic thinking and peer support [328]. The complexity of patient presentations and interrelated challenges created uncertainty for many patients and clinicians; yet clinicians felt their resilience came from human connection with team members [328]. Whilst capturing themes arising from these interviews and presenting a case example to support the use of collaborative processes within complex settings, no conceptual analysis nor participant prioritisation of themes helped to dissect the constituents of collaboration.

A review of conceptual frameworks exploring collaboration (1990-2003) identifies five common concepts: sharing, partnership, interdependence, power and process [134]. The concept of sharing includes working

towards collective goals, shared decision-making, joint working and shared responsibility [134]. The concept of partnership emphasises mutual respect as genuine cohesion arises from open communication and a collective identity [134]. Interdependence then follows as individuals surrender a degree of personal, in favour of group, autonomy. This surrender occurs as workers share, partner and then become interdependent; a highly autonomous act when performed out of free choice [134, 329]. It arises when trust exists within the process, encompassing both leaders and colleagues in a two-way process [134]. For this reason, power is the final concept the authors highlight, recognising that those with power determine the nature of a collaborative setting. Where collaboration is highly prized, power symmetry rather than hierarchy exists between manager and clinician, and clinician and patient [134]. Clinical leadership is shared, or transitions across members, depending upon expertise and requirements [330]. Authors note the delicate way in which leaders in such settings must conduct themselves within this matrix of consented interdependence and shared autonomy, avoiding the exertion of one's interests over another so as not to hamper the trust that maintains this interaction [134, 330]. This has implications upon the nature of a leader's role depending on the form of collaboration chosen. Although dated, this review provides a conceptual understanding of collaboration, in which sharing, partnership and interdependence replace individualism. The challenge in healthcare is that much research centres upon the clinician experience of collaborative structures. No known studies have provided an in-depth patient perspective alongside comparative clinician viewpoints.

The benefit of and need for collaboration is widely accepted across health care as evidenced in recent policy [331]. Collaboration overcomes the limitation of individuals enabling a collective solution to the increasingly complex problems faced in many sectors of society [332]. Rapid technological advance has increased both complexity and the need for collaboration, but this has outpaced our understanding of the transformation of current processes and organisation needed to support highly collaborative solutions [333]. As an example, a recent Cochrane review found nine randomised studies investigating patient outcomes following team-based interventions [334]. Firm conclusions were not possible due to study quality, rated low to very low, hampered by different interpretations of teamwork in several different settings [334]. Whilst collaboration is the conceptual focus, the team structure and its leadership remain important as they determine how collaboration operates.

Teamwork in the clinical setting

Collaboration and teamwork are considered distinct features of the social world. Collaboration is a variable component within the team depending on setting and task [335]. Teamwork in a healthcare setting has been described as:

'A dynamic process involving two or more health professionals with complementary backgrounds and skills, sharing common health goals, and exercising concerted physical and mental effort in assessing, planning, or evaluating patient care. This is accomplished through interdependent collaboration, open communication and shared decision-making.' [336](p238)

Therefore, team structure will affect the form collaboration takes. Misunderstanding and misuse of terminology describing healthcare teams is widespread including national policy [2]. This view promotes a hierarchy of teamwork to include transdisciplinary, interdisciplinary and multidisciplinary teams [337]. These terms are heterogenous constructs, so their application and configuration will vary between settings, tasks, and individuals. Definitions for these three team structures appear in Table 6.1. Across military operational hospital care only IDT and MDT models operate. For this reason, this study will only adopt the definitions for MDT and IDT, and not for the transdisciplinary team (TDT) (Table 6.1) [338]. *Inter* is used as a prefix to signify a team is working together in a highly collaborative, often co-located form [337]. *Multi* signifies that multiple people are working alongside one another or in parallel [338]; a hierarchical team structure requiring a senior clinician to coordinate the parallel efforts of monodisciplinary departments working towards monodisciplinary treatment goals [337].

Some studies also distinguish between interdisciplinary and interprofessional (i.e., multidisciplinary or multiprofessional). The term *professional* should follow the prefix of *inter* or *multi* when members of the team are all from the same domain (e.g., medicine or education). *Disciplinary* is used when members of the team come from different domains [338]. Again, this terminology is not consistent across the literature. For the purposes of this thesis, it is the prefix *inter* or *multi* that is of importance as this which signifies the team dynamic.

As CT at DMRC was made up of co-located clinical personnel, social workers, technicians, and prosthetists, *interdisciplinary* is the correct term to use. As noted in section 1, some professional groups subsequently introduced into DMRC maintained their own professional department and hierarchy. In these cases, they interacted with the IDT adopting an MDT model, thereby managing their own goals.

Term	Definition
Multidisciplinary Team (MDT)	'...where several different professionals work on the same project but independently or in parallel.'
Interdisciplinary Team (IDT)	...is a structured entity with a common goal and a common decision-making process ...the interdisciplinary team is based on an integration of the knowledge and expertise of each professional, so that solutions to complex problems can be proposed.
Transdisciplinary Team (TDT)	'A transdisciplinary team is characterized by a deliberate exchange of knowledge, skills and expertise that transcend traditional discipline boundaries.'

Table 6.1 Definitions of multidisciplinary, interdisciplinary, and transdisciplinary [134] (p120)

Chapter 4 emphasised the need for collaborative models of working in complex settings [231]. This is the principal justification promoted in healthcare literature reporting on interdisciplinary working, hence the reorganisation of clinical delivery which took place at DMRC ([Chapter 3](#)). Within civilian healthcare, the IDT approach can be found where ongoing complex health needs encompass both health and social care (geriatrics; palliative care; hand therapy; burns and plastic) [328, 334, 339]. Endorsed by WHO, this collaborative dynamic has been recognised as beneficial where there is no formulaic treatment and outcomes are uncertain [340]. It is increasingly accepted that no single profession holds all the answers, and so benefits seem pronounced when cultural and organisational barriers between professional groups are removed and leadership adopts a non-hierarchical style [341]. Beyond healthcare literature, hierarchical organisational models equivalent to an MDT are widely criticised when employed within complex settings due to their linear, disempowering approach thought to interrupt creativity and curtail necessary innovation [52, 325, 342].

Benefits brought by collaboration lead to this assumed hierarchy of teamwork [134, 337], in which teamwork and collaboration exist in a linear hierarchy, with transdisciplinary presented as the most collaborative and preferable and multidisciplinary as the least collaborative and efficient [338]. Snowden [236] counters this view to argue that the MDT approach is more suited in predictable, simple or complicated contexts. It is important therefore to consider setting, team and task when determining a model of teamwork [2]. A further challenge is that of tradition. Large healthcare settings, such as the NHS, frequently maintain an MDT operational status quo. Consequently, integration and innovation remain unfulfilled policy expectations [343]. Part of this difficulty arises from different interpretations of what integrated healthcare is. As Glasby [343] notes, integration of management and budgetary process necessitates operational simplicity, so an MDT delivery model is preferred. Employing a highly collaborative and integrated clinical team in complex healthcare settings requires more bespoke managerial and operational solutions.

In a comprehensive review of literature, Xyrichis [344] proposes that *team process* and *structure* are two key determinants of interprofessional climate. Where the process and structure are too insular, collaboration beyond the team is undermined [134]. An IDT process takes time to develop and the role of leadership ensuring process and structure helps to foster trust, interdependence and support, and is key to ensuring collaboration is embedded within the culture of the team [134, 330, 344]. But, mutual sharing, partnership, and interdependence, can cause role blurring between members. Individuals can feel disenfranchised and others burnt out [341]. Clarity of role and responsibilities are needed to counter this. Proximity between members will also foster cross-disciplinary working and partnership [134, 330, 344].

The variance of terminology in the literature, and lack of alignment of context, task and role, means there are very few quality studies from which outcome can be assessed [327, 334, 338]. This has also led some to call for an overarching term for collaborative teamwork that focuses upon the characteristics within each team and setting requirements [2]. This view of teamwork is more dynamic and in keeping with a complexity viewpoint.

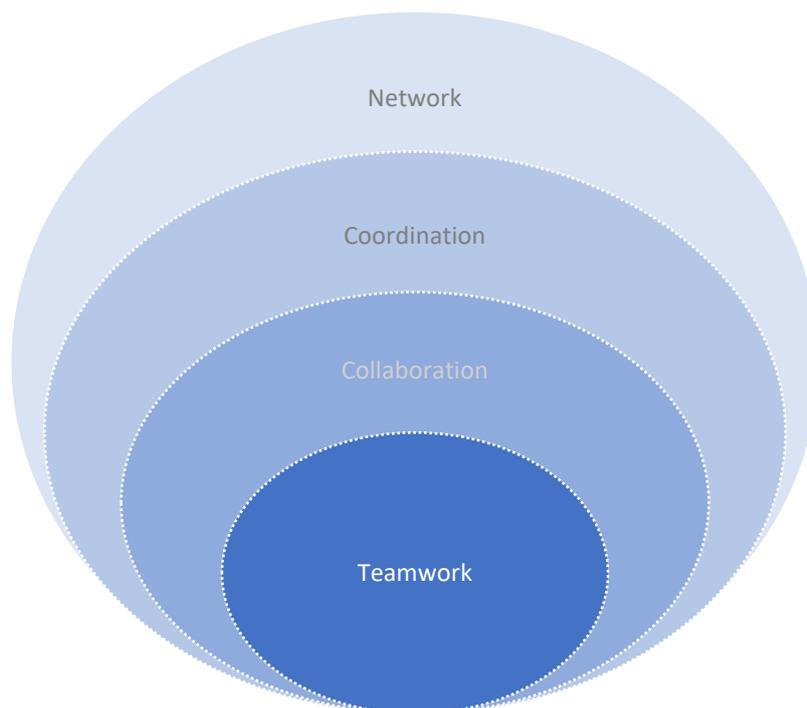


Figure 6-3 A typology of interprofessional work (Adapted from [3], p57)

The Healthcare Team: A complexity view

A hierarchical categorisation of teamwork (MDT – IDT – TDT) serves a managerial purpose but does not offer flexibility to the clinical team. A lack of research exploring the healthcare team, and the patient perspective compounds this issue [334]. Reeves [3] recognised the need for a conceptual framework of a healthcare team to illustrate how it could be adjusted to fit each context and be assessed for research purposes. Using

the term ‘interprofessional’ to represent the paradigm of the clinical team, he created a typology of interprofessional work based on available evidence (Figure 6.3). Nested circles represent increasingly collaborative and inclusive forms of teamwork, separated by permeable borders. Each layer has six dimensions describing relationships between patient, clinician and manager: shared commitment, shared identity, clear team goals, clear roles and responsibilities, interdependence between members and integration between work practices [3].

Xyrichis [2] empirically validated this typology against published literature. Where it did not align with studies deemed of sufficient quality, a team-based consensus approach was used to refine it. The result (Figure 6.4-6.6) included two further sub-categories within *collaboration* and three within *coordination*. Figure 6.4 displays the refined typology, and Figure 6.5 defines each category. The 6 dimensions proposed by Xyrichis [2] (shared commitment, shared identity, clear team goals, clear roles and responsibilities, interdependence between members and integration of practice) creates a continuum of activity (see Figure 6.5) as opposed to a binary IDT/MDT hierarchy. IDT aligns most closely with *teamwork* and *collaboration*, whilst the MDT aligns with *coordination* and *networking* (Figure 6.5). The validated framework ‘Interprofessional activity classification tool’ (InterPACT) (Figure 6.6) was developed to assist managers and clinicians to self-assess *settings* and *stakeholder needs* to inform interventions and research.

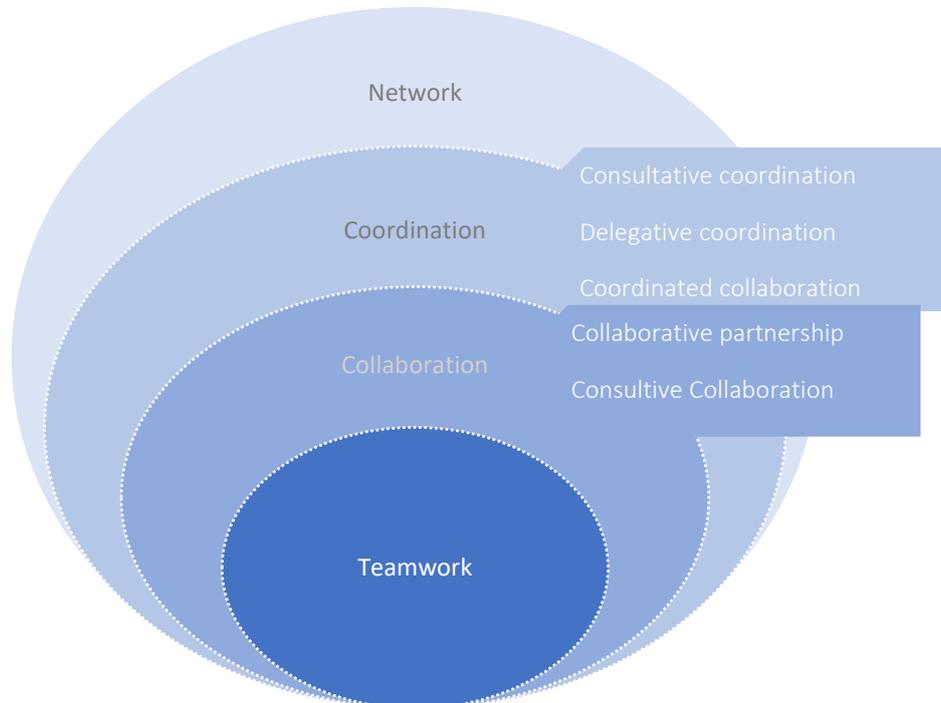


Figure 6-4 The InterPACT typology of interprofessional work activity (adapted from [2], p418.)

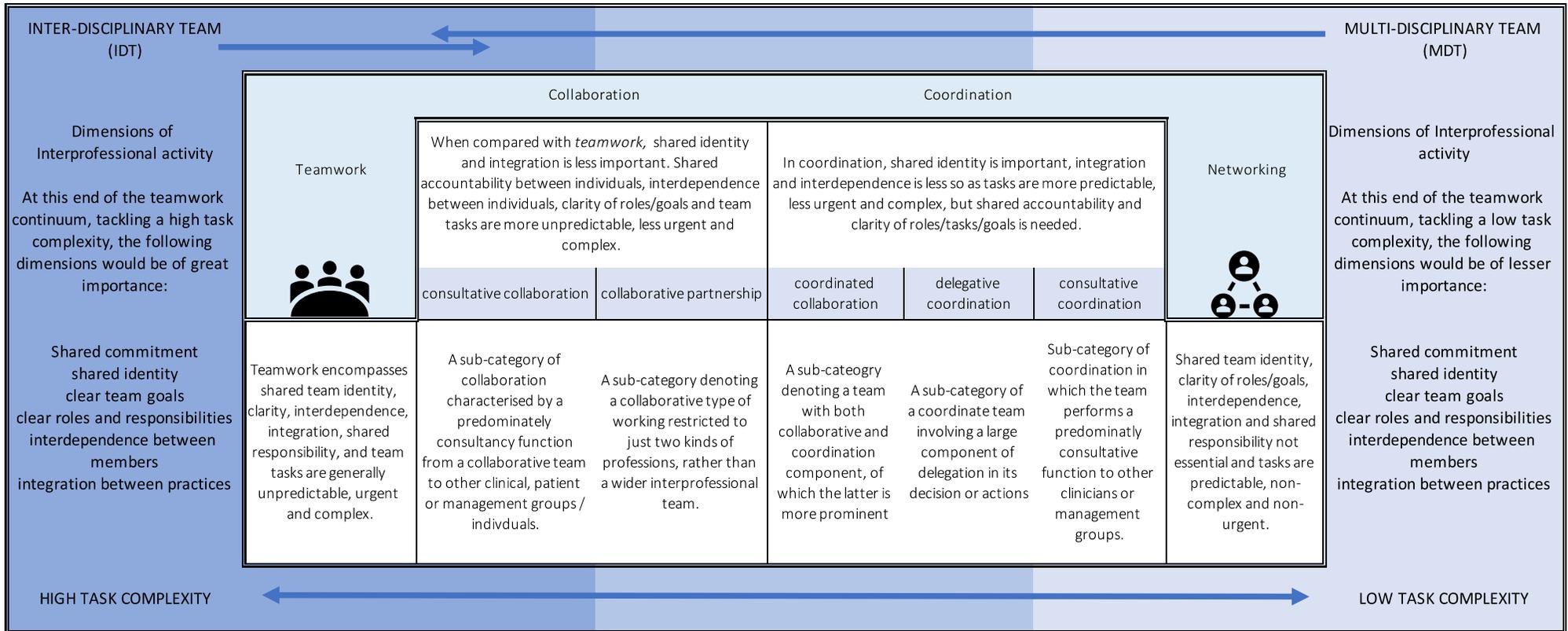


Figure 6-5 InterPACT dimensions and Interprofessional activity definitions (developed from [3] and [2]) (central portion of the figure in white / off-white). Outer part of the figure shows IDT to MDT continuum (top)/ task complexity (bottom). Dark blue (left) indicates high task complexity, high importance of teamwork dimensions, and optimal use of IDT model. Light blue (right) indicates low task complexity, low importance of teamwork dimensions and optimal use of MDT function.

InterPACT Evaluation of the teamwork continuum		Teamwork ←————→ Networking								
			collaboration	consultative collaboration	collaborative partnership	coordination	coordinated collaboration	delegative coordination	consultative coordination	
Dimensions of interdisciplinary / interprofessional practice	Shared commitment	★★★★	★★★★	★★★★	★★★★	★★★	★★★	★★	★★	★★
	shared identity	★★★★	★★★	★★★	★★★	★★★	★★★	★★	★★	★★
	clear team goals	★★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★
	clear roles and responsibilities	★★★★	★★★	★★★	★★★	★★	★★	★★	★★	★
	interdependence between members	★★★★	★★★	★★	★	★★	★	★		★
	integration between practices	★★★★	★★★	★★	★★	★★	★	★	★	★

Figure 6-6 InterPACT Continuum of teamwork (adapted from the InterPACT [2] (p423)) Self-evaluation of interdisciplinary intensity: ★★★★★very high, ★★★ high, ★★moderate, ★low

Summary

A social CAS is an adaptive system in which system parts interact and learn from interactions and outcomes. The principal system part is human, and so interaction and adaptation occur from collaboration between system parts and situated social learning. CoP is the most appropriate concept to be used in this thesis as it provides a framework upon which elements of the theoretical construct can be applied. It encapsulates the formal and informal settings existing in CT rehabilitation where clinicians and patients interact and share practice. Within these social settings, knowledge and experience become capital, but the norms and behaviours within CT rehabilitation are framed by military culture. This community of practice, therefore, serves individuals who need to develop competence in their skill as an amputee, providing connection to others who are also on this journey or supporting it. CoP inspire autonomy by bringing together amputees of different skill levels and at different stages of recovery.

Collaboration is a key strategy in complexity management [329]. Categories of teamwork used within the military (MDT and IDT) have been defined, yet a complexity view of teamwork is required for this study. The InterPACT is suggested as an assessment tool to evaluate collaborative teams, as it provides a dimensional view of teamwork, congruent with a complexity view. InterPACT's dimensional definitions of MDT and IDT may be comparatively offered against accounts from study participants to help analyse data and answer the research question.

Section 2: Summary

From the contextual background detailed in Section 1 key themes arose to inform the choice of epistemological, theoretical, and conceptual foundations for this study. Complexity has been defined as *unpredictable and dynamic; leading to multiple outcomes from a range of interactions and ongoing adaptation, where there are no defined rules of engagement*. These characteristics are evident from descriptions of context and clinical presentation in Section 1. The CT rehabilitation setting has been defined in Section 2, therefore, as a social complex adaptive system, acknowledging not just its complexity, but the adaptive and social dynamic elements within it.

Complexity science is adopted as the epistemological paradigm for this study. It is capable of embracing multiple perspectives to achieve a rich description and explanation of interactional patterns and outcome [11]. Using an adapted MRC framework as a guide, emphasis has been placed upon the social or human element as a key adaptive influence within CT rehabilitation. This human element brings unpredictability to any organisational system. A complexity view brings theories together to generate thick explanatory descriptions. Different theoretical approaches enable triangulation of views supporting the development of robust explanatory theory. The construct proposed in Section 2 incorporates three justified theoretical perspectives (Bourdieu, SIP and SDT). Although each theory takes a different viewpoint, they all acknowledge the centrality of human agency or choice in determining engagement in a social process such as rehabilitation. Their collective insight will help peel back layers of social and organisational dynamics involved in the rehabilitation of military patients who have suffered limb loss. The concept of CoP will be used in this thesis to weave together the above three theories. CoP have already been observed in military rehabilitation settings using group therapy [162].

Also, Chapter 6 introduced concepts of creativity, innovation, collaboration and teamwork, in managing complexity [329]. Martin's model of organisational culture highlights the role of the leader and their influence on an organisation's response to complexity [82]. Categories of teamwork used within the military (MDT and IDT) have been defined, yet a complexity view of teamwork is required for this study. The InterPACT is suggested as an assessment tool to evaluate collaborative teams, as it provides a dimensional view of teamwork, congruent with a complexity view. InterPACT's dimensional definitions may be comparatively offered to help analyse data. Having established the epistemological, theoretical, and conceptual foundations of this study, Section 3 will discuss the most appropriate methodology and method to answer the central research question.

Section 3: Research Methodology and Method

Section Introduction

The contextual background in Section 1 justified the central research question for this study. Section 2 has specified the epistemological, theoretical, and conceptual underpinning needed to answer this question. Section 3, consisting of two chapters, now aims to build on these foundations to unpack relevant methodological issues (Chapter 7) before defining the exact design, conduct and analysis of this research (Chapter 8).

Chapter 7: Methodological Issues. This chapter will consider the methodological issues confronting the research question. In adopting a pragmatic stance, this chapter will address how qualitative and quantitative methods can be combined to answer the research question, thereby justifying a mixed method design. The academic rigour of this study will also be considered.

Chapter 8: Research Method. This chapter will justify why the Nominal Group Technique (NGT) and semi-structured interviews have been chosen as the two methods of consultation. Methods of analysis and the integration of statistical analyses within the overall design will also be explained.

Chapter 7 Methodological Issues

Introduction

The methodology chosen to underpin any research method is based upon philosophical assumptions about the nature of reality (ontology) and our knowledge of that reality (epistemology) [223]. A research question may be viewed through a particular ontological and epistemological lens to determine a research method in keeping with this philosophical stance. Alternatively, ontological and epistemological position may be justified by the research question and its context [244]; known as a pragmatic stance. Given the intent to capture and interpret the dynamic contained within military rehabilitation (a social Complex Adaptive System (CAS)) the methodological research approach needs to be flexible and inductive; able to encapsulate a complexity view into which multiple theories can be incorporated. In adopting a pragmatic stance, this chapter addresses why a mixed method approach is the best way of answering the research question. It will address how qualitative and quantitative methods can be combined to answer this research question. An evaluation of methodological rigour will also be constructed.

Epistemological Debates

The central research question stated at the end of Section 1 asks “what are the key components required to manage the complex rehabilitation needs of military lower limb amputees?”. In Section 2, an adjusted MRC evaluative framework has been adopted to take a complexity view of the research question. Within the literature, opinions are often polarised around the optimal methodological stance to be taken in such circumstances. Broadly speaking, there are three principal research approaches: quantitative, qualitative and mixed method [244]. Each will now be considered in relation to the research question.

Quantitative Research Approach:

A positivist or reductionist epistemological stance would seek to take a quantitative approach and understand ‘how much’ improvement. In other words, this form of evaluation would quantify or interpret through measurement [244]. A positivist view is described as objective, and outcome focused:

‘...in which relatively straightforward patterns of causality are established by means of statistical procedure’ [345] (p459)

A quantitative approach would, therefore, evaluate outcomes using statistical means to understand causality by comparing set conditions or specific timeframes. The research question alludes to the complexity of the

research setting and seeks to establish 'key components' within it, so there is a need to quantify outcome and establish causality. Yet a quantitative approach exists to test theory within known boundaries. Outcome data for this cohort is lacking and there is no theory of interaction or causality. Without a clear theory to test, the complexity of the setting means that it is impossible to control all variables in terms of presentation characteristics, composition of care and timeframe [223]. Nevertheless, some have argued that a quantitative approach is still a valid means to evaluate complex public health interventions [346]. This stance assumes that interactions have been identified between different components to enable prediction. This is more applicable in later stages of exploratory research, or where there is no social element within the complex system. Human identity, values, ability and emotion will introduce uncertainty into any complex real world setting; this is difficult to control and measure [223].

'Approaches founded upon the assumptions of stability and equilibrium, of linearity in the relationship between variables, and of proportionality of change in response to causal influences are not appropriate in seeking to understand social systems that exhibit complexity.' [347] (p442)

A quantitative research approach requires predictability, stability and linearity to test theory [348]. The research setting cannot provide this; instead, a more context sensitive approach is required to develop a theory of interaction [349]. Nevertheless a quantitative approach may then be embedded within this type of evaluation if parameters are clear [350, 351].

Qualitative Research Approach:

There is no distinct theory of qualitative research, so it is difficult to define as it derives from several traditions [352]. In general, a qualitative approach seeks to understand the social process focusing on subjectivity [353]. Theory generation using an iterative and inductive process is based upon observation, consultation and interpretation [354]. As the research question is exploratory and seeks to investigate a setting which remains largely unresearched, there is a need to define and understand the composition of the intervention, including contextual features. Through the capture of subjective accounts, a qualitative methodology supports the identification of interaction between components and people, from which explanation can be generated and subsequently tested [244].

'Qualitative' is an umbrella term encompassing traditions from across the social sciences. Each discipline has its own world view to apply to a research question. Ritchie & Lewis [355] summarise some of the principal traditions, illustrating the intellectual discipline from which they arise ([Appendix 4](#)). Whilst there are numerous qualitative traditions and sub-divisions within the literature, three 'field-based methods' of enquiry are outlined below to exemplify their different perspectives: ethnography, phenomenology and grounded theory. Each approach seeks to understand how people create meaning from their existence.

1. Ethnography investigates the symbolism people live by and use [351]. Within this thesis, this could be an exploration of social identity or power dynamics in the clinical setting [356]. Ethnography would adopt observation as its key method. However, the retrospective nature of the proposed study precludes this approach.
2. Phenomenology explores descriptions of lived experience [354]. For example, a phenomenological perspective applied to the current study could focus upon the experiential journey from soldier to patient to veteran, or the experience of living with disability. Such analysis would provide a depth of understanding, but it may not provide the scope required given the breadth of the research question.
3. Grounded theory adopts an inductive process which seeks to build theory on human action [244]. Using purposeful sampling, accounts are coded and thematically analysed to reveal patterns and causal links [244, 354].

Whilst grounded theory emphasises an interactive, inductive focus on building theory, which fits well with aspects of the research question, wholesale adoption can demand use of particular methods of data collection and analysis [355]. The characteristics of complexity and the intervention mean the research approach must capture a variety of perspectives focussing on the research question unconstrained by a commitment to a specific philosophical paradigm [244]. For this reason, a pragmatic stance is taken in this thesis, enabling the research to draw from perspectives that fit with the research question [242]. Nevertheless, sampling methods, inductive development of the method and the thematic analysis of data have all been influenced by grounded theory [357, 358].

Pragmatism

Pragmatism is a research approach where the choice of method is driven by a question rather than a particular epistemological paradigm [244]. It allows the researcher to draw upon both qualitative and quantitative paradigms acknowledging that both seek to understand the world, albeit through different means. Each paradigm has its strengths and weaknesses, so pragmatism accepts that there is no universally correct way to learn and research [359]. As a result of this flexibility, it is widely used approach complexity research [242]. Of course, examples of this approach are not limited to complexity science. Pragmatism has been used to construct clinical pathways by drawing principally upon qualitative data from patients or providers and confirming the pathway using a quantitative evaluation of outcome [360-363].

Where there is a reliance on retrospective accounts of an intervention, recall errors can occur [242]. Pragmatism provides researchers the freedom to mitigate the risk of bias by triangulating qualitative or quantitative outcomes with alternative data sources [242] to help validate findings [349]. Using both

qualitative and quantitative perspectives in the same study is known as a mixed method approach. Qualitative data provides depth of understanding, supporting theory generation, whilst a quantitative approach proports to test and inform the process of theory generation through objectivity [350].

Mixed Method Approach:

A mixed method approach is claimed by some to compromise the purity and richness found within qualitative data [245]. Others believe that by combining both qualitative and quantitative approaches, the outcome is subject to two diverse research perspectives, providing a more complete world view, greater depth of understanding and potentially a more robust interpretation [364]. The proposed study will evaluate the rehabilitation of military amputees using an adapted MRC framework [13]. This framework proposes a sequential approach, without dictating methodological approach or the way in which methods could be mixed. The most effective way of answering the research question is for explanatory accounts, built from contextual analyses, to inform a qualitative consultation, the analysis of which is complemented by quantitative Armed Services Trauma Rehabilitation Outcome Study's (ADVANCE) data [196].

When qualitative and quantitative methods are brought together, they must be clearly sequenced and prioritised depending on research objectives and context [245, 350, 365]. Palinkas *et al.* [365] provide a useful taxonomy of mixed method design. Developed from a review of mental health literature, the authors identify five ways in which mixed methods can *function* in support of overall research objectives: mixed methods in convergence (both methods answer the same question); complementarity (both methods answer different components of the same question); expansion (outcomes using one method are explained using the second method); development (answering one question with one method, leading to other methods to answer subsequent questions); and sampling (one method selects participants who then partake in a study using the second method) [365]. In addition, they also show how the research process can be sequenced so that qualitative and quantitative approaches are either merged, to validate one dataset, connected, to build upon one another, or embedded within another [245, 350, 365].

Using the taxonomy above, it is proposed in this study that quantitative data should be *embedded* within a qualitative research process. Quantitative data will evaluate qualitatively formed hypotheses, for instance, experiential accounts of veterans mobilising on prosthetics may suggest positive psychosocial outcomes for these individuals. Quantitative data can then be used to assess levels of prosthetic ability to establish if there is an association between these levels and measures of depression, anxiety, and perceived social support. In this way, triangulating data sources will demonstrate credibility of the resultant theory [243]. Where findings complement one another, this strengthens current theory; where there is divergence, this will help broaden theory generation. The mixed method approach used in this thesis and presented in Chapter 8, will perform a *complimentary* function [365].

Mixing methodological approaches can cause confusion owing to the use of different terminology arising from contrasting philosophical foundations. This is particularly the case when assessing methodological rigour. To establish terminological clarity, the methodological rigour of qualitative and quantitative traditions will now be considered.

Methodological Rigour

The credibility of this study and its findings rests upon its methodological rigour. Qualitative terms used throughout this thesis will be placed into *rigour categories* as proposed by Guba and Lincoln [366] (also see Tuckett [367]) alongside those used within a quantitative tradition to define parallel terms. This process commences with a brief background as to how these terms arose and what they seek to represent.

Background

Qualitative research arose at the start of the 20th century from a need to explore social constructs and describe interactions between cultures and people [352]. Denzin & Lincoln [352] cite the 1970s as a period where qualitative traditions formalised in response to accusations about subjectivity. A plethora of traditions developed as different disciplines refined their own perspectives of how the social world should be viewed and researched [352]. This growth in research did not allay accusations that questioned the validity of a qualitative approach and led to what the authors termed '*a crisis of representation*' [352] (p3). There was a need to make qualitative research as transparent as possible, enabling others to evaluate its quality, whilst also guiding good practice. Developing appropriate terminology has been a critical part of this process.

The challenge for the qualitative researcher is that the social world is inherently complex and subjective, hence, the reason so many traditions arose. On the other hand, quantitative research, with its focus on objectivity, hypothesis testing, and measurement is easier to evaluate, leading to hierarchies of evidence [368]. Terminology used to assess rigour within a quantitative study includes validity and reliability [368]. This terminology differs from that used by qualitative researchers, but there is scope to adopt parallel terms to minimise confusion.

Parallel Terms

Research quality or rigour is achieved in a quantitative study by demonstrating *validity* (accurate measurement of a concept) and *reliability* (accuracy of a chosen measurement) [368]. Validity is made up of two dimensions, *internal* (degree to which a study is measuring what it claims to be investigating) and

external validity (degree to which the findings can be applied to other contexts beyond the study setting) [244]. These terms focus on the quality of measurement, yet the focus of a qualitative study is on lived experience.

Trustworthiness (or truth value) is the overarching term given by Lincoln & Guba [369] to refer to the confidence one might have in the quality of a qualitative study. Trustworthiness encompasses *credibility* (internal validity), *transferability* (external validity), *dependability* (reliability) and *confirmability* (how findings are shaped by the research participants) [370-372]. Tucket [367] summarises parallel terms devised by prominent qualitative theorists (Table 7.1) [366, 369, 373]. Table 7.1 lists the strategies adopted within this study to demonstrate the trustworthiness of the method and analytical process. An evaluation of mixed method research follows.

Evaluating mixed method research

The mixed method approach in this study exists around a complimentary relationship where a quantitative component verifies qualitative findings. The dominant paradigm within this study is, therefore, qualitative. ADVANCE quantitative data arises from a major longitudinal study that has already been subjected to external research scrutiny through protocol publications, peer review and ethical approval [196]. The evaluation of credibility for this thesis will, therefore, focus on the qualitative research component.

Numerous checklists appear in the literature; however, recent work has sought to incorporate these into formal reporting guidelines for qualitative research. A comprehensive search of the literature identified 22 checklists [374]. From these, 76 items were listed and grouped into three domains: *research team and reflexivity*, *study design* and *analysis and findings*; this COREC checklist contains 32-items to help researchers demonstrate the trustworthiness of their work [374]. Given its widely used by medical journals, a completed checklist for this study can be found in [Appendix 5](#). The checklist considers every aspect of the research process influencing both the nature of data collected and the credibility of the analysis. Whilst Table 6.1 clusters research strategies according to their quantitative rigor criteria, describing each using associated categories of qualitative rigor [367]. There are four categories of trustworthiness, which are difficult to separate [374]. Each category of trustworthiness is now considered in turn, to illustrate the rigour of this study.

Internal Validity (Credibility)

This category represents the extent to which study design measures what it purports to measure. [368]. This is assessed at each research stage including sampling methods and data collection, for example, whether

interviews or focus groups are conducted with audio/video recordings, transcripts, and field notes. Illustrating how data is collected and interpreted helps the reader to assess the extent to which valid meaning has been extracted [375]. For example, when does analysis commence? To what degree does analysis inform or interlace with the collection of data? A qualitative study is an iterative process and so data collection and analysis are rarely distinct but it is vital that the process may be scrutinised [371].

The adapted MRC framework incorporates a feedback loop within the analytical process to inform data collection ([Figure 4.4](#)). Contextual features of the setting have informed the development of the theoretical construct. Wolcott (1994) (cited in [244]) refers to the idea that analysis results in the transformation of data, moving our understanding forwards from description to analysis to interpretation. This concept has been incorporated into the analytical hierarchy, to be discussed in [Chapter 8](#). Accumulation of informal data within field journals and diaries maintains transparency of analytical thought in which peer review becomes a key part of the iterative process [374].

The importance of acknowledging the ‘negative case’ or demonstrating where non-patterns exist has been emphasised by several authors [244, 353, 354] although it does not appear on the COREC checklist. Exploring such cases tests the internal validity by subjecting data to challenge revealing its limitation. In this study, the use of research peers and confirmatory interviews will help ensure accounts of negative cases or anomalies are considered.

Triangulation has also been recognised as a way of confirming outcomes by looking at data from different research perspective [372]. Four types of triangulation appear in this study’s method [376].

1. Data Triangulation: Confirmatory interviews are conducted following each focus group.
2. Investigator Triangulation: Review of transcripts and analysis are tested with research and clinical peers.
3. Theory Triangulation: Section 2 has already highlighted the theoretical construct’s broad base.
4. Method Triangulation: By adopting both qualitative and quantitative research tools, outcomes from each will provide a more complete perspective.

Triangulation supports the internal validity of the study and the breadth of view it provides also contributes towards external validity (or transferability).

Rigour Category	Trustworthiness	Evaluation Criteria	Criteria for rigour	Research Strategy	Operational Techniques
Internal validity	Credibility: Confidence in the truth of the findings [366]	Credibility	Truth Value	Field / Personal Journal Audio recording Thematic log Confirmatory interviews Transcript	Atypical (negative case): Analysis and explanation of such cases broadens the data analysis. Purposeful (theoretical sampling) Constant comparison Member confirmation Triangulation Peer Review
External validity	Transferability: Applicability of findings in other contexts [366]	Fittingness	Applicability	Data display Simultaneous literature review	Purposeful (theoretical sampling) 'Thick' Description: The researcher makes explicit the patterns of cultural and social relationships and puts them in context [366].
Reliability	Dependability: Findings are consistent and repeatable [366]	Auditability	Consistency	Field Journal Audio recording Thematic log Auditing / confirmation transcript	Atypical (negative) case Triangulation Peer review Audit trail Use of computer software
Objectivity	Confirmability	Confirmability	Neutrality	Field journal / Notes Confirmatory interviews	Audit trail / Peer review Reflective account Triangulation

Table 7.1 Criteria for rigor and 'paralle' terms

(Adapted from Tuckett [367] p31)

External Validity (Transferability)

Transferability, generalisability, and external validity are all terms that consider the extent to which findings may have broader application. Unlike quantitative research, where a randomised control trial seeks to apply logic-based findings across a population, qualitative research is not designed to be generalised beyond the research setting [244, 368]. Some believe transferability is undesirable, as the intent should be to generate depth rather than breadth during the qualitative process [377]. Qualitative research generally exists to generate theory [357]. Clarity of the analytical journey and quoted data will illustrate how conclusions have been drawn, but rich descriptive detail of the context and participants helps transport the reader into the setting [378]. Denzin [377] refers to this as '*thick description...deep, dense detailed accounts*' (p89).

In this study, purposeful sampling has been used to capture broad viewpoints. Constant comparison of literature with study findings ensures theory is tested and generalised, revealing patterns. This rehabilitation intervention involved military and civilian clinicians, settings, and people across the UK as they transitioned from soldiers to patients to veterans. One to one interview and focus group consultations capture this breadth of experience, background, and perspective. The findings should, therefore, be highly transferable.

Reliability (Dependability)

A focus on meaning within a qualitative research setting is not highly reproducible [350]. Some authors ignore matters of reliability altogether [357]. However, caution must be applied when adopting terms that have arisen from a quantitative tradition. For a qualitative study, reproducibility is not the concern; authenticity or dependability is [357]. Therefore, the reliability of a qualitative study refers to the dependability of data collection, findings, and analysis.

Transparency of process will help illuminate bias to achieve dependability [371, 372]. The use of audio recordings, transcripts and computer coding will enable easy audit by fellow researchers [348, 379]. Mays & Pope [380] highlight the concept of inter-rater reliability, designed to ensure agreement of transcript coding [381], although the need to formally rate coding is increasingly under dispute. This practice assumes there is one meaning to be found in the data and so is reductionist [379]. Researchers will often see different patterns in the data [379]. It is argued here that the process should emphasise accountability and challenge rather than similarity. Coding should be scrutinised by other researchers to support theory generation by introducing alternative, challenging views [372].

In this study, coding has been performed using computer software. Coded data has then been presented using frameworks [382, 383]. Frameworks enable senior researchers to scrutinise the initial coding. In this study, participants have also been interviewed to verify coding decisions; one senior colleague helped to

refine coding where negative cases or lack of clarity existed. These strategies demonstrate dependability, but also objectivity (confirmability).

Objectivity (Confirmability)

Human interaction and interpretation inevitably contain bias [384]. Objectivity or confirmability centres on the steps taken to ensure that findings arise from participants and not the researcher. Transparency is provided when a researcher shares their thoughts and beliefs (reflexivity), examining their own assumptions. The [Foreword](#) of this thesis provides a reflexive account. In addition, NGT, used as part of the consultation process, includes participant voting; this provides an objective score for participant prioritisation as shown in the following chapter. It is used as an objective instrument to guide analysis and ensure focus group participants set the analytical agenda. Further triangulation using ADVANCE baseline data provides independent verification and confirmation of qualitative findings.

Summary

Whilst acknowledging epistemological debates and their value in exploring a research setting, given the characteristics of complexity, they should not drive the use of research methods. In this study, a pragmatic stance has been adopted to ensure that the exploratory approach remains flexible and iterative. A complexity science approach supports the use of qualitative and quantitative methodologies within a mixed method design, to help explore the research question more fully. These methods must be used in a logical fashion [385]. Embedding a quantitative component within a predominant qualitative approach will test theory, triangulate evidence, as well as guide the researcher to focal points within the data and support robust explanatory accounts.

To assure the methodological rigour of this study, a COREQ checklist has been completed to assess its trustworthiness ([Appendix 5](#)). Whilst the evaluation of, and terminology for, qualitative and quantitative approaches differ, Tuckett's [367] summary [Table 7.1](#), has been used to highlight parallel terms for internal and external validity, reliability and objectivity; and how research and operational strategies have been used in this study to support rigour. The following chapter justifies the use of these research methods in greater detail.

Chapter 8 Research Method

Introduction

Utilising a pragmatic mixed method approach, this exploratory research seeks to capture the experience of clinicians, managers and veterans, the interaction between these groups, structural components, and contextual factors to answer the research question.

A social CAS is not a static phenomenon [227], hence, an iterative approach purposefully sampling those involved aims to capture different perspectives. This chapter commences by restating the research question and study objectives. An overview of the method is then provided and justified. Research context and options available to achieve consensus are also considered. The use of NGT and semi-structured interviews will be justified, and the process of each method documented in detail. Study sequencing illustrates the iterative way in which consultation, provisional analysis and further investigation has been conducted. Finally, the process of qualitative data analysis is explained, justifying the use of computer aided software, to answer:

What are the key components required to manage the complex rehabilitation needs of military lower limb amputees?

This central research question implies three sub-questions:

- What are the complex rehabilitation needs of a military amputee?
- What are the key components of rehabilitation required to satisfy these needs?
- What are the principles we can adopt to support the effective management of these needs?

Five key study objectives guide how these questions will be answered. Table 8.1 presents these objectives and highlights the chapters in which each objective is fulfilled.

Thesis Objectives	Section / Chapter
1. Describe the context, setting, components and process of the rehabilitation delivered to the military amputee between 2006-2014.	Chapters 1-3
2. Develop an ontological, epistemological, theoretical, conceptual, and methodological stance capable of answering the research question.	Chapters 4-7
3. Evaluate the rehabilitation of military lower limb amputees via qualitative accounts of clinicians, managers, and patients with a focus on context and setting and ADVANCE (quantitative) outcomes.	Chapters 8-12
4. Use both qualitative accounts and quantitative outcomes to interpret the needs of the lower limb military amputee and the key components of the military rehabilitation process.	Chapters 10 and 12 Conclusions and Implications
5. Propose future research questions and propositions from findings in objectives 3 and 4.	Conclusions and Implications

Table 8.1 Thesis Objectives

Focus group data was collected between May 2018 – December 2018. Interviews were conducted between Jul 2018 and December 2019. ADVANCE Baseline data was collected between March 2016 until Autumn 2020 [196].

Considerations applied to the construction of the method

Given the need to capture experiential and human elements, a lack of published evidence and the exploratory nature of the study, consultation with those embedded within the setting was a vital and rich data source. An inductive or iterative approach (unstructured or semi-structured consultation) places the least constraint upon participants and allows the researcher to follow set directions but freedom to progress discussions in the hope of yielding unanticipated findings [384, 385]. Completely unstructured formats do have downsides that will be highlighted later.

Consultation can take many forms, for example, as a one-to-one interview, a group context, face to face or remote [354]; questionnaires, telephone, on-line interviews or in person [357]. The decision on which form is most apt, is a balance between the needs of the research question and the constraints or considerations of the research context including participant and/or environmental factors. The following discussion will consider the research context from the perspective of the clinical provider and veteran, formats used to gain consensus and the mitigation of bias [355].

Research Context: Clinical Providers

This research retrospectively explores a clinical service developed between 2006 to 2014. As military campaigns in Afghanistan and Iraq came to an end, the flow of operational casualties ceased. Whilst some casualties needed to complete their rehabilitation at DMRC, most were medically discharged. Many clinicians working as contractors were released from employment as clinical demand no longer existed. Those remaining, had been there throughout this period of activity. Both groups offer valuable insight. Those who had left the service were able to contrast their experience and provide a generalised view of DMRC rehabilitation provision. Those who remained were able to contrast and compare rehabilitation provision at a time of intense operational impetus with the present day. Data collection for this study commenced in May 2018, and so for both groups, there was a gap of at least four years between this study and when Complex Trauma (CT) rehabilitation had been at its peak.

Issues with recall can be minimised through group discussion as multiple viewpoints form a collective memory and test the quality of recall [242, 244]. Group processes are able to be a productive form of idea generation as participants discuss their own thoughts, causing new ideas or memories to surface as others contribute [386]. However, for some key senior officers, diary constraints make group discussions logistically impossible to attend. This would also be the case for those now working outside of DMRC.

Remote forms of consultation such as telephone interviews or online questionnaires would have been an easier method of consultation for those who were not co-located [386, 387]. A one-to-one interview may have allow for more focused and in-depth analysis of the research question from a single viewpoint [386]. Yet the group effect was important because the CT team included several professions; a diverse collective view replicated the interdisciplinary clinical discussions that had previously guided patient management.

As data collection commenced, DMRC, located in Epsom, Surrey, underwent preparations to move to Stanford Hall, Loughborough. The CT team was scheduled to relocate by the end of July 2018. As a result of the relocation, several key personnel ceased working for defence. A time pressure, therefore, existed to complete data collection with clinicians and managers prior to the relocation. But the closure of this facility also provided an opportunity to gather clinicians who had previously left DMRC. Closing ceremonies and reunions were planned, which provided convenient opportunities to consult those who had previously worked within the service between 2006-2014.

The limited opportunity to capture data amongst clinical providers, meant that group consultation was the most effective format for gaining ideas and multiple perspectives. Grouping those still employed at DMRC and separately consulting those who were now employed elsewhere, enabled recall and experiential accounts to be triangulated between the two groups. Not discounting the value of online questionnaires, one to one interviews were used where participants were unable to participate in group consultations. This

enabled specific lines of enquiry to be pursued in more depth and for verification of themes arising from group discussions.

Research Context: Veterans

The vast majority who had been injured and undergone rehabilitation within CT were medically discharged by 2014 and classed as civilians. Although geographically dispersed across the UK, most lived within reach of a Murrison prosthetic care centres. Previous research exploring physical and functional outcomes in this population has focused on proficient prosthetic users; a selection bias that meant these outcomes could not be generalised across this cohort [4, 121, 180]. Owing to the assertion in the literature that there is a relationship between QoL and prosthetic use [141, 173, 176], this study sought a more representative sample of this wider cohort.

Group consultation provided the opportunity for veterans to share views, beliefs, attitudes, raise questions and stimulate further ideas through discussion [388]. However, for some in this cohort, transportation, work commitments and willingness to put time aside for the research presented insurmountable issues. To maximise involvement groups needed to be local and held in accessible locations.

The social dynamic within a group forum, when compared with other methods of consultation, can elicit a multiplicity of emotions and thoughts [388]. The empowering nature of a group that constructively explores solutions and ideas can engender trust and create social bonds. However, others can find group settings intimidating, especially if the subject matter makes them feel vulnerable [389]. If the subject matter has potential to be sensitive, some individuals may not engage, whilst others may struggle with the emotional impact it engenders [388, 389]. For some veterans, a group discussion around traumatic and life-changing subject matter may be difficult and stimulate anger, post-traumatic symptoms, or grief. Careful selection of candidates was therefore vital. On volunteering, candidates were asked if they experienced flash backs, disturbing thoughts or difficulty sleeping. If they did, a screening tool used to diagnose PTSD would be administered [390]. Questionnaire results would then to be reviewed by an independent medical officer to determine if participation was advisable, and whether onward referral was indicated. No participant declared symptoms requiring use of this tool.

The group setting offers a powerful dynamic when participants are familiar with one another and there is already established trust between them [388, 389]. This facilitates honest, open discourse and maximises engagement. It was therefore decided to facilitate local groups across the country using a military charity for limbless veterans known as BLESMA, prosthetic centres and veteran sports teams. In this way, individuals were incentivised to join with those they were familiar with. It allowed groups who were already meeting

for another purpose to attend. Local facilitators also knew who was in their area and were able to organise groups of mixed prosthetic ability.

Veteran consultations were collated and analysed separately to the clinician groups. The same discussion questions and group format were used for both. Veteran consultation commenced with two one-to-one interviews conducted with two veterans. These interviews are included in the analysis as they enabled the researcher to listen to their language and accounts and confirm question wording. The ability to recall events and experiences using a one-to-one interview format was more difficult for these subjects and so these initial interviews confirmed the appropriateness of group consultation for this population.

Format of Consensus

Different group formats exist. They vary from a focus group centred on discussion around a chosen question or subject area, lightly facilitated by the organiser, to a more structured format, such as a Delphi, where the steps and processes are clearly defined, and individuals may not necessarily meet within the same geographical location [391]. The goal of a structured consultation is to amass collective experience and build consensus between participants. A consensus approach is defined as '*a systematic means for measuring and developing consensus*' [392] (p14). It encourages participants to discuss and debate their own experience and views around a given topic with others in a select group but does so in a way that seeks to bring these ideas together to form a consensus statement [392]. Such an approach is used when problem solving, idea generation and priority setting is required [393]. However, a consensus approach is also more systematic and formalised than a focus group [393]. This structure might also restrain discussion and undermine achieving the depth of debate sought [355].

Sufficient discussion and careful facilitation are needed to ensure that interaction between components of care within the clinical construct and the social dynamic can be explored [392]. The value of the consensus approach can be seen in research on care pathway development [391, 394-396]. In these examples, the specific consensus method depended upon the sample being consulted and the context of the research [391]. For example, Delphi has been used when sampling clinical or patient experts, policy makers, clinical leads and academics, none of whom are geographically co-located [391, 392]. Interaction between selected panel members can be via questionnaires; each round of questionnaires is further refined from responses received [393]. Delphi is widely accepted as an effective and efficient method to develop clinical practice guidelines; examples include the diagnosis and treatment of rotator cuff pathology [393], cancer care [397], stroke care and geriatric rehabilitation [396].

Questionnaire design is often based on a systematic review, or established knowledge of a specific practice area [393]. It is more difficult to use the Delphi approach when the subject area is novel and there is little

published evidence, or when there is little homogeneity between panel participants [392, 393]. In these circumstances, consensus is difficult, and dissention can occur within a panel [392, 393]. The confined and remote nature of interactions inherent within Delphi might also prevent open discussion [393]. Such discussion is a rich data source providing valuable interactional insight as a panel explores reasons for disagreement, or problem solves areas of uncertainty in pursuit of a consensus [392].

In contrast, a focus group format is less structured, offering more freedom for open discussion. But it relies upon facilitated virtual or in person, face-to-face meetings [389]. This format has been shown to support idea creation, whilst interactions enable participants to modify constructs, they have previously held and come to shared understandings on controversial issues [398]. As a result, focus groups have proven successful format when building consensus between diverse cohorts, such as clinicians, patients, policy makers and carers [394, 395, 399, 400]. Healthcare examples include the creation of an integrated interdisciplinary pathway, encompassing conventional and complementary medicine for lower back pain [401], integrated management of complex geriatric rehabilitation needs [396], consensus on the components required within an enhanced post-colonic surgery recovery programme [402] and the creation of an integrated care pathway for neuropathic pain [403]. The fundamental difference between these examples and those studies adopting a Delphi approach resides in the breadth and complexity of the problem statements. In the above examples the research questions are complex, and the breadth of consultation required needed to encompass diverse groups of patients, carers, academics, and clinicians. In each example, studies report that discussions between participants provided rich data to include idea generation, solution focused interactions, consensus formation, and interactional analysis between individuals and groups [354].

Although group interaction offers the opportunity to clarify, discuss and refine ideas, the dominance or eminence of some participants can bias the direction of discussion and block the contribution of minority ideas [354]. Marketing research has sought to overcome this effect by comparing conventional face to face focus groups with online computer-mediated communication (CMC) groups [404]. CMC appears to be a more effective means of ideas generation, in both quality of ideas and increased creativity [405]. One reason could be that CMC offers the opportunity to control anonymity and prevent group dominance by using written and video formats. Greater anonymity appears to reduce participant eminence [406]. Participant eminence creates a hierarchy, distorting group discussion contributions, either through group hijack (over dominance) or a reluctance to contribute [406]. Where consensus is sought on matters deemed sensitive, or where diverse thinking is an issue, a CMC group is reportedly less likely to succeed [405, 406]. Negotiation, leading to mutual understanding, is more likely in face-to-face settings [407]. Research exploring CMC pre-dates current technological advances in remote communication. However, the findings highlight the importance of preventing group domination, and encouraging equal contributions [407].

In this current study, consultation with clinical providers and veterans provided a valuable opportunity to capture clinical experience and patient reflection on a largely unresearched service. The many specialisms included within the clinical team, made necessary by various injury presentations, offer diverse perspectives. Care was needed to ensure consultations extended to minority views and did not just capture the experiences of the more numerically dominant professions or senior personnel. For patient populations, it was critical to capture the voice of prosthetic users and non-users, as well as junior soldiers and officers. With such diversity of experience and complex views it would be difficult to achieve consensus using a Delphi approach. In addition, with the closure of DMRC, there was little time to complete a Delphi study amongst clinical providers. A Delphi approach might also have excluded those veterans whose literacy or physical disability made participation a challenge.

Widespread negative publicity about the quality of veteran prosthetic care also made the subject matter emotive for some [205]. Given the hierarchical nature of the military and the contentious subject matter, an open discussion using a focus group could risk group hijack by senior officers, disenfranchised clinicians, or veterans angry at the standards of their medical care. Equally, not everyone is comfortable contributing publicly to group discussions, especially if their opinion differs from others, and so minority views may not have been voiced. The chosen format needed to enable free and open discussion and allow for disagreement whilst also seeking to achieve consensus. To encourage broad participation and equity of contribution across all participants and maintain focus on the research question, a structured focus group format was therefore proposed.

One such approach widely used by The James Lind Alliance in sensitive areas requiring broad engagement is the NGT [408, 409]. NGT allows for individual reflection and free listing of ideas around set questions. Ideas are fed back involving all participants and followed by group discussion of these ideas [410]. Anonymity of ideas can be provided if needed, and the inclusion of all ideas into a group discussion ensures all participants contribute and airtime is given to minority ideas [410]. This process reportedly limits the opportunity for group hijack and deviation from the problem statement [391, 411]. The discussion anonymises individual ideas and these then become part of a group outcome. Consensus is achieved by the participants individually ranking these collective ideas according to how they rate the importance of them [411]. These rankings are added together to produce a group consensus on the question under discussion [412]. Clear outcomes provided by this format have caused participants to report high satisfaction ratings [411, 412]. The process provides qualitative data from the free listing exercise, showing how participants define the research question, and from the group discussion as these ideas are considered [413]. NGT may also provide a quantitative measure of consensus, highlighting discussion *hot spots* or wide differences in opinion [411, 412]. This tool is a helpful way of adding credibility to the analytic process. Collectively, these reasons justify NGT as the chosen format of group consultation.

Researcher bias: Strategies to minimise its influence

Domain 1 (Research team and reflexivity) of the COREQ assessment tool draws attention to a researcher's background, knowledge, and relationship with the participants.

'The qualitative researcher's perspective is perhaps a paradoxical one: it is to be acutely tuned-in to the experiences and meaning systems of others—to indwell—and at the same time to be aware of how one's own biases and preconceptions may be influencing what one is trying to understand.' (Maykut & Morehouse, 1994, p. 123, cited in [414]).

This background is documented in the [Foreword](#) illustrating connection with both clinical providers within CT and patient and veteran groups. An appreciation of their journey is apparent given deployment and managerial responsibility for their rehabilitation post-injury. This membership or connection with the population being studied must be considered as a potential source of bias, being referred to as *insider - outsider* [414].

The insider will share an identity, experience, language, and trust with their study population. The outsider, in contrast, will not have experience of these cultural aspects. This can bring fresh insight to the social dynamic within the study population, but it can also lead to misunderstanding and confusion [415]. For both, there are as many arguments for as there are against. For some, membership of the group makes the researcher blind to the sub-culture they are seeking to investigate, and the researcher risks making assumptions in their analysis, rather than fully understanding the dynamic they have observed [415]. When a group identifies around a shared experience (being in the military), being an insider helps to gain trust and acceptance from study participants [414]. Adler & Adler [416] refine this argument suggesting the researcher may fulfil one of three membership roles [414]. A *peripheral member researcher* does not participate in the central activities of the wider group. An *active member researcher* is not committed to the values of the group but does participate in core activities. And the *complete member researcher* is an active member of the group and shares its values and goals.

The concept of *insider – outsider* helps alert researchers to any bias which may arise. Equally, this concept offers a binary choice between two principal existences, yet the nature of qualitative research should cause an investigator to become immersed in the research and its story [414]. A truly reflexive researcher should move freely between both positions as they observe, reflect, and seek to understand phenomena to enable interpretation. Consideration of this bias will be discussed further during Section 4.

Using Adler & Adlers [416] taxonomy, the author is classified as a *complete member researcher* for the clinical providers cohort and a *peripheral member researcher* for the patient and veteran group (Table 8.2). Membership of both groups facilitated participant recruitment. Being an *insider* meant there was understanding and trust, enabling participants to speak honestly about sensitive issues. Insider knowledge

also helped to understand the language and acronyms used and experiences discussed. Having worked within the CT Team, the author also gained active support from both managers and clinicians.

For an insider/peripheral member the critique is that familiarity with the setting may result in making assumptions about the data, compromising the researcher’s objectivity. To maintain objectivity, data collection and analysis were subject to external scrutiny and triangulation ([Table 7.1](#)) [414]. An analytical journal ([Appendix 11](#)) was also kept to evidence the development of theory [381, 414]. Additionally, the concept of data saturation has been used to guide the end point of data collection; achieved when no new themes were apparent during consultation [378].

Sample	Insider Characteristics	Outsider Characteristics	Membership role
Clinical Providers	As a physiotherapist working within the Complex Trauma team at DMRC / RCDM, the researcher worked with all clinicians and managers involved in the study.	N/A	A complete member researcher
Patients / Veterans	The researcher is a member of the UK Armed Forces. He has deployed on combat operations. He is known to the veteran group as one of the Physio leads in CT.	The researcher was not a combat casualty, and he is an Officer (veteran group rank range: 20% officer, 80% soldier ranks.)	A peripheral member researcher

Table 8.2 Membership role of the researcher with clinical providers and the veteran population- [416]

The Method

Ethical Approval

Ethical approval was granted for this study by Imperial College Research Ethics Committee on 16th May 2018 (ICREC Reference: 18IC4492) and the Ministry of Defence Research Ethics Committee (MoDREC) on 22nd May 2018 (Reference 866/MODREC/18) ([Appendix 6](#)).

Ethical approval for the statistical element of this research was gained as part of the ADVANCE Study which was granted by MoDREC (Protocol No 357/PPE/12).

Consultation sample and recruitment

Focus groups and semi-structured interviews were the two chosen forms of consultation. The method utilised for each form of consultation will be described before inclusion criteria and recruitment strategy are outlined.

Sample

Sampling was purposeful to ensure a breadth of experience and expertise within each group [357]. Three types of individuals were consulted: clinicians, clinical managers, and veterans/patients. Effort was made to include a breadth of professionals in the clinical manager and clinician groups. Veteran participants varied in their amputee presentation; all were combat related. Two veteran participants were non-prosthetic users. No initial volunteers were available from mental health or social work teams. Semi-structured interviews were used for information gathering (n=2 veterans); and verification purposes (n=13).

The groups and their inclusion criteria are as follows:

1. **Clinician Group:** Physiotherapists, occupational therapists, social workers, nurses, doctors, exercise rehabilitation instructors (ERIs), prosthetists /orthotists, Community Psychiatric Nurse (CPN), dieticians and clinical Administrators.

Inclusion criteria: Participants must have worked with CT patients within the clinical rehabilitation team in Role 4 (military secondary healthcare based at RCDM or DMRC) between 2007 and 2014. The aim was to recruit a broad representation of the specialties that made up the CT interdisciplinary team.

2. **Clinical Managers Group:** Consultants, administrative managers, department or service heads, rehabilitation coordination officers.

Inclusion criteria: Participants must have been involved in the management of the clinical service involving CT patients in Role 4 between 2007-2014. This included service leads, rehabilitation consultant leads and those with direct line management responsibility for CT sitting on DMRC's Executive Committee.

3. **Veteran / Patient Group:** All ranks, to include combat and non-combat causes of amputation.

Inclusion criteria: Participants must be an amputee. Their initial injury must have occurred between 2007-2014 and they must have undergone rehabilitation at DMRC Headley Court within CT. The cause of amputation was not considered crucial.

Recruitment

Zorn *et al.* [398] reports that a focus group size of between 4-8 individuals is necessary if the aim is to encourage each participant to contribute. A maximum of eight participants was, therefore, planned for each group. Participants were recruited as follows:

1. Clinician / Clinical Managers Group:

a. The Complex Trauma Team were notified of the study in staff meetings and volunteers were requested. Focus groups 1, 2 and 3 were recruited in this way.

b. In July / August 2018, past and present employees who had worked at DMRC Headley Court were invited to attend closing celebrations. Clinicians who had previously worked within CT were contacted directly and offered the opportunity to participate in two focus groups planned to proceed these closing celebrations. Two focus groups were recruited in this way.

2. **Patient / Veteran Group:** Assistance received from members of [BLESMA](#) and their support officer network, enabled regional focus groups to be set up across the UK; Northwest, Midlands, Southwest (2), Southeast and London. Veterans were notified of the focus groups through their support network, the [CASEVAC Club](#) (a veteran self-help group), [ADVANCE Study](#) Facebook page and word of mouth. Focus group locations were chosen for the convenience of those attending and to capture any likely regional variations. Two initial face-to-face interviews with focus group volunteers were conducted to confirm NGT question wording.

Consultation Method

Methods used, common to both groups are presented below, after which the NGT and semi-structured interview process will be outlined.

Recording and transcription of NGT Focus Group and Interviews

Focus groups and interviews were recorded using an [Olympus VN-713PC](#) digital voice recorder. Recordings were securely stored, transcribed (by [PageSix Transcription Services](#)) and anonymised. All transcriptions were checked against the audio recording and corrected where necessary. For interviews which did not yield new information, field notes were taken, and audio recordings retained but they were not transcribed ([Appendix 7](#)). The following additional data were collected from consultation sessions:

- a. **NGT Focus Groups.** Participant notes made during focus groups were collected and participant voting forms retained ([Appendix 8](#)). Group ideas on flip chart or white board were also photographed and used as notes if needed during data analysis (see examples in [Appendix 9](#)).
- b. **Consultation summaries.** In addition to the audio recordings, the researcher made handwritten or recorded audio summaries during or immediately after each consultation. These were recorded in NVIVO 12 (version 12, QSR International) and used as a quick reference guide to sort consultations during the analysis phase ([Appendix 10](#)).
- c. **Reflective Journal.** Following consultation sessions and during the analytical process recorded reflections under specific subject headings were placed in NVIVO 12 ([Appendix 11](#)).

Expert Panel.

An expert panel was formed to determine the questions to be used during the NGT Focus Groups, as well as an interview outline for semi-structured interviews. The panel included Imperial College researchers, a veteran amputee and physiotherapist. The panel were presented with the results of the historical analysis outlining the development of the CT Service at DMRC, the purpose of the research and the intended design and format of the NGT Focus Group. Figure 8.1 lists the agreed question set NGT focus groups. The NGT focus group format will now be outlined.

NGT Focus group questions:

1. What components of the service do you feel were key to the successful outcomes we saw? And what are you most proud of?
2. Knowing what we know now, what changes would you make to the service (e.g., additional components, removal of components)?
3. What do you feel are the top five issues veteran amputees now face in their daily lives?

Figure 8-1 NGT Question Set

NGT Focus Group Process

Prior to each group, the researcher attended the setting to ensure the environment was comfortable and not overly noisy. Seating was arranged so everyone was close enough to enable free discussion. A flip chart was set within sight of the group upon which notes would be made to refer to. Audio equipment was tested.

Some of the focus groups took place in restaurants. For these groups, the establishment was informed of the purpose of the group and a private area provided to ensure that conversation could not be overheard. Prior to each group, participants had received a letter of invitation ([Appendix 12](#)) and a participant information sheet ([Appendix 13](#)). On arrival, participants were provided with a consent form ([Appendix 14](#)) and a handout including focus group questions, an introductory presentation, and voting forms ([Appendix 15](#)). Consent forms were read and signed; participants were asked to verbally confirm their consent to audio recording and taking part. Each group ran for a maximum of 2 hours (Figure 8.2) as follows:

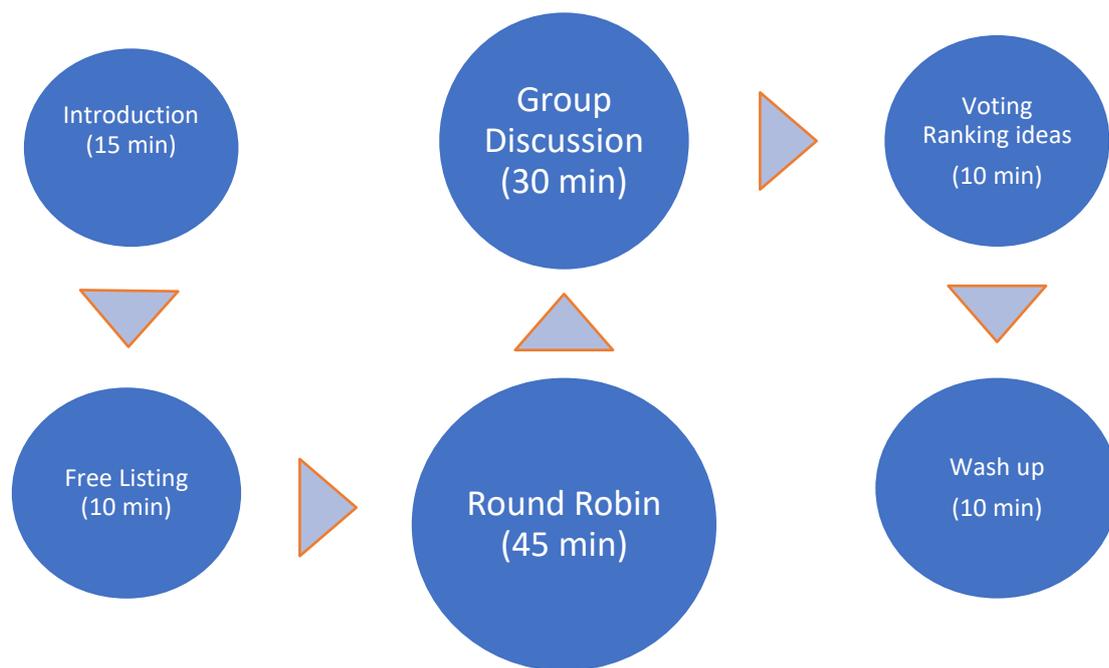


Figure 8-2 NGT Stages and time allocation.

- **Introduction.** Participants were familiarised with the location of fire escapes, toilets, and refreshments. Participants were informed that audio recordings would be transcribed, and contributions anonymised. The purpose of the research was outlined in a set introductory presentation. Discussion questions were presented and the plan of the NGT was explained. The vote at the end of the session was explained so participants could prepare for this (15 min).
- **Free listing.** Individuals silently generated written ideas for the three focus group questions (10-min).
- **Round Robin.** Ideas listed on a flip chart, incorporating discussion (45 min).
- **Group discussion.** Discussion of listed ideas as a preparation for voting (20min).
- **Voting.** Individual ranking of top ten ideas on a voting card (10 min).

- **Wash up.** Conclusion and feedback questionnaire (10 min)

Following the introduction, presentation of questions, and silent individual generation of ideas, the Round Robin feedback commenced. The subject matter was not considered sensitive, and participants knew one another. Contributions were not anonymised, so participants provided explanations if needed. Clinicians and managers were familiar with contributing to round table discussions as part of the interdisciplinary process. The round table feedback ensured every participant had the chance to express views [412]. Brainstorming has been shown to be a more productive mechanism for idea generation compared with discussion alone [410]. By allowing the Round Robin feedback to be separate from the discussion stage, ideas documented on the flip chart during feedback were anonymised as they were listed with other ideas. Discussion developed these ideas and spawned new ones. The flip chart provided research notes on the discussion and a visual help for participants to remain on topic [411]. The ranking and scoring of ideas then provided a quantitative indication of the importance an individual and group attributed to an item [412]. All groups yielded a significant number of ideas, so there was insufficient time to include a second round of voting, as has been similarly documented in other studies [393, 417]. Voting helped provide a clear consensus across groups and where it did not occur.

NGT Ranking of ideas.

Following group discussion, participants were asked:

'Please rank in order of priority what you believe are the ten most important components of rehabilitation, which must be included in a rehabilitation pathway for lower limb amputees. These components should come from the ideas generated from questions 1 and 2' (Appendix 15)

Participants scored up to ten items on a scale from 100 – 0. The item they perceived as most important was scored as '100'. Then they scored a maximum of nine items anywhere between 99 – 0 [411]. The relative importance of the item with 100 points depended on the points given to other items on their list. This method of ranking allowed a comparison of 'scores' within the group and across groups [393, 411, 417]. Some researchers convert the score into a weighting [411]. This was not considered to add any benefit, and rather than sacrificing discussion, individual scores were added together to give a cumulative total.

Following the ranking of ideas, participants were asked to list what they felt were '*...the top five issues veterans face today?*' They were asked to place them in order of importance. Rather than rating these ideas in a similar way, time pressure led to these ideas being listed in rank order.

Semi-structured interview process

Interviews were conducted one-to-one or in pairs. Interviews took place in private offices assuring minimal disturbance and privacy. Prior to each interview, the researcher ensured that chairs were arranged to facilitate easy communication, the conversation could not be overheard and that refreshments were available. Audio equipment was also tested. Each participant had been provided with participant information prior to arrival ([Appendix 13](#)). On arrival participants were asked to verbally consent to audio-recording and taking part. They were also asked to read and sign the consent form ([Appendix 14](#)).

Participants were familiarised with the location of fire escapes, toilets, and refreshments. It was explained that whilst the interview would be recorded, their contribution would be anonymised if the interview was transcribed. The generic structure of each interview can be found in Figure 8.3 although the precise questions depended upon the subject matter of each interview (Table 8.3).

Draft Semi-Structured Interview Format

Interview questions / subject areas: Veteran Group

1. MOBILITY / SOCIAL ENGAGEMENT: How did you travel to the interview / how easy is it to transport yourself to events or social engagements? Do you experience any consistent issues when getting to an engagement? Does it put you off going out? How do you get around these issues?
2. QoL / MOBILITY: Do you think that your ability to mobilise affects how you feel about life?
3. Remind the candidate the purpose of the research.
4. What in your experience was the most important feature of the military rehabilitation which enabled you to get to where you are at? Why?
5. THEMATIC CONFIRMATION: Confirm the themes discussed with the participant and verify your interpretation
6. What would you change about your rehabilitation?
7. THEMATIC CONFIRMATION: Confirm the themes discussed with the participant and verify your interpretation
8. What are the key issues you now face as an amputee?
9. THEMATIC CONFIRMATION: What from this list of themes would you rate most highly? Why?

Interview questions / subject areas: Clinician / Clinical Managers Group

1. What was your role when you were involved in the rehabilitation of combat casualties?
2. What was it about the rehabilitation provision which enabled lower limb amputees to achieve the functional outcomes they did?
3. SUMMARISE the purpose of the research and the themes from all three groups (show thematic chart) to the interviewee. Focus on specific areas if required.
4. THEMATIC CONFIRMATION: Is there anything you can think of, which should be included?*
5. THEMATIC CONFIRMATION: What from this list of issues or themes is a surprise? Why?*
6. THEMATIC CONFIRMATION: What from this list of themes would you rate most highly? Why?*
7. What do you feel was missing from the rehabilitation provision?
8. If we had to do this again, what do you think we should do differently which would help either improve long term outcomes, or enable more efficient delivery of care?

*Where the purpose of the interview is information gathering, questions about thematic confirmation are replaced by questions around the specific information requirement.

Figure 8-3 Semi-structured interview question guide

Conversational questions were used at the beginning to relax participants and start them thinking about research topic [386, 418]. The research was introduced, after which the aim was to seek advice and thoughts from the participant backed up by their experience. There was no presentation or set script [386, 418]. A series of more probing questions followed, using the experiences they had divulged as examples. The purpose of this routine was to question specifics relating to the individual and then centre conversation around the global theme of the interview (rehabilitation, transition etc). For the clinician / clinical manager,

the intent of the opening questions was to help them recall events. For the veteran, the intention of introductory questions was to facilitate recall of rehabilitation experiences, but to keep them anchored in the present to enable comparisons to be made. The aim was to help interviewees to articulate their thoughts around the experiences that may have led them to hold these perspectives.

Most interviews were used for the purpose of verification, to confirm analyses, mitigate against bias, avoid researcher misunderstanding and explore themes in greater depth. Table 8.3 lists the 15 semi-structured interviews that took place, their purpose and the participants involved.

Interview Aim	Subject matter of the interview	Interviewee
Verification Interview 1	Adaptive Sport and Adventure Training	Founding Head of Battle Back (Audio available, not transcribed)
Verification Interview 2	IDT Re-organisation at DMRC	Head of Group Therapy (IDT Re-org Lead)
Verification Interview 3	Focus Group 1 & 2 verification interview	DMRC Medical Director
Researcher Verification 1 (Coding Check)	Coding check and analytic process verification	Director of Nursing (Imperial College Healthcare Trust)
Participant Verification 1	Insider/Outsider Focus Group	DMRC Nurse Matron DMRC Health Care Assistant
Verification Interview 4	Insider/Outsider Focus Group Presentation of overall analysis	Commanding Officer DMRC Headley Court
Participant Verification 2	Review of the voting categories and coding categories	Clinical Lead Physio at DMRC and RCO RCDM
Verification Interview 5	Development of Role 4 Mental Health	Clinical Lead RCDM Mental Health
Verification Interview 6	Development of DMRC Mental Health	Clinical Lead DMRC Mental Health
Verification Interview 7	DMRC Mental Health integration	Clinical Lead DMRC Mental Health
Participant verification 3 (Not transcribed)	Verification of focus group 5 and 6 (clinician perspective)	Prosthetist (formerly DMRC contractor)
Participant verification 4 (Not transcribed)	Verification of IDT focus groups (managers perspective)	Consultant lead for complex trauma

Presentation of the final analysis 1 - verification	Complex Trauma	Surgeon General (1)
Presentation of the final analysis 2 - verification	Complex Trauma	CT Manager (2)
Researcher Verification 2 (InterPACT assessment)	Framework analysis: MDT vs IDT	Post-graduate research forum

Table 8.3 Semi-Structured Interviews (Clinician / Clinical Manager)

The method evolved as data was analysed, revealing where further exploration was needed. What follows presents this process and illustrates the sequential nature of data collection, analysis, and verification.

Sequencing of Focus Groups and Interviews

The clinician / clinical managers group will be discussed first, followed by the patient / veteran group. Figure 8.4 shows how the clinician/clinical manager group and interviews were clustered to enable theory to develop. Following each focus group, data were analysed; subsequent enquiry and verification arising from this analysis was captured using semi-structured interviews. Sequencing of data extraction, analysis, and verification thereby informed subsequent consultation (Figure 8.4). Few managers were able to find time to participate in focus groups; most participated in one-to-one interviews (Table 8.3). This protected the focus groups from being hijacked by more senior personnel and provided managers opportunity to express strategic and historical knowledge on ideas that had arisen within focus groups.

DMRC Focus Groups: In total five clinician / clinical manager focus groups were conducted at DMRC Headley Court. The initial two focus groups included clinicians and managers still employed at DMRC. Following these, a confirmatory interview took place with the consultant lead for CT. A chapter proof submitted for publication in Greaves [18] was provided also by the Director of Defence Rehabilitation in lieu of an interview. This document provided both a historical and evidenced overview of CT as well as offering a strategic perspective of the service. The importance these two focus groups placed upon the IDT approach, and Sport and Adventure Training (AT) also resulted in two *information gathering* interviews to help understand the impact of both initiatives on clinical services; with the Head of Group Therapy (who had overseen the introduction of the IDT across DMRC), and the Head of Battle Back at the time.

Insider / outsider Focus Group: During the initial coding, a feature termed 'insider/outsider' became apparent. Both focus groups were made up entirely of IDT members. They had raised issues around the interaction between the IDT and those clinical departments outside of the IDT (nursing and mental health). To ensure these professions were included in the consultation, both nursing and mental health were specifically approached to take part. A specific focus group was planned in which the nursing team were dominant in numbers, to ensure they felt comfortable expressing opinions that differed from IDT clinicians. Two members of the IDT were also included in this group to provide an IDT view. Experiential accounts provided by the nursing team (part of the MDT at DMRC) contrasted with IDT accounts and views. Further clarification was sought following this focus group using participant verification with the Matron and a health care assistant, both of whom had worked with CT patients throughout. One provided a clinical management view and the other a clinical perspective. In addition, the Commanding Officer of DMRC, also a nurse, provided a confirmatory view of this analysis.

Clinical Focus Groups: These two groups included members of the IDT who had left DMRC at the end of operations in Afghanistan. For logistical reasons, these groups were run concurrently on the same day. Both groups received the same introduction, whilst the rest of the NGT was performed separately. The researcher ran one group, and a member of Imperial College academic staff facilitated the other. Both groups reflected on their experience of CT, having left, and worked elsewhere. This provided a valuable opportunity to compare accounts with the initial two groups who remained employed at DMRC.

Verification Interviews: Verification interviews and one verification paper review were conducted with senior officers, or project leads to provide analysis of key themes discussed during focus groups. These included three one-to-one interviews with military community psychiatric nurses (CPN). Mental health had been a source of much discussion in every group. Yet they were not represented in any focus group, nor were they key members of the MDT. The purpose of this consultation was to ensure their voice was included, to refine the insider /outsider view, to gather information about how mental health services operated and to provide *outsider* verification of thematic views of the treatment paradigm. Verification interviews were purposefully sampled to provide alternative perspectives to the views captured in the focus group.

Participant Verification Interviews: Four verification interviews were also conducted with focus group participants to confirm interpretation and analysis of focus group data (Figure 8.3). The first two interviews

were formally recorded and transcribed. In the second, categorisation of statements used on voting forms were verified by the participant. Interviews 3 and 4 were not transcribed as neither yielded new data.

Presentation of Final Analysis - verification: Two interviews were conducted, in which final analyses from the clinician / clinical manager group was presented; with the Surgeon General (SG) and CT Manager. The SG is the most senior medical officer in the British Armed Forces and provided strategic and political insight of the events and policy decisions upon which the analysis was based. The CT manager was in post from the start of CT, until the closure of DMRC Headley Court and so provided tactical insight and comment on the analyses.

Researcher verification: During analyses patterns emerged between different teamwork models. The interdisciplinary research forum at Imperial College agreed to review the analytical framework to confirm this finding. The InterPACT as an evaluation of interprofessional teamwork, illustrates conceptual components of teamwork. It was used to assist members of the forum in their review of data ([LINK](#)). An audio recording was made of this review, however, the forum split into two groups, coming together at the end. The audio recording was, therefore, difficult to transcribe given background noise. Neither group attributed an InterPACT grade by the end of the review, so the researcher used audio recording and discussion notes to attribute an InterPACT grade. This evaluation was forwarded to participants via email for confirmation ([Appendix 16](#)).

Patient / Veteran Group

Two initial interviews with veterans allowed the researcher to practice questioning technique, test language use and explore relevant issues. The attributes and locations of each focus group can be found in Table 8.5. The NGT format was followed as previously described. Attendance at the first three groups was inconsistent and resulted in small numbers. Smaller group sizes, on reflection, allowed space to verify understanding and for participants to interact freely and openly with the support of one or two peers. Together, this dynamic allowed them to affirm one another's experience as well as aiding recall as the discussion stimulated ideas and memories.

Verification. Unlike the clinician / clinical managers group, verification of veteran focus group data took place within the focus group itself. The researcher had gained experience facilitating focus groups and so felt able to do this without interrupting the flow of discussion. The risk with this form of verification is that it

precludes challenge, as both data and verification arise from the same source [386]. For instance, the current sample largely consisted of prosthetic users, and so issues and experiences discussed would be orientated around prosthetic use. For this reason, verification was also sought from ADVANCE Baseline data. ADVANCE Baseline data captured self-report and clinician assessed physical, psychological, and social outcomes from a larger population of volunteer veterans who had suffered amputation, as a result of combat injuries.

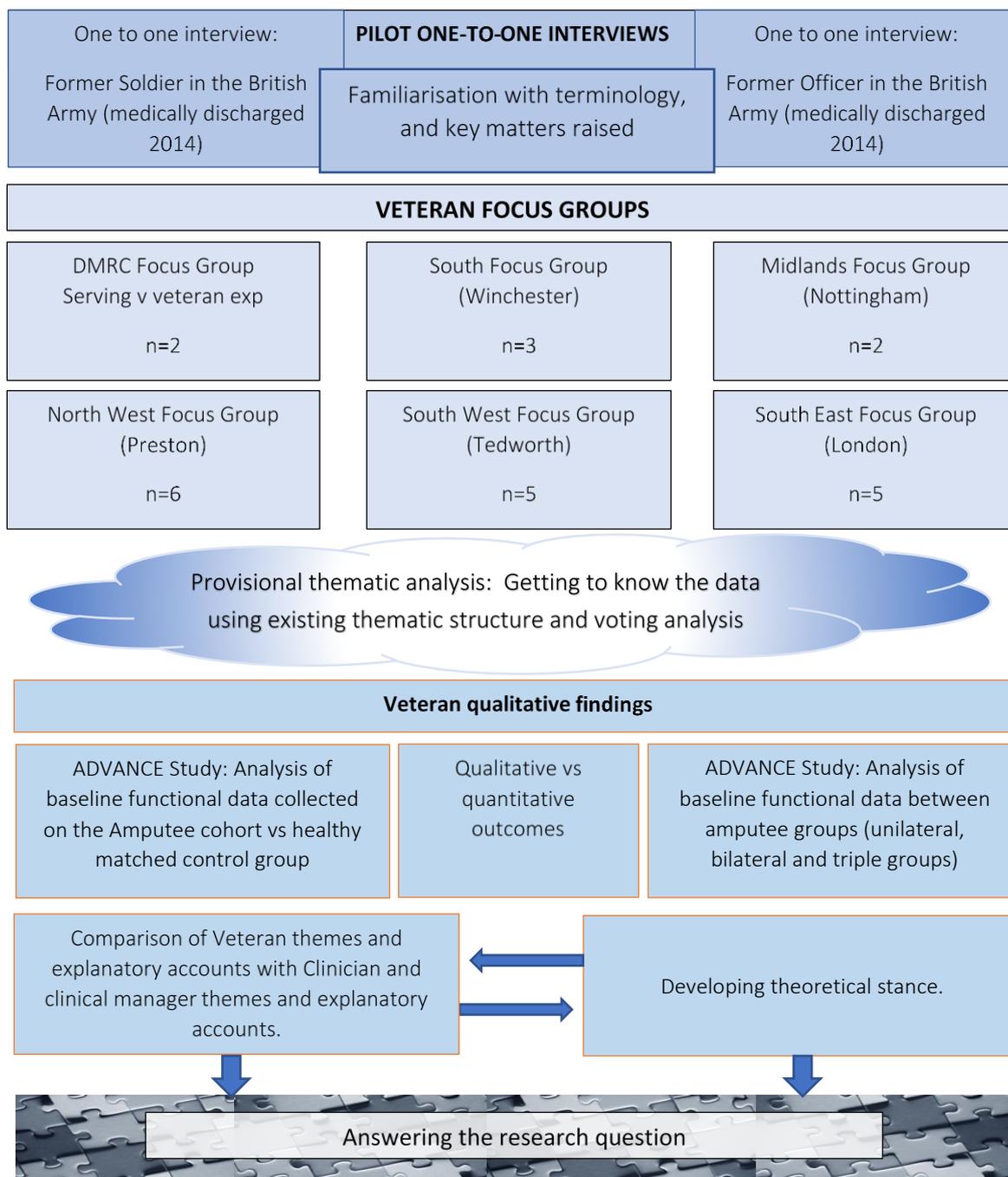


Figure 8-5 Sequencing of consultation: Veteran

Quantitative analysis: ADVANCE Study

The ADVANCE study is a 20-year prospective cohort study [196] of 600 male soldiers (aged 18-50) 'exposed' to physical combat injury whilst on operation in Afghanistan and 600 uninjured 'unexposed' male soldiers also deployed to Afghanistan. Controls have been frequency matched according to their role on deployment, rank, service, and age [196]. Participants are subject to a series of self-report questionnaires, clinician assessments and physical examinations to capture musculoskeletal, cardiovascular, psychological, and social health. Bennett et al [196] provides a full account of the method and procedures used to collect outcome data. Initial baseline tests on all subjects were completed in May 2020. Testing is ongoing, repeated in years 3, 6, 10, 15 and 20.

Application

Analysis of ADVANCE baseline data has been performed to help verify qualitative themes primarily emerging from the patient / veteran group. It also establishes, for the first time, the physical functional outcomes achieved by veterans who had suffered amputation due to a combat injury. This enables a comparison of physical, psychological, and social outcomes, across this military patient group, and within civilian populations. QoL, as a measured outcome, is also of interest as it involves an interrelationship between physical, psychological and social health [192]. To understand this relationship, confounders influencing physical, social, and psychological outcome (physical presentation, injury severity, prosthetic ability, pain, employment, residential status, marital status) must also be examined.

A data request was submitted to the ADVANCE Board in April 2020. [Appendix 17](#) Provides a justification for each of the outcomes requested. For example, pain outcomes were requested to investigate associations between pain and injury severity, social, psychological, or physical outcomes. All raw data from exposed and control groups was supplied by the ADVANCE study team.

Statistical Tests

The amputee cohort was divided into three groups according to the number of major limb amputations suffered: unilateral, bilateral, and triple amputation groups (n=157). Data from an uninjured matched control population (n=157) was supplied for comparative purposes. Statistical tests were performed by the researcher using [IBM SPSS Statistics version 26 for Windows \(IBM, Armonk, NY, USA\)](#).

For some variables, sample size was low or clustered affecting analysis of variance and association. Following consultation with the ADVANCE Statistician, these variables were re-coded by the researcher creating categorical variables contrasting clinically / non-clinically relevant scores ([Appendix 18](#)) [419]. In

particular, the small sample size in the Triple group, and its variance in outcome, led to the decision to compare outcomes according to prosthetic walking ability rather than *Amputation Count*. A multi-centre trial found a typical 6-minute community walking distance was >409m [420]. Six-minute walk distance (6MWD) was used to categorise the exposed population into a variable called *Walking Category*. Exposed participants who could walk >409m were categorised into a *community walking* group. Where 6MWD was below 410m, participants were classified as *non-community walkers* ([Appendix 18](#))

Normality was assessed using Kolmogorov-Smirnov test and tests for skewness and kurtosis. Level of significance was set a priori as $p > 0.05$. Only *age* was normally distributed; all other variables were classed as non-parametric data. Between group analysis was conducted for all outcome scores to establish differences between uninjured controls and the amputee cohort, and uninjured control, unilateral, bilateral and triple amputees ([Appendix 19](#)).

For non-parametric data, a Kruskal Wallace test was performed with a Mann Whitney post-hoc analysis. For categorical variables, a Chi-square test was performed. If the assumptions of Chi Square test were violated, a Fisher's Exact test was performed (2x2 table) or *likelihood ratio* (LR) recorded. Where a direction of association was sought between continuous and ordinal variables, Spearman's correlation was performed. Each statistical test used and with which variables can be found in [Appendix 19](#).

Qualitative analysis

The iterative nature of this qualitative study meant that data analysis occurred alongside data collection. The systematic and auditable process of analysis, based upon Miles & Huberman's [375] analytical hierarchy, is presented. Prior to this, the tools required to manage data processing, retrieval and presentation are outlined.

Computer Assisted Qualitative Data Analysis Software (CAQDAS)

Analytical process must be easy to present and audit. Given the quantity of data being processed, CAQDAS was used to help manage and code data. There is critique in the literature regarding the use of computer software in qualitative analysis [421]; a core concern is the imposed system of working on the researcher. Pertinent to this study, is the criticism that it does not easily manage complex coding structures in which several themes may interact together [421]. However, CAQDAS is simply a management tool. It does not do the analysis, yet simply enables the coding and retrieval of large quantities of data. It can also perform frequency tests, counting word usage, or coding frequency for groups and can assist in building graphical models and thematic charts [422].

NVivo 12 (version 12, QSR International) was used in this study, chosen as a highly regarded, flexible and versatile product [423]. It also offers accessible support and training as well as video guides. It is possible to incorporate literature, policy documents, reflections, and other sources of information into the project to be coded alongside transcripts. The researcher attended a two-day introductory course on NVIVO (University of Surrey, Nov 2018); followed by online training (NVIVO Training, April 2019). All analytical processes below were performed in NVIVO 12, unless specifically mentioned otherwise.

Analytical Hierarchy

Despite the non-linear nature of this method, a hierarchical process of analysis was employed. This hierarchical approach (Figure 8.6) is justified as it ensured a systemised approach was taken as data were analysed. This is particularly important in circumstances where events and data cause constant revisions in thematic explanation or description [355]. In such settings, emerging theory must be credible; this requires a process of analysis to be easily auditable [378].

THEORETICAL BASIS OF PROJECT ANALYSIS

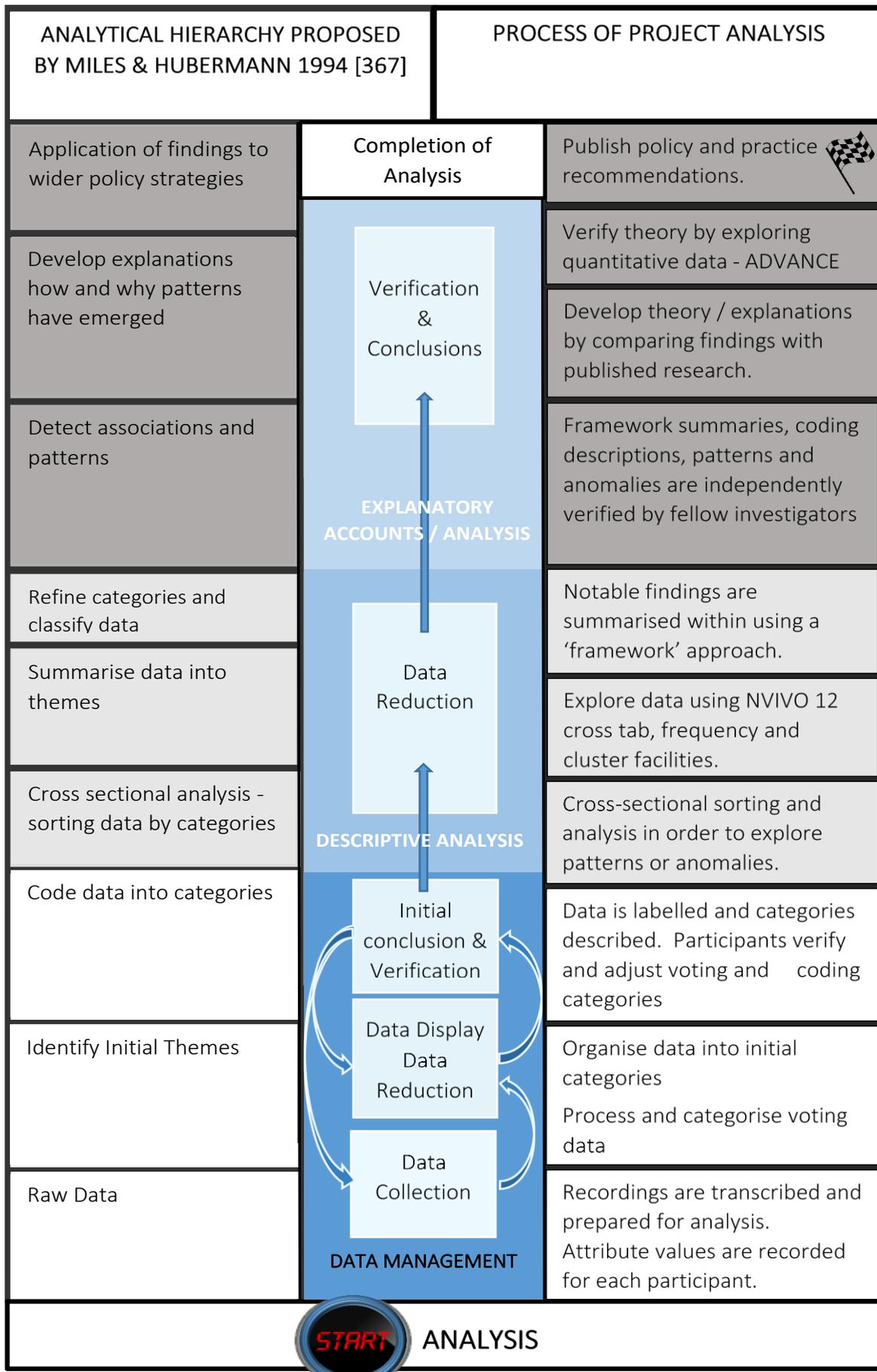


Figure 8-6 The Analytic Hierarchy (Adapted from [375, 424])

The model of analysis used was developed by Ritchie & Lewis [424] and their presentation of an analytical hierarchy first proposed by Miles & Huberman [375]. Three phases exist: data management, descriptive analysis and explanatory analysis [424]. In addition to using the analytical hierarchy, 'Framework' was also adopted to order and synthesize large amounts of data and present key themes [383]. Framework, a matrix based analytical method developed by Ritchie & Lewis [424], was intended to be highly structured, almost deductive, by defining the categories into which data would go. In this thesis, the thematic structure has formed as data has been analysed, and once completed, it has then been summarised within a framework, thus maintaining an inductive stance [385]. The stages of analysis within this analytical hierarchy will now be outlined.

Data Management. Raw data from interview and focus group transcriptions were reviewed against audio recordings. Corrections were made where errors were found. This process allowed the researcher to become familiar with the content, but also the expression and emotion of statements made. The transcript was read a second time without audio during which it was coded. These codes were categorised into themes and sub-themes. This phase was ongoing during data collection and verification phases (Figure 8.4 and Figure 8.6). At the end of this process, coded data for each theme was reviewed to ensure that data had been correctly categorised. In addition, voting data was collated and reviewed in relation to emerging themes. During the process of ongoing coding and verification, if themes were recognised later in this process, earlier transcripts were reanalysed and re-coded for this later theme. For instance, the importance of coding *attitude* was realised to help discern if a statement on a subject was portraying positive or negative sentiment, trust, or distrust. Earlier transcripts were recoded to ensure consistency.

Descriptive Analysis. Descriptive accounts aim to condense data and allow researchers to make sense of them [354]. Themes were, therefore, clustered and linked, from which conceptual maps were drawn. Voting results were added onto the maps showing which themes or sub-themes participants attributed importance to. This process allowed cross-sectional comparisons, investigating intra and inter-group differences in voting patterns. Frequency analysis of coding was also used to explore if particular groups of participants were more likely to voice certain perspectives or attitudes, or which themes dominated discussion [424]. Once main themes and prominent interactions had been identified, these were placed into a framework. An example can be found at [Appendix 19](#). Quotations were distilled down, but raw data retained. This method enables fellow researchers to scrutinise raw data and the theme it had been coded into [383].

Explanatory Accounts. Principal themes were verified using participant interviews, peer review or assessed using quantitative data. For instance, key themes from the clinician and clinical manager group were assessed against the InterPACT, whilst ADVANCE baseline data was used to verify qualitative themes emerging from the veteran consultation. The theoretical construct ([Figure 5.2](#)) has been used to link descriptive summaries with theory, and these theoretical patterns or descriptions were also reviewed in the literature. For the clinician / clinical manager group, the literature and the theoretical construct provided both verification and explanation of patterns seen, allowing theory to emerge. For the Veteran group, explanatory accounts emerged using a similar process. Unexpected outcomes from ADVANCE quantitative analysis, whilst deviating from the published literature, nevertheless reinforced theory developed from both groups.

Summary

This chapter has sought to provide a comprehensive description and justification of the method thereby facilitating the reader's evaluation of the credibility of the research process. A complexity science approach has informed a pragmatic stance in the choice of method. Embedding a quantitative research component (ADVANCE) within a predominantly qualitative study enables these research approaches to perform complementary functions, with the intent of yielding both depth and breadth in explanatory accounts. Sequencing of this mixed method approach, using NGT focus groups (n=11), pilot (n=2) and verification interviews (n=15) and ADVANCE data is proposed as the most effective way to answering the research question. Data analysis will be aided by the theoretical construct, statistical and qualitative data analysis software.

Section 3: Summary

The origins of the research setting presented in Section 1 have been shown to be complex. Section 2 illustrated the nature of complexity, how it operates in an organisational context, and the additional considerations needed when a human component is involved. The epistemological, theoretical, and conceptual foundation presented in Section 2 provides a series of complementary approaches through which collected data may be viewed.

A complexity view of the research setting places implications upon decisions around the most appropriate research methodology and method. A research approach enabling a flexible and iterative stance will facilitate an exploratory mindset. Pragmatism coupled with a mixed method approach will ensure the research question drives the research method. Embedding a quantitative component within a predominantly qualitative approach will capture the experiential data necessary to answer the research question.

The choice of a predominantly qualitative method has been justified via pragmatic considerations and an exploration of other possible options. Insider knowledge of the research setting can be an asset, but it can also introduce bias, particularly when the design of the method is inductive and iterative. Using the COREQ checklist, the method has been evaluated to allow external scrutiny (see completed framework in Appendix 5). Multiple verification points have been sequenced into the method, providing opportunity for participants, peers, and senior personnel to view and interrogate emerging interpretations. The addition of ADVANCE baseline data also introduces functional data and social and psychological outcomes into the interpretative process.

It is to this qualitative and quantitative data Section 4 now turns. Results and discussion from the clinician and clinical managers group are presented first. This is followed by the results from the veteran group, including ADVANCE study data and a subsequent discussion chapter.

Section 4: Results and Discussion.

Section Introduction

In Section 4, the results for each component of this study are presented and separately discussed in relation to the central research question, theoretical construct, and wider literature. Chapter 9 presents key findings from the clinician / clinical manager's consultation exercise and Chapter 10 evaluates and discusses these findings. The same pattern is repeated for Chapters 11 and 12 with reference to the veteran group. The summary at the end of the section draws together both findings and discussion into a coherent whole before final Conclusions and Implications complete the thesis.

CHAPTER 9 Clinician and Clinical Manager Group Results

Introduction

Section 3 detailed the process of clinician / clinical manager consultation. Five focus groups were conducted with between 5-6 participants (Table 9.1/9.2). In addition, 13 verification interviews were conducted with 14 participants. In total, focus groups and interviews involved 29 clinicians and 12 clinical managers with wide-ranging roles (Table 9.1). The focus groups used a Nominal Group Technique (NGT) to facilitate consensus building. These groups will be referred to throughout this chapter as NGT focus groups or simply focus groups. Transcribed audio-recorded discussion is referred to as 'data' throughout. Data have been organised, coded, and categorised to create surface themes and sub-themes using NVIVO 12 software. Thematic structures emerging from this analysis have been conceptually mapped providing an overview and outline of how components of rehabilitation interact with other components as discussed by participants. Because of the complexity of the overall map, this chapter will focus on key quadrants within it, for example, the Interdisciplinary Team (IDT). Decisions about where to focus analytical attention have been made by those components of rehabilitation participants rated highly during the voting exercise at the end of each focus group.

Two forms of verification of key findings are also presented in this chapter. Thirteen semi-structured interviews explored the dominant theme of IDT/Multi-Disciplinary Team (MDT) interaction. Interviews were similarly coded and categorised alongside focus group data. Coding of transcripts and creation of thematic categories was independently peer reviewed by a military clinical colleague (Defence Medical Rehabilitation Centre Headley Court (DMRC) Clinical Lead Physiotherapist / Royal Centre Defence Medicine (RCDM) Rehabilitation Coordination Officer (RCO) (Participant Verification 2) and Director of Nursing (Researcher Verification 1) ([Table 8.3](#)). Fellow researchers attending the Imperial College Healthcare Postgraduate Research Forum also reviewed statements coded to teamwork using the [InterPACT](#) evaluation tool as a guide [2] ([Table 8.3](#)).

Profession	No.	Method of consultation		Role:		Status			Sex		Paid Employment		Employed at or admitted to DMRC		Member of the IDT	
		Interview	Focus Group	Clinician	Manager	Mil	Civ	Vet	Male	Female	Yes	No	Yes	No	Yes	No
Clinical Administrator	1	-	1	-	1		1		1		1		1		1	-
Consultant	4	3	1*	2	2	4	-	-	4	-	4	-	3	1	2	2
Community Psychiatric Nurse (CPN)	3	3	-	2	1	3	-	-	1	2	3	-	-	3	-	3
Dietician	1	-	1	1	-	-	1	-	-	1	1	-	1	-	1	-
Exercise Rehab Instructor (ERI)	7	2	5	5	2	-	5	2	3	4	7	-	2	5	5	2
Health Care Assistant (HCA)	1	1	1*	1	-	-	1	-	-	1	1	-	1	-	-	1
Nurse	4	2	3*	2	2	1	3	-	1	3	4	-	4	-	-	4
Occupational Therapist (OT)	4	1	3*	2	2	-	4	-	-	4	4	-	3	1	4	-
Physiotherapist	11	1	11*	10	1	4	7	-	4	7	11	-	6	5	11	-
Prosthetists	4	1	4*	3	1	-	4	-	2	2	4	-	1	3	4	-
Veteran	24	2	22	-	-	1	-	23	23	1	16	8	0	24	-	-
TOTAL	64	16	52	29	12	13	26	25	39	25	56	8	22	42	28	12

Table 9.1 Demographic table of study participants. *Participants from this professional group were also interviewed, see Table 9.2.

	Clinical Profession	Manager	Clinician
Focus Group 1 (DMRC Clinicians)	Physiotherapist (clinical lead) Physiotherapist Prosthetics lead Occupational Therapist Clinical Administrator	- - - - -	2 1 1 1 1
Focus Group 2 (DMRC Clinicians)	Consultant* Rehab Coordination Officer (Military Physio) Military Physio clinical lead (Military Physio)* Complex Trauma Manager * Vocational OT / CT Deputy Manager Dietician	1 1 - 1 - -	- - 1 - 1 1
Focus Group 3 (MDT vs IDT)	Occupational Therapist Exercise Rehabilitation Instructor Nurse Matron* Ward Nurse Health Care Assistant*	- - 1 - -	1 1 - 2 1
Focus Group 4 (Ex-DMRC Clinicians)	ERI Physio	Nil	4 1
Focus Group 5 (Ex-DMRC Clinicians)	Prosthetist* Physiotherapist	Nil	3 2
Verification Interviews	*Focus group participants (See above) Head of Battle Back (ERI) Head of Group Therapy (ERI) DMRC Medical Director (Consultant) Commanding Officer DMRC (Nurse) Community Psychiatric Nurse (CPN) Surgeon General DMS (Consultant)	3 1 1 - 1 - 1	3 - - 1 - 3 -
Researcher Verification (review of research process)	Expert Panel (Formulation of NGT question) Director of Nursing (Coding review) Interdisciplinary Postgraduate Research Forum (Coding review of IDT and MDT data)	2 1 -	2 - 4

Table 9.2 Clinician / Clinical Manager focus group / Interviewee professional background

*Focus group participants who took part in one to one interviewed

Overview of findings

Key themes

Using the analytical process described in [Figure 8.6](#) coded statements were grouped into themes. All coded data were reviewed within each specific theme to ensure they were correctly attributed to the right theme/s. Eight key surface themes arose from clinician and clinical managers discussion of key components of care:

- Attitude

- Clinical team dynamics
- Goal centred resourcing
- IDT organisational culture
- Intervention
- Leadership
- Necessity the mother of invention
- Philosophy of care

A conceptual map was created to illustrate how surface themes and sub-themes interacted (Appendix 32 / Figures 9.2-9.9). This map is followed by a thematic referencing count (Table 9.3), voting scores (Figure 9.1) and a table presenting priority themes and their enabling and enabled actions within the conceptual map (Table 9.4).

Conceptual map

The complexity of the overall conceptual map can be seen in [Appendix 32](#). To make the information contained within it more palatable, this map has been broken down into priority themes (Figures 9.2-9.9) and these will be presented. On each map, the key on the right indicates the meaning of each symbol. Surface themes appear as diamonds. Thematic groups are colour coded; this coding helps to visualise the surface theme and linked sub-themes. Surface themes and their sub-themes are linked by lines which appear as off-shoots from the surface theme. Elsewhere links between themes and sub-themes are shown by arrows which illustrate the direction of interaction between components. Interactions between priority themes are indicated by blue arrows. Red arrows indicate negative interactions. Whilst the components of rehabilitation rated most highly during the voting exercise have not been presented yet, it is important to note they are indicated in the conceptual map as a circle with a blue outline. These voting items are called '*Priority themes*'. Additional features will be discussed in more depth as results are presented.

Thematic referencing count

Table 9.3 presents emerging themes and related sub-themes together with a count of the numbers of times sub-themes have been coded and in how many files. This provides an indication of the time spent discussing each. *Attitudes* were not included in this comparison as these are attributed emotions used to categorise statements from across the conceptual map. The most salient features to note are as follows:

- *Leadership, patient goals* and *functional vocational skills*, were the most heavily referenced items, but none of these appear in voting scores (see yellow highlighted boxes in Table 9.3). The interaction of

these highly referenced themes is presented in Figure 9.2. Green interactive arrows show *Leadership* and *patient centred goals* have a direct or indirect enabling action on all priority themes. Table 9.4 displays this interactive pattern, listing themes according to their interaction with priority themes as enabled or enabling.

- Although the IDT is a concept that achieved high importance in the voting, it was not referenced as highly as other themes. It is, however, discussed across several themes contained within *clinical team dynamics*, *IDT organisational culture* and *leadership*.
- *Mental health* also received consistently high voting scores, yet it was not heavily referenced.

Numbers of coding references is only indicative of the time spent discussing an item, implying areas of interest. This is a useful exercise to draw attention to *hot spots* within the discourse requiring further examination. Importance was attributed to items in the conceptual map using participant voting scores (Figure 9.1) using blue circles.

Surface Theme	Sub-theme	Files	References
Attitude Statements which represent an emotion or sentiment towards the subject	Distrust	12	97
	Negative	14	327
	Positive	15	531
	Trust	11	363

Clinical Team Dynamics Structural and organisational processes within the clinical team	Communication within the IDT and MDT	10	114
	Equality vs Hierarchy	13	146
	IDT - the joint approach	14	95
	MDT IDT Reorganisation - background	4	27
	Mix of military and civilian staff	8	106
	Proximity	11	57
	Views of working together	13	87

Goal Centred Resourcing Resourcing of a service centred around enabling patient directed achievement goals.	Continuity of staff	8	19
	Optimal Staff Allocation (acute and sub-acute environment)	11	26
	Required resource (equip and funding)	7	32
	Simple joined up communication - documentation - IT	6	21
	The setting (infrastructure - outdoor space - gyms)	8	25
	Time	8	38
	Training Support	6	15

IDT Organisational Culture Collaborative social process operating within the clinical	Black box thinking (positively learning from failure)	13	297
	Clinical Coordination Roles	9	25
	Collective learning together	9	40
	Defining the clinical roles	9	64

team following its reorganisation into an IDT arrangement	Joint Therapy Sessions	8	11
	Networking beyond the IDT	10	48
	Peer Support – Clinician – Patient – Manager	12	207
	Risk Tolerance	14	43

Interventions Clinical rehabilitation interventions	Health Promotion – health education	8	14
	Mental Health	13	103
	Buddy buddy	4	6
	Loss – grief – anger	7	15
	Resilience Training	7	30
	Pain Management	7	15
	Managing my medication	3	13
	Physical Therapy (OT, ERI, Physio)	5	11
	Prosthetic Provision	6	40
	Social Work	2	3
Use of Sport and Adventure Training	9	19	

Leadership Clinical and administrative leadership of treatment teams	Consistent Leadership	9	349
	Leadership role (MDT / IDT)	10	416

Necessity the mother of innovation Accidental innovative ideas which were forced by circumstances	Active Case Management	2	4
	Group therapy - one to one	7	21
	Periodic Intensive Residential Rehab (PIRR)	10	25
	Shared consciousness between organisations	9	30
	The ticking clock	8	30

Philosophy of care Philosophy of military rehabilitation as articulated within the Defence Medical Rehabilitation Programme	Art of the possible - Whatever it takes	14	52
	Continuity of care	8	23
	Early Intervention	5	11
	Functional Vocational Skill Focus	9	351
	Holistic adaptable approach to therapy	7	25
	Military Ethos and Banter	9	33
	MSK Strength and conditioning	2	3
	Patient Centred (Goals - Intervention)	12	352

Table 9.3 Thematic referencing count

 Highly referenced sub-themes

Voting scores

Clinicians and clinical managers were asked to rank what they believed to be the ten most important components of rehabilitation to be included in a rehabilitation pathway for lower limb amputees. Voting data was calculated for each group and across all groups. Clinician voting data can be found at [Appendix 20](#). Six themes were highly rated across all 5 focus groups; cumulative and group scores are presented in a separate conceptual map created for voting scores (Figure 9.1). The one component scoring highly and consistently rated across all focus groups was *the* IDT.

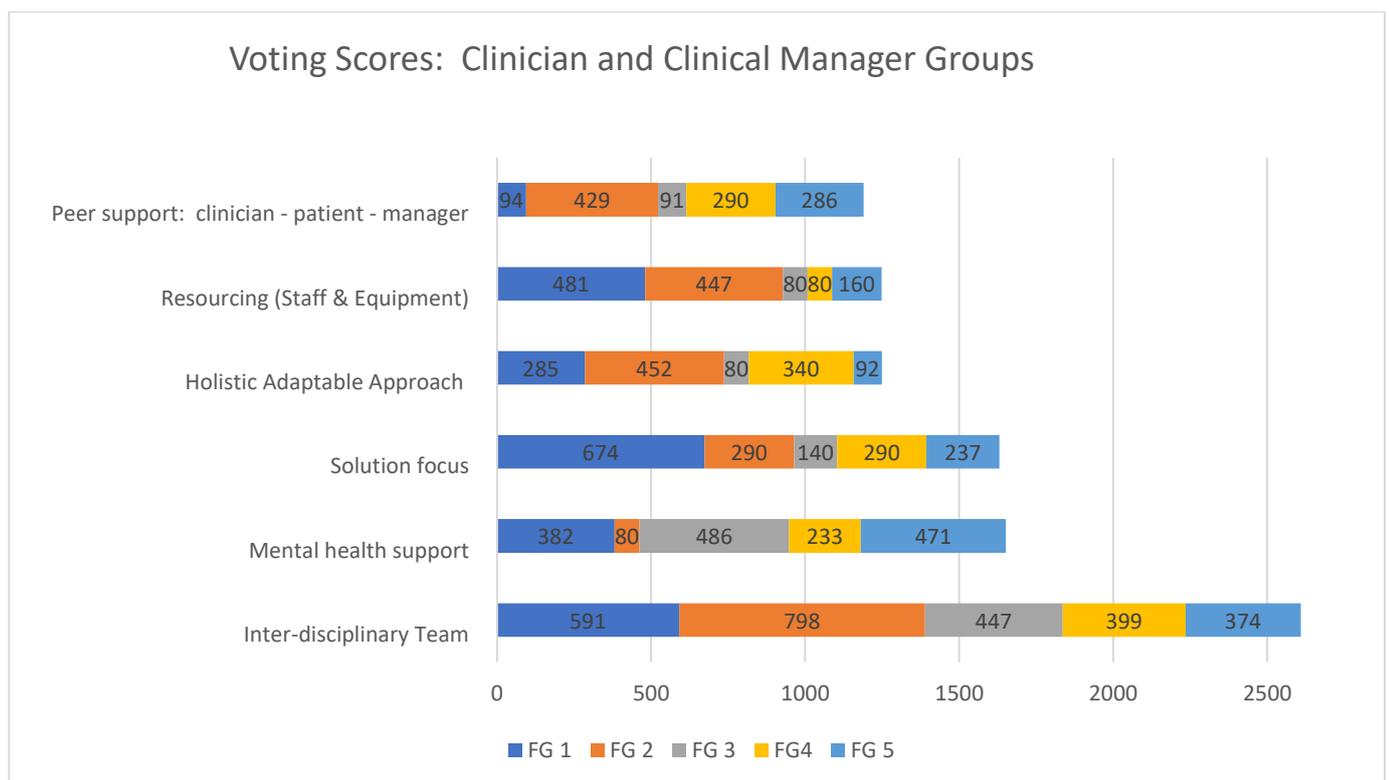


Figure 9-1 Voting Scores: Clinician and Clinical Manager Groups

Voting scores in the form of priority themes, surface themes and sub-themes have been integrated into the conceptual map. Voting items placed onto the conceptual map as *Priority Themes* appear as a blue circle.

Two voting items appear differently on the conceptual map:

1. 'Solution Focus' is represented by two sub-themes, *Blackbox Thinking* (reflective solution focus) and 'The art of the possible' (innovative mindset).
2. 'Resourcing (Staff & Equipment)' is attributed to the surface theme 'Goal Centred Resourcing' as this theme captured all resource focussed discussion.

Examination of the conceptual map shows that these priority themes were either ‘*process enablers*’ (defined as those whose interaction appears to facilitate others) or ‘*process enabled*’ (the interactional direction appears to facilitate the voting item). Where a theme is described in the data as having a negative influence upon a voting item, this is listed as a *process disabler*. Table 9.4 lists *process enablers*, *process enabled* and *process disablers* for each voting item. IDT Joint Approach, for example, is an enabler of all other voting items, except Mental Health. Mental health is presented principally as a process disabler within the conceptual map

Voting item	Process Enabler / Enabled / Disabler	Direct interaction with
IDT Joint Approach	Process Enabler (for)	IDT Organisational Culture – Equivalence – IDT Communication – Collective Skills – Art of the Possible – Philosophy of care-Goal centred resourcing – Peer Support
	Process Enabled (by)	Leadership – Proximity
Mental Health	Process Enabler (for)	Use of sport / AT – Staff resilience -Buddy buddy
	Process Disabler (for)	Working together – Joint therapy sessions – info loss between organisations – (feeling) ill equipped.
	Process Enabled (by)	MDT / IDT Leadership
Solution Focus ¹	Process Enabler (for)	Risk Tolerance – Flexible approach - Holistic Adaptable Approach
	Process Enabled (by)	IDT Joint Approach - Peer support – IDT Communication – Collective skills – Philosophy of care – Goal Centred Resourcing –Leadership- Equivalence
Holistic Adaptable Approach	Process Enabler (for)	Managing loss / grief (cycle)
	Process Enabled (by)	Philosophy of care - Functional Skill Focus – Use of sport / AT – Art of the possible IDT Joint Approach - Joint therapy sessions – Networks beyond the IDT – Collective skills.
Goal Centred Resourcing	Process Enabler (for)	The art of the possible – support for training – The setting – Equipment and funding — Time (inclusive component) ² – Staffing – Early intervention.
	Process Disabler (for)	Lack of Information Technology (IT)
	Process Enabled (by)	Patient Centred Goals – IDT Joint Approach - Leadership
Peer Support	Process Enabler (for)	Blackbox thinking – Joint therapy sessions – Flexible approach
	Process Disabler (for)	Distrust
	Process Enabled (by)	Organisational Culture – IDT Joint therapy sessions - Equivalence

Table 9.4 Voting items contribution to the conceptual map. ¹ Consisting of Blackbox thinking; Art of the possible. ²Component which is universal theme across the map **red font: negative interaction**

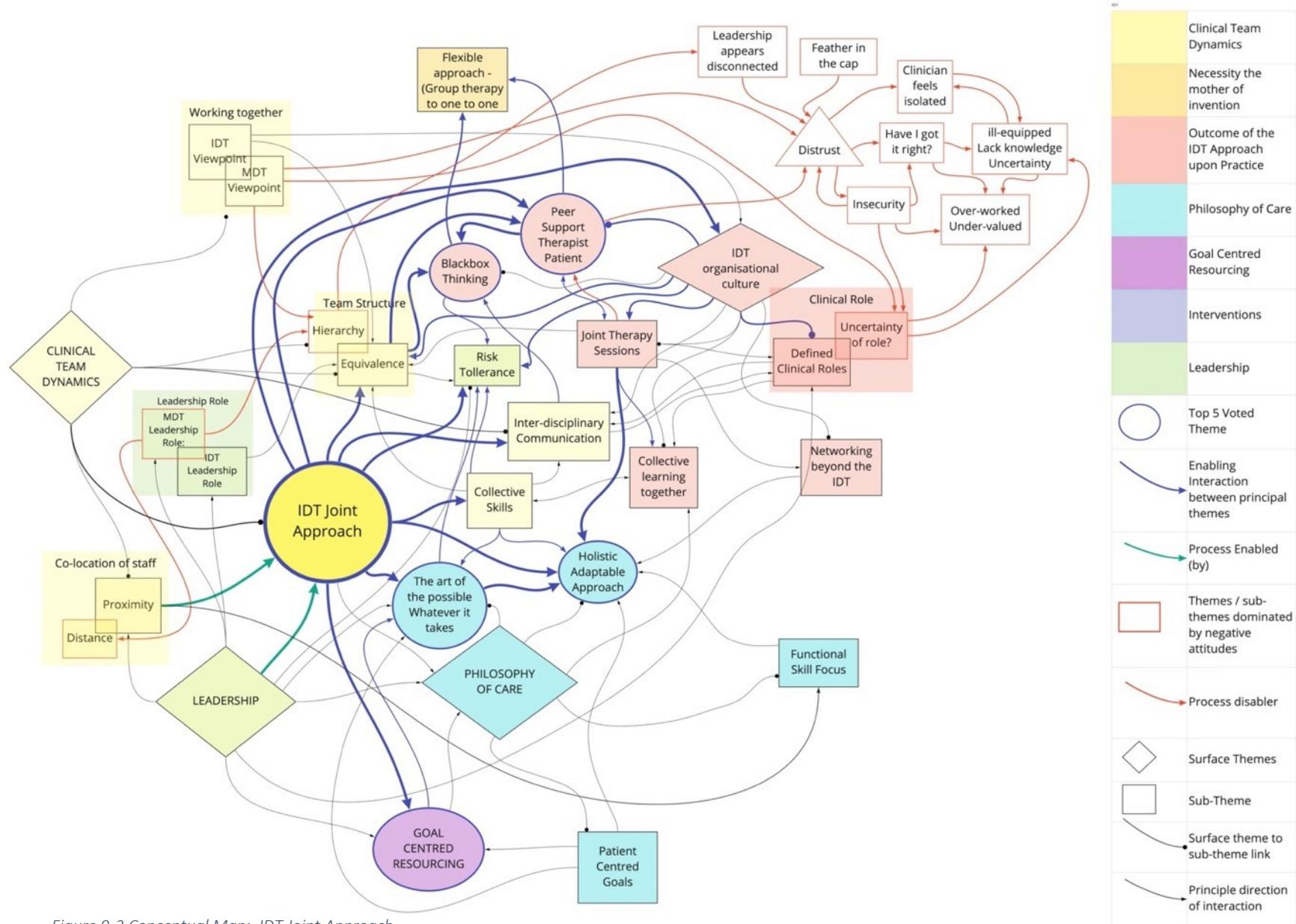


Figure 9-3 Conceptual Map: IDT Joint Approach

Priority Themes

Using the analysis of process function (Table 9.4), the six priority themes will now be analysed in greater depth, illustrating their influence within the conceptual map, and evidenced using quotations from the data.

1. IDT:

Whilst the IDT was the most highly rated component, it is necessary to provide a picture of clinician's views of DMRC prior to its inception.

'...it was a negative side of life at Headley because it was very tribal, I didn't feel there was any great degree of professional respect...' (Verification Interview 5, p9)

'...It's arguable to say we deliver multidisciplinary rehabilitation. I used to say we deliver a series of monodisciplinary interventions...in a mutually exclusive way' (Verification Interview 2, p2)

The IDT is a group dynamic without professional boundaries, in which team members share the same goal and work in partnership to achieve these. This model was consistently rated by all clinicians and clinical manager groups as the most influential component of rehabilitation to be carried forward into future rehabilitation provision for military lower limb amputees (Figure 9.3). Participants discussed this component in two ways. First, it was discussed with respect to team dynamics, comparing its merits based on individual experience of having worked within alternative settings (e.g., MDT). This was particularly the case in the final two focus groups that consulted clinicians who no longer worked in CT or military rehabilitation.

'...it recalibrated their thought process... when there wasn't a physiotherapy department ... started thinking themselves as a member of the spines team ...lower limbs team. And you will now hear OTs and physiotherapists and the ERIs referring to themselves as the spines O. T or the lower limbs physiotherapist. The description is always team first, sub profession, second which is a complete reversal as to how it used to be.' (Verification Interview 2, p8)

'...A real support network ...everyone being together...we faced any challenge...and set goals together and worked through it...if a patient wanted to do something crazy, everyone made it happen, regardless...there were just great friendships between staff and patients, and it kind of created those relationships of trust...' (Focus Group 5, p1)

Second, clinicians discussed the impact of the IDT approach upon the organisational culture within the team; represented as a separate theme (*IDT Organisational Culture*) enabled by *IDT Joint Approach*. Interactions linking the IDT approach are presented as positive.

'...the joint working within the IDT so being able to work really closely with all the different members of the team. Easy access to the consultants for questions that you want answered' (Focus Group 1, p10)

'...it's the management framework that sets the culture and the environment to allow that clinical delivery to flourish.' (Verification Interview 2, p16)

Enabler: Figure 9.3 shows *IDT Joint Approach* directly enabling the priority themes of *Solution Focus (The art of the possible / black box thinking (via Equivalence / Peer Support))*; *Holistic Adaptable Approach*; *Goal Centre Centred Resourcing and Peer support*. In short, clinicians and clinical managers attribute the IDT approach as a principal enabler of four out of five remaining priority themes.

'...it was a sharing of ideas with the rest of the staff... you are very much encouraged to have an opinion and to express that opinion... so problems realised quickly and solutions sought very quickly as well.' (FG1, p9-10)

'... the IDT ... would identify who would be best to lead on a specific goal or how...best to incorporate everybody into that...' (FG3, p6)

Enabled. Two key themes enabled the IDT approach, *Leadership* and *Proximity*. *Leadership* created the environment and processes to enable collaboration, and *proximity* made individuals work together.

'...(manager) allowed us to have autonomy...If you compare complex trauma to some of the other teams where their OCs were military, they kept changing every two years and we had stability from our manager... she allowed us to have a voice ...We didn't feel like we were just staff at the bottom, we could ...create change.' (Focus group 5, p34-35)

'I think it's a physical and cultural proximity. It's not just how close they are.' (FG2, p7-8)

'...inter-disciplinary team working... a lot of effort was put into maintaining staff cohesion, morale, value, support, no turf wars between disciplines. Shared offices helps but more so regular socials helped' (Presentation of final analysis 2, p44)

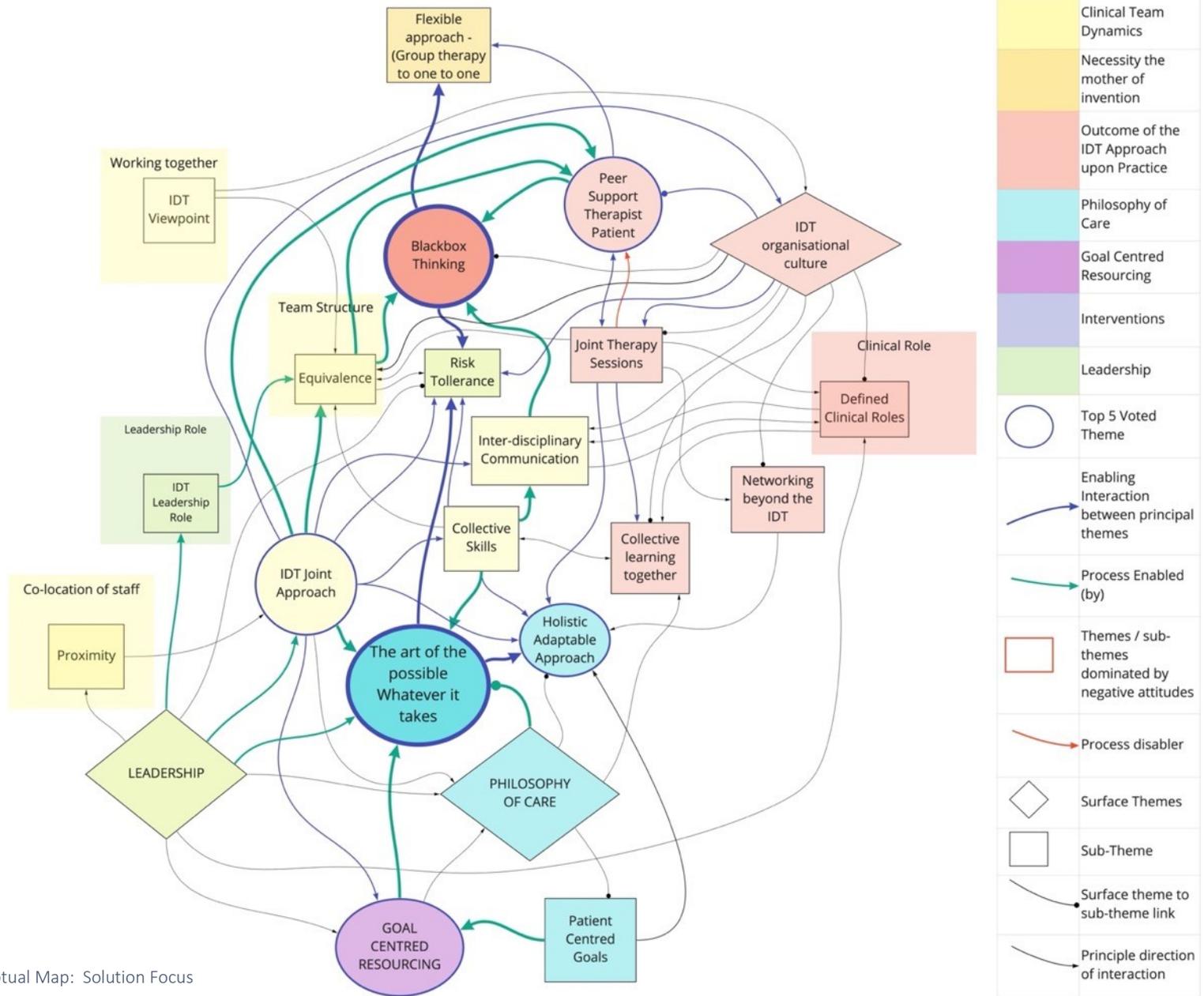


Figure 9-4 Conceptual Map: Solution Focus

2. Solution Focus:

Solution Focus was a term participants used during voting to identify a positive innovative spirit (Figure 9.4). Data coded *Solution Focus* were divided into two sub-themes to represent different components. First, *The Art of the Possible*, represented a positive spirit of pursuit, leaving no stone unturned in searching for a solution. *Art of the possible* is an offshoot from the surface theme *Philosophy of care*, in which there is an enabling function articulated in policy and military ethics, acknowledging the Defence Medical Service (DMS) role to recover life and limb, and maximise the recovery potential of an injured soldier; this requires an understanding of an individual's goals [140].

'There was no evidence for the management of multiple limb loss in a residential setting with young, active, predominately men...Okay, what do you think they need? Well, they're non risk averse people, so they probably want a non-risk averse approach to their rehabilitation. They still consider themselves active and relatively fit, so we need to organise it such that.... we keep them active and maintain their fitness levels at the same time as progressing their functional rehabilitation. And this all led to this mix of aggressive, intensive, non-risk averse rehabilitation which proved more through serendipity than a supporting evidence base, to be successful.' (Verification Interview 2, p17)

'We've not got it right, let's just keep developing it and I think that then becomes an attitude as well ... interesting things (developed) like your horticultural stuff, like the yoga thing...because they are quite off the wall thinkers...' (presentation of final analysis 2, p27)

Second, *Black Box Thinking* was a theme named after a book by Matthew Syed [325]. It represents a reflective and positive handling of failure which is an essential part of a creative, exploratory, innovative system [82, 307].

'... if you were unsure ...you went and asked and discussed it ...There was a clear process of how you accept risk up the chain, but, also, an empowering of, 'Crack on...' (FG 2, p5)

'...until you have that clinical experience, you've got to go wrong to know what's right... we had to trial and error quite a few things on the patients before we got it right, and that means we got it wrong sometimes...risk acceptance, isn't it? You accept that you may screw it up...whether the risk versus reward is worthwhile going for, and if it goes wrong, you then correct yourself.'

'We were honest with the patients ... 'We're going to give it a go, but it might not work ...the patients were happy to take that risk too.' (FG 2, p44-45)

Enabler: Risk tolerance, is a necessary part of an innovative process. As an enabler it acknowledges the balance leaders faced as they sought to enable experimentation (*Art of the possible*) and creative solutions, whilst also learning from failure and so managing risk (*Black box thinking*).

'You've got 20-year-olds, who are going to do things that 20 year olds...And people will fall over..... you have to accept a risk and it was a clinical risk ... And the patients have to buy into that risk as well.... So if you want to run a marathon, just running five miles a day doesn't really help. You've got to keep pushing those boundaries until you get the strength and stamina to do it. And the hierarchy got a bit twitchy, but we... we just accepted it as a clinical risk...' (Verification Interview 1, p9-10)

'Ultimately the buck stops with the consultant... it allowed the therapist to ...push their knowledge and skills because they knew that they were going to be covered... as long as it was under control.' (Verification Interview 1, p10)

Enabled. Three key themes enabled *Solution Focus (Art of the possible / Black box thinking)*. First, the IDT approach, through its emphasis on *Collective Skills, Peer support, IDT communication and Goal centred resourcing* provided direct and indirect enabling actions. Second, the role of *Leadership*, through its tolerance of risk and willingness to encourage collaboration, empowered clinicians to seek creative solutions to problems.

'There were still all sorts of unique, complex challenges that were never experienced before that, that had to be addressed... it was very innovative What do you need? We need this? Okay, this is what we can provide. There was always people willing to explore the art of the possible. So I think it almost stands alone, complex trauma, as an example of what can be done, but it does need funding and normally ambition, when it clashes with funding is where reality, normally enters the discussion.' (Information Gathering 2, p15)

Goal Centred Resourcing acknowledged the funding requirement inherent in any creative and/or innovative process. The key point is that this resourcing requirement stemmed from *Patient Centred Goals*. It is this sub-theme that informs where solutions are needed and commissions the process to find solutions.

'...because they got the chance to go back home, live the everyday things and come back and then say, "I found doing X, Y and Z the most difficult things". You set those then into their identified...patient-centred goals and they worked on that for admission and then they went home and they found something else more challenging.' (Focus group 3, p5)

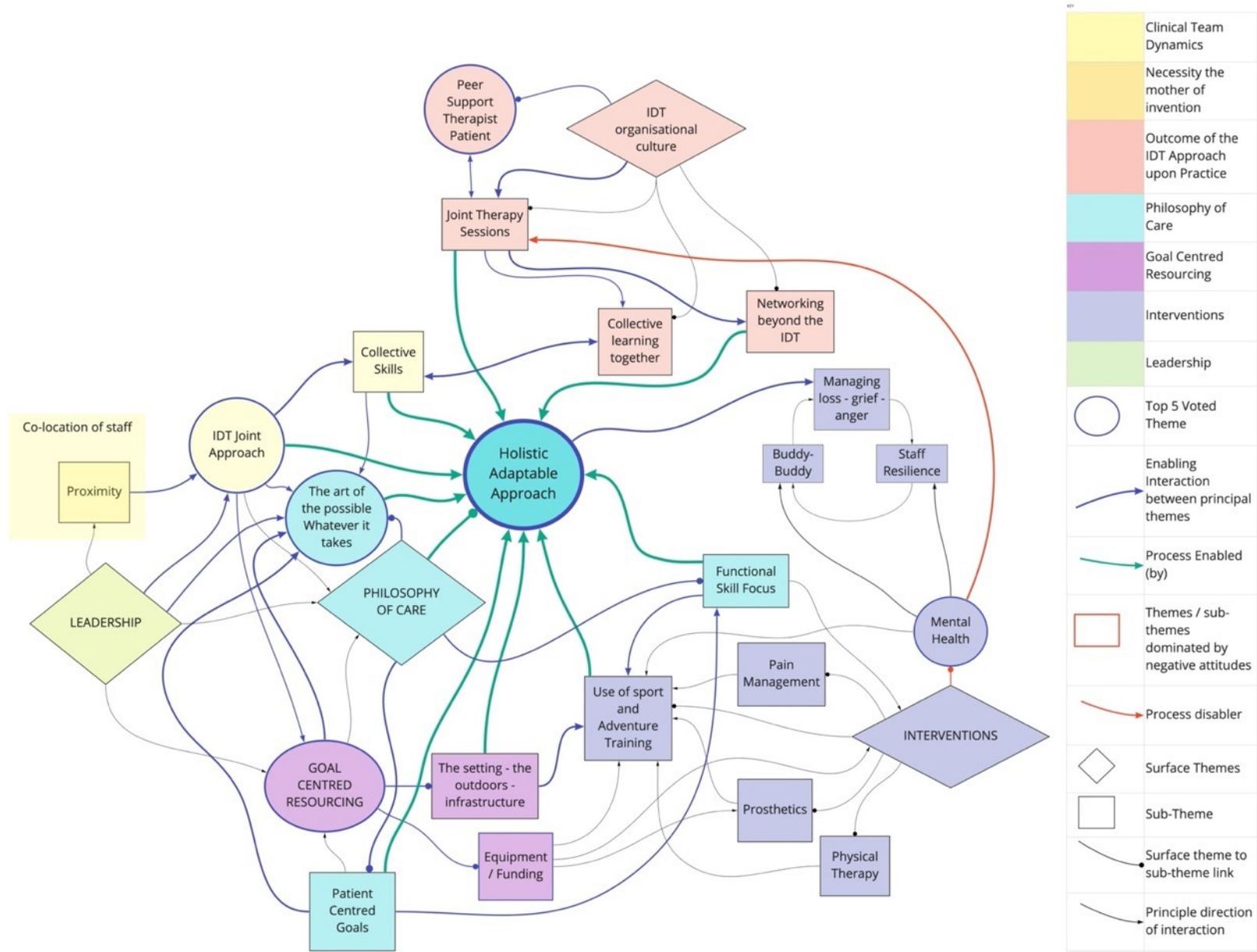


Figure 9-5 Conceptual Map: Holistic Adaptable Approach

3. Holistic Adaptable Approach

This component describes a breadth of provision extending beyond traditional therapeutic treatment and medical care (Figure 9.5). This primary theme is almost entirely process enabled, although this approach was believed to provide informal psychosocial support outside of mental health (*managing loss-grief-anger*). *Holistic adaptable approach* is the culmination of processes shifting the traditional view of treatment and clinical delivery. Traditional treatments that focused on specific domains of healthcare (i.e., physical rehabilitation) were not made redundant, but approaches offering physical, psychological, and social benefits were prioritised given their functional utility to the patient. This will be illustrated using the example of *sport and adventure training (AT)*.

Enabler. *Holistic adaptable approach* was an enabler of informal services contributing to the psychological adjustment of loss (*managing loss / grief – buddy buddy cycle*).

‘yoga...I think that’s a really good addition to the programme...it was quite ...And, as far as mental health, I think it was very helpful for a lot of guys.’ (Focus Group 5, p14).

‘I would say that rehab into sport...challenges, like the Ironman...was such an asset. It gave some of these guys something to work towards...I remember (name) saying ...let’s give them something else to focus on that is ninja, that is amazing to be a part of, that sounds so cool, and the icing on the cake is the race but the work is where all that transformation comes, and all the laughs and realisations of actually, I can still do all these things, is the training and the six months’ worth of working.’ (FG5, p17)

Enabled. Two thematic clusters enabled *Holistic adaptable approach: philosophy of care* and *sport and AT* (Figure 9.5). The military *philosophy of care* upon which a functional, sporting and occupation outcome is sought, resourced the infrastructure and enabled a process by which clinicians sought to incorporate such activities within the treatment space. This treatment approach located within a collaborative IDT environment, underpinned by an innovative culture and a diverse arrangement of skills, propelled this sub-theme into prominence.

‘...a holistic approach, flexible content and creative ideas. I think the fact that we’re all, like [name] and [name] were saying, able to try stuff and give it a go but also be quite creative and motivate each other or inspire each other’ (Focus Group 1, p11)

‘Back in the early days the guys used to go to Exmoor...I remember taking (name)...he did quad biking, horse riding, canoeing, and he used the recumbent bikes and when Friday came, he was a different person because he’d had his first taste of being able to do things and it opened his eyes up to the fact that he could still do things.’ (Focus Group 3, p19)

Battle Back is a dedicated *functional skill-based service* [425]. It was an extension of recreational therapy already existing in the clinical programme, introducing competitive sport adapted for various injuries. Battle

Back was initiated by Army Adventure Training, providing injured soldiers with the opportunity to compete in adaptive sport or Adventure training (AT). It was designed to support normalisation; this opportunity is discussed within the sub-theme Sport and AT. Battle Backs operational centre was DMRC, where it could access injured personnel and develop clinical links. Its network and leadership lay outside of the clinical domain working in parallel with them, but not directed by them.

'Consultants and physios....recognised the value of ...allowing individuals to take ownership of risk in their (patients) recovery pathway...in adaptive sport....often exposing people to activities they didn't even think they could do when they were well ...enabled us to help the patients to challenge their own perception of what was possible and you could see lives change... 'if this is possible (skydiving for example) what else can I achieve, how can I redefine myself as a civilian ultimately.' (Information gathering 1, 26:42 – 29:07min)

Clinicians reported on tension between Sport and AT and clinical goals. On the one hand sport was a motivator for many; a way to get fit and discover a new purpose. AT allowed young people to rediscover thrill and adventure alongside fitness gains, supporting their prosthetic rehabilitation.

'...when someone found an adaptive sport that they wanted to be good at, it re-energised their commitment to doing the dull and boring exercise, because they knew if they could improve their strength and endurance, range of movement, they would be even better...it improved their compliance in their recovery plan...' (Information gathering 1, 26:42 – 29:07min 30:44-31:28)

On the other, it could become a distraction from their rehabilitation, or present risk that might result in further injury.

'...he (patient example) got so involved in sport, in competitive sport, he didn't do any of his retraining when he had the opportunity...now ...he hasn't got those opportunities easily anymore.' (Focus Group 1, p45)

'I think it helped challenge the perceptions of the clinical team...there was a heavy undercurrent of scepticism...there were questions being raised about people getting injured through participating in these activities...delaying their rehabilitation ...but ...discuss with the individual about the quality of life questions...sense of fulfilment...being reintroduced to the feeling you get having experienced a large dose of adrenaline...maintaining your interest in rehabilitation' (Information gathering 1, 29:54- 31:07)

The debate centred around risk, and clinicians desire to protect patients from injury that might delay recovery, and the patients reported need to be exposed to risk as part of their recovery. In military systems where clinicians had control of physical training, it was argued the clinical aversion to risk delayed patient's normalisation.

'In Australia their physical training branch comes under their medical branch...so a lot of things which contain an element of risk are...turned off...so if you look at the development of military adaptive sport they are not even at 2008...in terms of working collaboratively and accepting a degree of risk...it's an essential part of the recovery process in terms of making people feel like themselves, making them feel like productive members of society rather than patients.' (Information gathering 1, 47:39 - 49:44).

This tension arose because of the co-location of clinical and functional skill-based services as neither the clinical service, nor Battle Back had overall control; both missions served the patient, and their leadership was distinct. *Sport and AT* is a key feature in military training and so in the conceptual map it is enabled by *military ethos*. Ultimately its existence was maintained by *patient centred goals*, although this is hidden in the conceptual map as patient goals act via the surface theme *Interventions* and *goal centred resourcing*. Due to its importance to patients these tensions were resolved through collaboration so both could exist in parallel to support patient recovery.

'We came up with an agreement with clinicians...if someone was in their first third of recovery, rehabilitation was their priority ...we are not going to change your admission, between admissions you can do other stuff, but it shouldn't be massive with massive risk attached. In the middle (middle third of recovery), case by case, then at the end (last third of rehabilitation) we should really now be looking at transition, and if something came up let's reschedule that readmission.' (Information gathering 1, 54:30 – 56:10)

The success of this arrangement is seen in the fact that clinicians consider *Sport and AT* an *intervention* that sits beside traditional clinical therapies.

4. Resourcing (Goal Centred Resourcing)

Participants rated resource availability highly. This theme included staffing, the provision of infrastructure (gardens, hydrotherapy, clinical space), access to services and investigations, and the freedom to procure non-standard equipment deemed necessary for a patient's progress, particularly state-of-the-art prosthetic componentry. Discussion about resourcing recognised the central role played by team leadership, as evidenced in the conceptual map (Figure 9.6).

'...the environment was really useful for giving them a really good test...proximity to Prosthetics, so that if there was an issue that we could go within that session to sort stuff ...If we needed equipment it was available, from my point of view, from working in previous places that just wouldn't have happened...the gait lab as well so that we could get some really hard numbers for patients and they got feedback ...to see what they looked like.' (FG1, p10)

Yes, finance was made available to us if we could clinically justify it, which we did.' (FG1, p5)

The outcome of sufficient staff numbers was seen to provide the flexibility for relationships and trust to form, enable joint working, peer support and the development of meaningful therapeutic partnerships with patients and colleagues. Continuity of staffing was a critical component within this process; to be further discussed in chapters 10 and 12. This resourcing is conditional upon the needs of the patient group, in terms of their complexity or individual problems. Therefore, whilst the component name attributed by those voting was 'Resourcing (Staff & Equipment)', the content of discussion reveals it to be a much broader concept dependent upon patients' complex needs.

Enabler. This priority theme is a process enabler for *art of the possible, resourcing training, the setting, equipment, time, and optimal staffing*. Through '*optimal staffing*' it is also an enabler of IDT organisational culture. *Time* is classified as a universal theme, meaning it enables other themes across conceptual map. As a resource and an offshoot of *Goal Centred Resourcing*, participants recognised *Time* as a critical component of relationship building, nurturing trust and partnership.

'...these guys have found themselves with a completely different life and situation ...you needed to have that understanding about them and being with, working with them for such a long time...allows you to definitely do that. And they change throughout that time as well, like their acceptance and understanding of what their life will be. You know, like it was just so important to have that longer contact time.' (FG5, p11)

Disabler. A negative offshoot of *Goal Centred Resourcing* was the integration and resilience of information technology (IT). Participants felt the lack of IT integration, its fragility and limited capability, was a drain on clinical time.

'IT that works...so it does what it's supposed to do not the cheapest basic systems...it's about it working but it's about it speaking to other systems, it's about not having to replicate your activity several times over...' (FG1, p16)

Enabled. *Goal centred resourcing* is predominantly enabled by three themes working together:

1. *Patient Centred Goals.* Patient centred goals represented the way in which rehabilitation was provided and resourced around patients' recovery goals. Consequently, it appears as an enabler for all clinical services and their resourcing. As an offshoot of *Philosophy of Care*, it is a principle instilled within Defence Medical Rehabilitation Programme (DMRP). Applied to complex and unpredictable combat and traumatic injuries, it ensures delivery of services and treatment pertinent to a patient's clinical need. Contrast was drawn with the NHS, in which rehabilitation services were not resourced to pursue individual patient need, rather generic pre-defined provision. Participants recognised this difference arose because of the bespoke needs complex injuries create, and because defence rehabilitation has a mission to return personnel back to occupational fitness.

'...But the point about the functional goals...we have literally set goals based on what the guys wanted to achieve and where they were in their lives etc. as opposed to being totally resource driven which is what the NHS is. ...NHS is doing now so-called rehab, but I don't think it is rehab but it's what I call the painting by numbers...they just do OT, can they wash and dress? Can they make a cup of tea and toast? Have I done a home visit? ... that's the goals driven by the resources that are available. We were able to basically set any goal we liked that was meaningful and relevant to that person and work until we got them there...' (Presentation of final analysis 2 p6)

2. *IDT Joint Approach / Leadership.* The requirement to pursue funding for services and equipment was raised and pursued by the clinical team but enabled by *Leadership*. This funding was always driven by patient goals. The enabling action of leadership sourcing resources helped distance clinicians from the demands of executive management. Clinicians recognised the protection this had upon their work, ensuring they were free to focus on patient care with minimal interruption.

'...when we moved away (into Jubilee Building). it almost got accepted that we would run our way and there would be (manager) shielding us so we could get on with the job. (FG4 p34)

Leadership effectively shielded clinicians from the administrative necessities of running a service, seen in positive statements regarding resourcing made by IDT clinicians. Verification interviews with managers reported their struggle as they sought to provide timely support to the need they witnessed but faced bureaucratic delay.

'Peacetime business processes do not support wartime operations.' [17] (p437)

5. Peer Support

Peer support (Figure 9.7), represents the provision fellow clinicians or managers offered each another, including psychosocial, knowledge-based, experiential, and problem-solving support. Amongst clinicians, it cemented social connection overcoming traditional professional boundaries, and encouraged a sense of equivalence and trust leading to cross disciplinary sharing of practice. This supportive function within IDT organisational culture helped clinicians to face the uncertainty and complexity of each clinical presentation. In so doing, this support was extended to the patient.

'I think there was a willingness for staff to learn but not just for the patients but with the patients and from the patients, so we learned as we went along...' (FG1, p5)

'I loved it, it was such a challenge to think, 'Right, what's my role in this big team of people to help this individual?' and it was so exciting to figure it out...how do we get this guy without a hand to hold this to strengthen his shoulder? You know, like, yeah, I think it was really challenging, and it was a shared experience for everyone. I think that's why morale was so great, because when you're in an experience with somebody and you're all learning at the same time it's just such a leveller.' (FG5, p2)

Enabler. Uncertainty and perceived skill inadequacy were commonly reported across the team. But where interdisciplinary peer support was perceived, it was viewed positively as part of a learning process. *Peer Support* is an enabler for *Joint Therapy Sessions* (and *Collective Learning*), *Black Box Thinking*, and *Flexible Mindset*. Through this social process, innovation and skill development occurs. *Joint Therapy Sessions* and *Peer Support* were also associated with statements of trust and mutual respect between colleagues.

'I think we all respect each other so much and there wasn't really a kind of a hierarchy in terms of, even the consultants, you know, we could speak to them on the same level so then we didn't mind staying that little bit later... and maybe working that little bit harder, it made it a bit easier.' (FG4, p12)

In one interesting reflection, a participant now working in civilian practice, recalls the response when adopting a similar exploratory and discussive approach in their new role.

'I got my hand slapped very quickly when I left... I was used to working with other clinicians from different disciplines and that we could be open like that and discuss...I quickly realised that other people felt that I was criticising or questioning what they were doing rather than exploring and working together...I got my hand slapped and had to step back.' (FG4, p29)

Disabler. When joint working did not occur, insufficient *Peer Support* was perceived in key clinical areas. Statements describing this experience were coded as negative (red arrows on the conceptual map). Insufficient *Peer Support* created *Distrust*, visualised in the conceptual map as statements of self-doubt and isolation.

Examples provided of this negative interaction include *Mental Health*, where members of both MDT and IDT felt ill-equipped to handle some psychological presentations. Negative associations with *Joint Working* arose when they were unable to gain the support they felt was needed from specialists. This is part of a more complex feature within the data that will be introduced below in attitudinal patterns and discussed in Chapter 10.

'...had we had mental health support as a nursing team... carry over some of the basic work that the psychologists or the psychiatrists were doing, that would have given everybody a good underpinning and we could have then maybe supported them a bit better...You can't just fix it and put a plaster on it; sometimes it is just listening and they don't want you to solve it...But, if you've then someone that you can say, "Okay, well this happened and they can help you make sense of why you're feeling like you are", you then feel, "Okay, well ...I'll be able to manage it ...' (participant verification 1, p15)

'... they're recalling stories of watching their friends being blown up in front of them and they can visually tell you word for word and taste it and smell it and see it and you're having to sit there and listen to that and just almost contain them and hold them, you're then left with how that made them feel, but no one is there to then support you. And I think we did really well to not crumble and just say, "Do you know what? I can't do this, this is too much, I've had enough...'" (participant verification 1, p5)

Further accounts illustrate the vulnerability staff felt knowing how to manage what they perceive is the impact of mental health issues.:

'...we kept saying to (mental health team), "Come down and spend time with us, come and mingle with the guys..." ... (mental health response) '(the patient doesn't) have PTSD so we don't need to treat them'. Wo wo wo, come and see what's happening in our session and realise ... this is not working... you want to call it adjustment, whether you want to call it PTSD, whatever you want to call it –It's affecting their ability (to function).' (FG4, p99)

'I didn't have supervision, and when I left, I did say I felt really strongly about that. Because suddenly...someone was downloading about wanting to take their life, had enough, wanted out, you know, and you just think...' (FG5, p11)

Enabled. *Peer support* was predominantly enabled by *IDT Organisational Culture* as this interdisciplinary interaction facilitated an ethos of collective endeavour in response to the uncertainty inherent in complex settings. *Equivalence* was an important enabler encouraging interdisciplinary support and inclusion of the patient as an equal partner.

'You can't just go, 'Let's just have a crack.' It's more a case of, actually, have we got the supportive structure that enables us to take risks.' (FG2, p3)

'I put fun and laughter ...part of that came out of us all having good relationships with the rest of the team and the patients...some of the group sessions with patients worked amazingly...new amputees on their legs for the first time around...learning so much from the amputees who were further down the line, and I can remember a session where they were practising steps... so motivating with each other... I can't remember who managed to do the step, and they were all going to clap him and not one of them could clap because they all had upper limb injuries, and they all just fell about laughing ...' (FG5, p7-8)

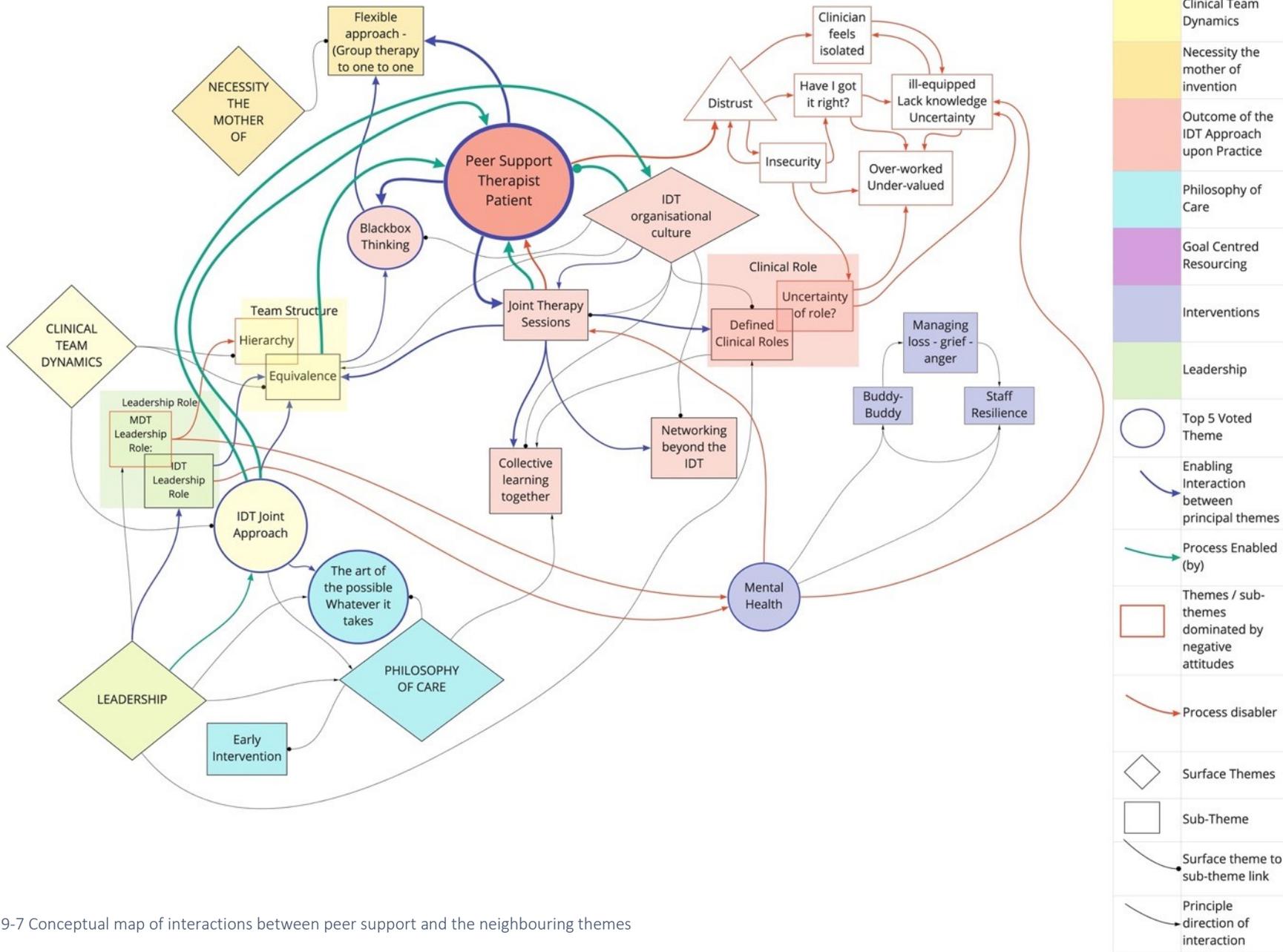


Figure 9-7 Conceptual map of interactions between peer support and the neighbouring themes

6. Mental Health

Mental Health is an offshoot of *Interventions* (see Figure 9.8). Although the second most important component of care in the voting process, it is presented now owing to its complex attitudinal patterns. Attitudinal variance around mental health centred around perceptions of care delivered by other professions; concerns for the future health of the veteran population; and positive sentiment about the novel application of sport and interest-based therapy to help build mental resilience. It illustrates the importance of capturing attitude within the coded material.

Enabled: Mental health is enabled by *IDT* and *MDT Leadership*. Coded statements originate from three one-to-one interviews with CPNs and illustrate a perception of interference and disempowerment, hence the negative interaction illustrated on the conceptual map.

'... made me change the brief...to fit his agenda because he wanted to build his empire at Selly Oak.' (Verification Interview 6, p12)

'... it was clearly apparent that it's a consultant led process which I have no objection to but that even the Consultants did not have a great grasp of psychological trauma... as a Junior Officer with no job cover, going against some Senior Consultants that had spent their entire career in that place thinking that what they do is the best standard of care; I don't need to explain the amount of resistance that was initially given.' (Verification Interview 5, p6)

'...some of the Senior Consultants, didn't have a professional respect for us as individuals. So, the concept of, "You will do what I say because I'm the Consultant" applied ...that was the definite problem and unfortunately the ...In-reach Consultant (Psychiatrist), was never known for his stoic confrontational.' (Verification Interview 5, p9)

Disempowerment and control caused those running the mental health service to actively distance themselves from this control. Mental health was removed from the Nursing Division and formed their own department, geographically located away from treatment locations. Subsequent eligibility criteria limited which patients could be referred into the service.

'We did turn things around, so we were eventually given our own space and our own offices that were well away from the ward, which took an unbelievable amount of graft because of one particular Consultant...' (Verification Interview 5, p6)

Enablers / Disablers: Statements coded to *mental health* are also coded as positive and negative. Of this data, 61% of statements were coded as negative and 39% positive. To understand this high negative sentiment, a detailed framework has been constructed ([Appendix 23](#)). Table 9.5 summarises the framework. In addition, three interviews with CPNs are summarised in [Appendix 24](#). Negative sentiment arose principally due to a mismatch in expectations between mental health and the wider team, leaving clinicians

feeling ill-equipped and mental health feeling misunderstood. Positive sentiment arose as clinicians reflected on informal initiatives which developed to fill this perceived gap in service.

*'...the docs and everybody perceived that you've got a mental health centre, they are going to deal with everything mental health ...actually a CPN is quite a limited remit. A CPN is a) a **community** psychiatric nurse; we're not in the community...Secondly, ...they really only work under the direction of a psychiatrist ...they generally only work with people who have diagnosed mental health conditions. Well, we didn't have a lot of that, we had people who were undergoing a normal adjustment disorder with no aberrant mental health diagnosis and so the mental health nurses were like, 'no need for us'... but the team are going, 'Well, who the hell is going to do this then?' (Presentation of final analysis 2, p11)*

1. **Disablers.** Within the conceptual map, *mental health* is presented as a disabler of the following themes: *Working Together, Joint Therapy Sessions / Peer Support, Information Loss, and Feeling Ill-equipped*. The cultural and geographic proximity noted in the IDT was contrasted with the distance perceived between mental health and the clinical team, particularly as it located away from the ward.

'...mental health....The fact that they were in a building away from everybody for the whole time...Up a hill... unfortunately, I think that's going to last as a legacy because we didn't instil the right story right from day one that this is just as much a part of rehab as prosthetics, physio, OT, you know, and we went and isolated it from the whole picture and the staff.' (FG4, p88)

As mental health created their own team, the expectation became that they would provide a comprehensive service like other specialist teams, such as the pain team. However, mental health did not have the clinical diversity to meet this expectation.

'...they set themselves up as a little mental health team...but ...they actually needed a mental health OT, they needed psychology, they needed other people like that not just nurses...' (Presentation of final analysis 2, p12)

This difference in expectation created a partnership gap for MDT and IDT clinicians in a clinically important area, leaving clinicians feeling ill-equipped, but also left the mental health (MH) practitioner feeling isolated. This clinical isolation was associated with distrust and self-doubt; the implications upon *Peer Support* and staff resilience can be seen in Table 9.5.

'I think we did really well to not crumble and just say, "Do you know what? I can't do this, this is too much, I've had enough..." (Participant verification 1 (MDT Clinician), p5)

'I think the emotional scars have healed ...there were definitely points in that posting...where I would go home and just blubber...through almost mental exhaustion.' (Verification Interview 6 (MH Clinician), p 17).

2. **Enablers.** Positive sentiment arose from accounts detailing the novel forms of mental health support that grew to fill this perceived service gap. Clinicians believed that patients preferred informal support rather than clinical intervention. The IDT was apt for conceiving and developing holistic treatment initiatives, using interest-based environments such as sport, adventure training or horticulture, as documented above. The mental health dynamic will be discussed more fully in Chapter 10. Attitudinal patterns will now be explained to assist further understanding of the conceptual map.

'...what helped... the horticultural stuff, the yoga ...not everyone's a physical being...she'd got loads of the mental health stuff down in the greenhouse for the staff and patients, people went to the greenhouse...They didn't go to the mental health team... they rocked up for a cup of tea in the greenhouse ...or they went to (name) in yoga...it wasn't a complete vacuum but it was kind of being filled in different ways really.' (Presentation of final analysis 2, p16)

Mental Health Framework - Summary of Clinician Statements

	Positive	Negative
Service delivery	The mental health gap was filled by creative and innovative ideas of clinical staff. Patients appeared to gravitate towards these less conventional services to gain informal support.	The mental health department was geographically distant and difficult to access for patient. This also distanced them from the rest of the team, undermining clinicians' perception of the service and the contribution it could make to them and their client group.
Patient dealing with loss	Time is a healer, but it needs to be spent well. The Service needs to be structured upon equivalence amongst clinical disciplines and especially equity between physical, mental and social recovery. Actively enabling organic forms of mental health support to flourish from within the patient group, through shared experience, and opportunities to arise which gives patients a new horizon to look to.	The loss of person and purpose extends beyond the immediate loss of colleagues and limbs. But the loss of career and family role undermines purpose, status and a sense of masculinity. Clinicians did not feel that this was recognised fully by clinical services and may contribute to some feeling the loss they were processing meant they did not fully engage in their physical rehabilitation. But their opportunity to rehabilitate fully has passed and they missed it.
Staff resilience	Resilience was facilitated by: <ul style="list-style-type: none"> • Mental health expertise guiding team dynamics • Empowerment of clinicians and a sense of autonomy • Geographically and culturally embedding clinical specialities together helped connections to form. 	Rapport between clinicians and patients led some to report feeling overwhelmed at what their patients faced. Mental health did not share their urgency causing frustration and a sense of isolation in these staff. The need for staff to be able to offload, and to know how to manage situations without overly escalating matters was expressed.
Patient expectations		Patients expected a similar style of Service from mental health, experienced elsewhere, enabling trust and recuperation. But the role of the CPN was more consultative reportedly leaving the patient cynical or feeling let down.
Expectations of fellow clinicians		A mismatch in expectation of the role of the CPN and the service which was provided led to clinicians feeling frustrated and ill-equipped to handle some patient cases. The inexperience of clinicians in mental health matters capitulated this sense of abandonment.
Service requirement	Accommodating patients in multiple occupancy rooms supported peer support between them.	Military mental health introduced services using uniformed capability when the requirement to support staff and the patient group demanded greater breadth.
Mental health service personnel		Mental health clinicians reported that their role lacked clarity, expectation or support. Leaving them feeling unprepared, embattled and isolated. They did not feel listened to or appreciated by their hierarchy.
MDT and IDT Leadership (Enabler)	In time the service lead was handed to a consultant psychiatrist who could communicate directly with consultant colleagues.	Senior consultants sought to shape the service, but this was resisted by mental health practitioners who felt what was proposed was not best practice.

Table 9.5: Mental Health Framework - Summary Statements

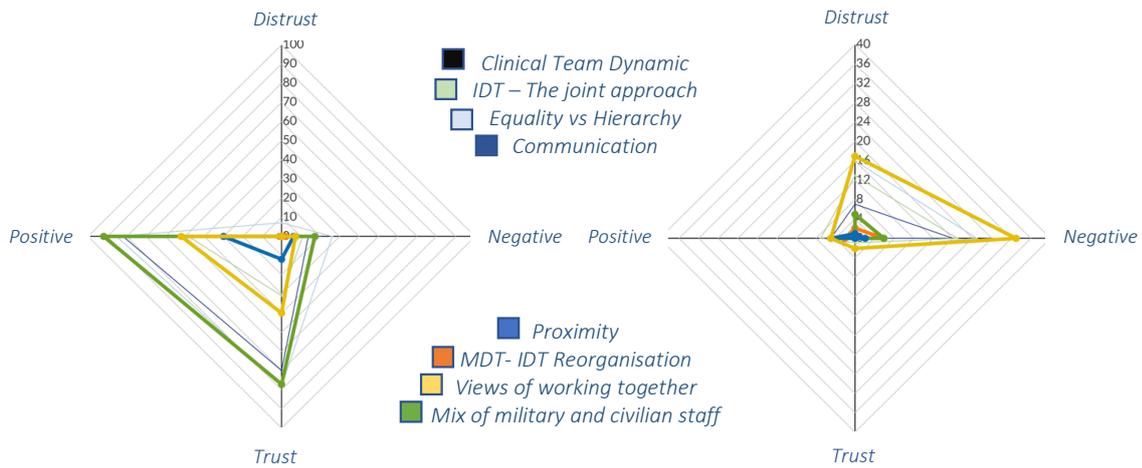
Attitudinal Patterns

The attitudinal variance noted in mental health noted has also been recognised elsewhere during data analysis. By removing all but negative interactional arrows from the conceptual map, Figure 9.9 highlights five sub-themes on the left showing strong associations with negative interactions. These are *MDT Leadership / IDT Leadership; Hierarchy / Equivalence; Proximity / Distance; Defined Clinical Role / Uncertainty of Role; and Working Together*. Attitudinal differences are largely seen between members of the IDT and MDT. For instance, in Figure 9.9 negative interactions arise from *MDT Leadership, Distance, Working Together, Hierarchy* and *Uncertainty of Role*. Ignoring the negative impact IDT and MDT leadership had upon mental health, the following numbered patterns appear in the data (Figure 9.9).

MDT Leadership (1) is perceived as distant (2) and hierarchical (2). Distance (2a) negatively impacted MDT teamwork (3a) creating distrust. These accounts suggest therefore that a hierarchical approach disempowered the clinical team to respond adeptly to the complexity they faced, creating role uncertainty (3b). This uncertainty left the clinician feeling insecure about their capability, and the team isolated (4). This combination of distrust and insecurity created a series of negative attitudinal perspectives which may have undermined personal resilience; illustrated by the dashed blue circle (4) in Figure 9.9. To highlight:

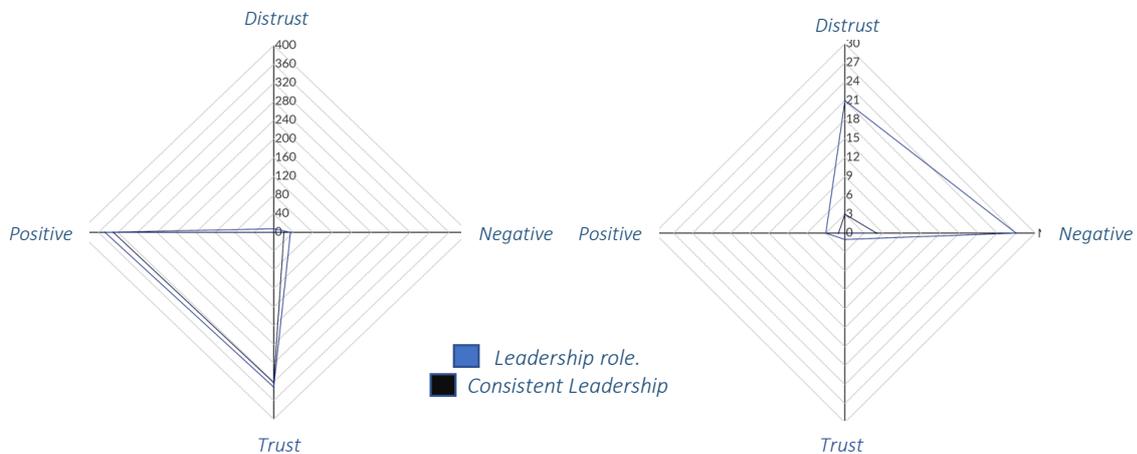
'...when you come in as military, you need to-...put a feather in their cap; ...it was working well but they wanted to change it and that's what they did. And then they would go and we would pick up the pieces...that's not to say that people can't come in and change things, but do it in a way that acknowledges the people that are currently working, their skills, their experiences and marry the two together ...not come in, tell them that they're doing it wrong and they're doing it this way...'
(Participant verification 1, p7-8)

The case of mental health has shown that IDT clinicians, like those in the MDT, were not immune to distrust and insecurity when faced with a clinical challenge perceived as outside of their capability and unsupported. This hypothesis of distrust and negativity has been explored further using a cross-matrix frequency count performed in NVIVO 12. This action counts the number of references coded to *Team Dynamics* and *Attitude* themes. It then partitions the count according to team membership (IDT or MDT) and splits the count into the four sub-themes within the *Attitude* theme (positive, trust, negative, distrust). Results for each team (IDT or MDT) are presented on a 4-axis radar chart, in which positive, trust, negative, distrust form each of the four axes (see Figure 9.10).



a) Frequency count for statements coded to IDT, Attitude and Team Dynamics

b) Frequency count for statements coded to MDT, Attitude and Team Dynamics



c) Frequency count for statements coded to IDT, Attitude and Leadership.

d) Frequency count for statements coded to MDT, Attitude and Leadership.

Figure 9-10 Cross-matrix comparison of reference count for Attitude and Team / Leadership (IDT vs MDT)

In Figure 9.10b, MDT statements coded to both *Team Dynamics* and *Attitude* are almost entirely attributed to the negative and distrust sub-theme, represented by the green triangle. In contrast, statements by IDT members for the same themes are largely coded as positive and/or trusting (Figure 9.10a). This pattern is repeated for the *Leadership* theme (Figure 9.10 c/d). The difference in attitudinal patterns between MDT and IDT participants is stark; the content of these statements has, therefore, been scrutinised and compared in a framework (Appendix 23). Summaries provide verbatim evidence in Figures 9.11 and 9.12.

(MDT) Team Dynamics	
Positive	<p>I think we supported each other but I don't know that the wider MDT supported us. <i>(Confirmation of mono-disciplinary support – but not wider team)</i></p> <p>so I introduced (Name) to the concept of behaviour activation, he introduced me to the concept of adaptive sport and then together we just thought, "Well why don't we try and actually target this to a group of people who we think would benefit? Let's try PTSD".</p> <p><i>(Developing services which reach outside of clinical team)</i></p>
Negative	<p>So, there was this real medical model is basically what I'm trying to describe, this real entrenched model of how they deliver their rehab and I had to fit in and when I didn't, it caused a degree of shock. <i>(Perception that medical hierarchy imposed how rehabilitation should be delivered upon the wider team)</i></p> <p>it didn't look right to them (consultant) and because it didn't look right, they got upset about it. Because they got upset about it, conflict happened and then because conflict happened the military bits kicked in and all sorts of things went wrong. <i>(Use of military hierarchy to influence medical delivery)</i></p> <p>Yeah, no time for training, you were literally just in there running...I'd come from a standard NHS environment ... to seeing these really traumatic injuries with no sort of training prior to that. It's training on the job, you know, I remember tripping over my first patient ... double amputee, and just going, "Oh my God," ...it was full-on. <i>(Perception that as a clinician you were given little training support and just had to get on with it - survive)</i></p> <p>...the bit that was demoralising is that we were viewed as a babysitting service, whereas in fact a whole raft of work was done during the nights here when a patient was up at 2am or 3am in the morning and they were in pain and they were coming to terms with what they'd lost. <i>(Feeling demeaned by the rest of the clinical team – their contribution was not recognised)</i></p> <p>So, on two fronts; one is the therapists didn't get what we do and then you had part of nursing who didn't get what we had to do. So, we were finding it a bit tricky (laughs). <i>(Their role lacked definition - they are not understood – their contribution was not recognised even by their own profession)</i></p>
Trust	<p><i>Nothing coded for trust</i></p>
Distrust	<p>So, I would return the next day ...to...said patient and ...it's almost like a suicide watch going on within the Complex Trauma. So, there was never any tolerance (to allow them to grieve). This is a unique group, and we don't know how they're going to respond... we have to have quite distinct red lines and everything before then we need to tolerate. Think about their headspace and think about the loss of control that they've just gone through in their life...it was hugely apparent that there was a lot of work to be done, not with the patients but with the treating Team. <i>(Perception the team distrusted their clinical opinion, and they distrusted the teams handling of the situation)</i></p>

Figure 9-11 Sample of coded MDT statements relating to Team Dynamic theme. *Highlighted text* Researchers analysis of verbatim quotes

(IDT) Team Dynamics	
Positive	<p>It wasn't a specialist area for anybody at Headley when the conflict started, so they (hierarchy) gave us a lot of support to get that training and to get the staff in that would have some of that support for us...so the communication within the team and through the team and the support from each other as this was all happening and the fact that most of the staff at that point in time and all the way through, gave more than the hours that they were paid for to get the job done and put a lot in to it. <i>(Perception that hierarchy was supportive, communication and commitment was shared across the team)</i></p> <p>Although we were a large team...people did all stay late. Almost, work became the social life <i>(Bond of friendship across the team)</i></p> <p>Everyone was working was really hard, it wasn't like you're like, "Oh, those physios, they're sitting doing nothing"....Because we were like all working flat out. <i>(Recognising each others contribution – definition of roles)</i></p> <p>...actually the social aspect, the fact that we had ...parties, things where we just all interact....It was so important. <i>(Bond of friendship, not all work)</i></p> <p>whilst it was work, it was hard work, it also didn't feel like work...you go and do something, and you think, 'Well, this is fun,'</p>
Negative	<p>Mental health never embedded in the team, and I think we could've addressed a lot of these issues if it had been embedded in the team. And I think, again, although it got so big, nursing and rehab did have to split...it's separation that causes difficulties. <i>(Team dynamic was not shared with MDT)</i></p> <p>Certainly, the good staff-patient ratio but also, as I say, for us, we've been through a lot of staff in prosthetics and for some of them it just wasn't the right place to work, you do need the right like-minded staff who are willing to put in the hours <i>(In the IDT not every face fitted – shared commitment needed)</i></p>
Trust	<p>a holistic approach, flexible content and creative ideas. I think the fact that we're all, like [name] and [name] were saying, able to try stuff and give it a go but also be quite creative and motivate each other or inspire each other <i>(Sharing ideas, experimenting – trust in one another to have a go)</i></p> <p>You have to have a staff member who's open, who doesn't think someone questioning them, is criticism....And I certainly found that when I was doing something I would, you know... "Right, XXX, what do you think of this?" ...it was the same in IDT meetings. It wasn't, "Why is this person not doing this yet?" <i>(Trust involved being vulnerable, open to ideas – perception this existed across the team and in joint meetings)</i></p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day...whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice. <i>(Recognition of oneness even when disagreement arises – trust and respect to have honest conversations)</i></p>
Distrust	<p><i>(Nothing coded for distrust)</i></p>

Figure 9-12 Sample of coded IDT statements from Team Dynamic theme. *Highlighted text: Researchers analysis of verbatim quotes*

Verification: Interviews and Research Forum

Semi-structured interviews and a focus group were used to verify analytical interpretations. In total 13 Clinicians and clinical managers were interviewed, with a further 5 researchers reviewing coding practice. All but two clinician interviews were transcribed and coded alongside focus group data as described in Section 3. Table 9.7 provides a summary of the purpose and key outcome from each interview.

Key confirmatory interviews included DMRC Nurse Matron and HCA and the Commanding Officer separately verifying observations of MDT leadership. Three interviews with CPNs confirmed reports of the impact of hierarchy upon service provision. Until these interviews much critique had been directed at mental health. However, these interviews describe the personal challenge faced by these clinicians as they established their service within an environment dominated by physical health practitioners and provide insight into the protective actions taken in response to the scrutiny they faced from senior officers.

The CT Manager interview provided historical background to issues of integration with nursing and mental health teams. Leadership adopted by the CT manager and consultant lead was described as a *coaching* style, emphasising empowerment, nurturing talent, and relationships.

Interviewee	Subject matter of the interview	Key Findings
Founding head of Battle Back* (Verification Interview 1)	Adaptive Sport and Adventure Training	Understanding of how adaptive sport was founded and what its relationship was with the clinical rehabilitation service.
Head of Group Therapy (IDT Re-org Lead) (Verification Interview 2)	IDT Re-organisation at DMRC	Background of rationale for adopting IDT, and how this process unfolded. Resistance to the reorganisation, especially from senior clinicians was highlighted. Importance of leadership and proximity to collaboration. Reflection of many staff show it was a positive transition. Although, it was felt it did not go far enough.
DMRC Medical Director (Verification Interview 3)	Focus Group 1 & 2 verification interview	Confirmation of interpretation of themes and voted categories. Historical background provided on development of Complex Trauma.
Director of Nursing (Imperial College Healthcare Trust) (Researcher verification 1)	Coding check and analytic process verification	Verification of the coding approach, coding structure and theory search at the start of the thesis*.
DMRC Nurse Matron DMRC Health Care Assistant (Participant verification 1)	Insider/Outsider Focus Group	Confirms complex relationship with military hierarchy. Discontinuity caused by military personnel. Military style of leadership is hierarchical. This style can be disruptive. Sense of isolation felt by nursing staff as they felt excluded from IDT, and unsupported by their leadership. Solution of the key worker role has improved their connection with the IDT.
Commanding Officer DMRC Headley Court (Verification Interview 4)	Insider/Outsider Focus Group Presentation of overall analysis	Confirmation of the dilemma faced in nursing / DMRC. Posting of military personnel is necessary but it creates discontinuity. Few understand the role of nursing in rehabilitation, so adopt a more familiar military command style. Solution enacted was the creation of a civilian Nurse Matron role at DMRC.
Clinical Lead Physio at DMRC and RCO RCDM (Participant verification 2)	Review of the voting categories and coding categories	Clarification of problem categories in voting. Review of the themes and sub-themes and how these relate to the priority themes.
Clinical Lead RCDM Mental Health (Verification Interview 5)	Development of Role 4 Mental Health	The development of mental health services at UHB, at the start of the conflict. To verify challenges and solutions to the establishment of this service
Clinical Lead DMRC Mental Health (Verification Interview 6)	Development of DMRC Mental Health	The development of mental health services at the start of the conflict. To verify challenges and solutions to the establishment of this service
Clinical Lead DMRC Mental Health (Verification Interview 7)	DMRC Mental Health integration	A review of mental health services at DMRC and verification of the services interaction with the wider MDT and IDT.
Prosthetist (formerly DMRC contractor)* (Participant verification 3)	Verification of focus group 5 and 6	This interview retained in audio format and was not transcribed as no new themes or data arose from this interview. Conclusion: Data saturation achieved (clinicians).
Consultant lead for complex trauma* (Participant verification 4)	Verification of complex trauma IDT focus groups	As above. Conclusion: Data saturation achieved (clinical managers).
Surgeon General (Presentation of the final analysis 1 - Verification)	Complex Trauma	To verify a historical and strategic view of the context.

CT Manager (Presentation of the final analysis 2 - Verification)	Complex Trauma	IDT reorganisation needed to encompass nursing and mental health. Clinicians were shielded from the executive management, in particular resourcing. Team leadership chose to integrate contractors into team activities like all other staff which led to a positive integrated work environment. Leadership style was referred to as ‘coaching’ and its strength came from continuity and the dual leadership pillar (clinical / managerial).
Post-graduate research forum* (Researcher verification 2)	Framework analysis: MDT vs IDT	Review of the data in the teamwork and leadership framework. Review and validation of the coding structure and application of the InterPACT (Appendix 16)

Table 9.6 Clinician / Clinical Manager Group Verification: Purpose and key outcomes *Session was not transcribed

Conclusion of the verification process involved a focus group discussion of coding and statements with the Imperial College Healthcare Postgraduate Research Forum. Coding was reviewed and considered with reference to the InterPACT (Interprofessional Activity Classification Tool) ([Figure 6.5](#)).

Research Forum: Verifying interprofessional activity within MDT and IDT

The InterPACT figure has six categories ranging from shared commitment to integration between work practices. The aim was for the Forum to score IDT and MDT activity based on a summary framework (Tables 9.7 and 9.8). As the Forum ran out of time, the researcher scored activity based on their discussion. InterPACT scores were emailed to participants for further comment; no disagreements were received. Statements scored in Table 9.7 and 9.8 show the MDT operating a ‘networking’ model. Networking is defined as:

‘A networking relationship is one in which shared team identity, clarity of roles/goals, interdependence, integration and shared responsibility are less essential. Tasks are also more predictable, non-complex and non-urgent. Networks can be virtual...’ [426] (p59)

Scores attributed to IDT statements showed that they had adopted a ‘teamwork’ model, defined as encompassing:

‘...a number of core elements including, but not restricted to, shared team identity, clarity, interdependence, integration, shared responsibility, and team tasks are generally unpredictable, urgent and complex.’ [426] (p58)

The importance of the IDT and its collaborative culture was consistently voiced across all focus groups (Figure 9.1), yet disparity exists when comparing IDT and MDT accounts. Both teams treated the same

patients, at the same time, in the same location; one operating using an IDT model the other in an MDT format. This significance of this finding will be discussed in the following chapter.

Characteristic	MDT	InterPACT Score
Commitment	<p>Shared commitment towards professional goals, but MDT did not feel a sense of commitment or understanding towards them from the IDT.</p> <p><i>'you're 24/7 service...you have no quantity of time ...you don't have "I'm looking after John between eight and four...People are coming at you 24/7 at no particular time for whatever reason, whether it be, you know, pain management, wounds, mental health issues, it's just a myriad of things coming at you... So, when you sort of talk about sort of the structure and the sharing it almost seems to stop at the door sometimes with (us).'</i></p>	★★
Shared Identity	<p>Identity was lacking within the MDT and their role within the wider team appears compromised. Instead, the MDT reports express feeling undervalued and isolated.</p> <p><i>...when you sit in IDT, if anything has gone wrong or it hasn't happened, it will fall on (us), "So, why wasn't that done? Why didn't they go here? Why didn't you do that?" or, "Why hasn't that been done?"</i></p>	★
Clear Team Goals	<p>Rather than shared, goals are perceived to be specific to the professional discipline.</p> <p><i>'...therapists would set goals and there was a lot of sleep hygiene. Well, we weren't allowed to have that as a nursing goal as it was a therapist goal.'</i> (1-1 Ver_Int_30:50)</p>	★
Clear Roles and Responsibilities	<p>A lack of clear roles and responsibilities was reported.</p> <p><i>'On two fronts; one is the therapists didn't get what we do and then you had part of (our team) who didn't get what we had to do.'</i> (1-1 Ver)</p>	★
Interdependence within the team	<p>There wasn't a sense of interdependence between MDT and IDT</p> <p><i>'That resilience piece, by sharing, didn't then translate, it didn't happen to (us).'</i></p>	★
Integration between work practices	<p>MDT report little integration of definition of role and so they express a sense of being undervalued and overworked.</p> <p><i>'...because we haven't got defined outcomes, we just take on everything else. So, then you do get to the point where, if it wasn't an OT or a physio that should have done it, it had to be (us) and you're just left with picking up the rest of it.'</i></p>	★

Table 9.7 Forum Assessment of MDT Statements

Characteristic	IDT	InterPACT Score
Commitment	<p>Team share a commitment and mission to jointly support one another and achieve group goals</p> <p><i>'It wasn't a specialist area for anybody...so the communication within the team and through the team and the support from each other as this was all happening and the fact that most of the staff at that point in time and all the way through, gave more than the hours that they were paid for to get the job done and put a lot in to it.'</i></p>	★★★★
Shared Identity	<p>Team identity is shared and came above professional identity</p> <p><i>'...(without) a physiotherapy department or an occupational therapy department... you will hear OTs and physiotherapists ...referring to themselves as the Spines OT or the lower limbs physiotherapist. The description is always team first, profession second, which is a complete reversal as to how it used to be.'</i></p>	★★★★
Clear Team Goals	<p>Treatment goals are shared by each professional group.</p> <p><i>'...you'd sit down with the whole team (including the patient), and you'd set that patient's goals for that admission as a team, rather than the patient going around and sitting and setting goals with Prosthetics, with OT, with Physio... then when we know what the priorities are... (if) the patient's got something else they're working on...'</i></p>	★★★★
Clear Roles and Responsibilities	<p>Roles and responsibilities are clear and thereby enabling sharing of responsibilities and joint working across the team.</p> <p><i>'...it was shared well amongst all of the IDT who would identify who would be best to sort of lead on a specific goal or how all of the physio, OT, ERI, nursing staff, how best to incorporate everybody.'</i></p>	★★★★
Interdependence within the team	<p>Joint working, peer support, creating interdependence built on trust.</p> <p><i>'I was already well on in my career, but I think it was more just, like you said, that everyone kind of built-up trust between each other, and it went across age groups within those staff and the social side of things, I think things like the team building days and stuff like that, were everyone was mixed up and built really good relationships.'</i></p>	★★★★
Integration between work practices	<p>Joint working is common, integration of work practice is facilitated by proximity between staff and joint working areas.</p> <p><i>'Proximity and regularity of conversation.'</i></p> <p><i>'...also, the acknowledgement of the crossover between each profession... It wasn't, "Oh OTs do that, physios do that, ERIs do that," there was "Let's joint-work".'</i></p> <p><i>'I think that was really good, the joint sessions, it started to be accepted that that was beneficial to the patient and to the staff'</i></p>	★★★★

Table 9.8 Forum Assessment of IDT Statements

Summary

In this chapter, an analysis of qualitative accounts from the clinician and clinical managers group, voting data and verification formats placed importance not only on the clinical features of this service, but social processes enabling a collective and collaborative navigation of complexity. Three key findings are apparent:

1. The key component of care highlighted by clinicians and clinical managers is the IDT. Conceptual mapping of focus group data indicates participants believe that the IDT initiated a culture of exploration and innovation. As a priority theme, the IDT presents as an enabler of all other highly rated priority themes, except for mental health.
2. Attitudinal differences are found between MDT (negative) and IDT (positive) discussions of leadership and teamwork. Both teams treated the same patients, at the same time, in the same location; one operating in an IDT manner; the other using an MDT model. The hierarchical style of MDT leadership attracts much negative sentiment, with members feeling disempowered to respond adeptly to complexity. This created isolation and role uncertainty. An assessment of statements using the InterPACT illustrates a notable discrepancy between the style of teamwork needed and the actual operational style used by the MDT.
3. Mental health is the second most important component of care rated by clinicians and clinical managers. Yet, collaboration between mental and physical health was problematic. The mental health service responded against hierarchical demands from rehabilitation consultants by distancing their department from the IDT. Later in the discourse a solution was initiated by the mental health lead enabling this service to perform a unit wide collaborative function. Accounts illustrate the vulnerability felt by staff with little access to mental health expertise.

In the following chapter, the significance of these findings will be discussed in relation to the wider literature on teamwork, leadership, and complex settings.

CHAPTER 10 Clinician and Clinical Manager Discussion.

Introduction

This chapter will discuss the theoretical construct and wider literature in relation to key findings on IDT/MDT, leadership, and mental health. Understanding why the IDT is so highly rated will help explain attitudinal differences between MDT and IDT with regards to teamwork. The influence of context and task will be considered, particularly with regards to resilience and solution focused approaches.

The role of the leader is a clear enabler of rehabilitation services. Attitudinal differences between MDT and IDT may arise from adopted leadership styles. The literature presented in Section 2 is consistent on the matter of leadership in complex settings; organisational strategy must be clear, and staff should be empowered to fulfil this strategy through exploration and experimentation [134]. But collaboration and trust must also be nurtured [134]. Accounts of participants will be considered against this literature.

Participants also placed great importance upon mental health. This service will be discussed in more depth towards the end of the chapter. It will be used to illustrate and discuss the points raised above with regards to teamwork and leadership. Recent policy drives towards integrated systems of care will be acknowledged as this discussion demonstrates the impact upon clinicians and clinical managers when this is not achieved. The chapter ends by highlighting limitations of the research methods.

IDT vs MDT

One component of care scoring highly and rated consistently across all groups is the IDT. Despite consistent voting scores, distinct attitudinal differences have been found in the data when discussing experiences of teamwork. Those in the MDT predominately expressed negativity and distrust, whilst those in the IDT offered trusting and positive statements. A deeper issue of resilience is also noted. Both MDT and IDT members provided clinical care to the same population, in the same location, at the same time. The only difference was that one operated out of a monodisciplinary department and the other from an IDT.

Resilience, is defined as:

'...a dynamic process encompassing positive adaptation within the context of significant adversity'
([427], p1)

Resilience is a widely researched topic [157, 427, 428]; a multi-dimensional construct, that can be approached from the perspective of individual psychological traits or from an organisational behavioural perspective [429]. Although beyond the remit of this thesis to explore this subject in depth these perspectives coupled with the theoretical construct offer an organisational and social identity view of resilience.

First, differences in attitude between IDT/MDT structures correspond with individual statements suggestive of resilience and justify the use of social theory as an explanatory model. During this process, two frameworks have been used to understand the team dynamic and the setting; InterPACT [2] and Cynefin [231]. [InterPACT](#) proposes a typology around which teams can be built to meet contextual demands, yet it does not specifically identify the context [2]. The Cynefin Framework provides contextual insight and helps draw distinctions between complicated and complex settings [231]. The rehabilitation context has already been identified as complex. Cynefin advocates certain characteristics within the team dynamic, for example, trial and error and collective idea generation to enable creative, interactive, and experimental approaches. Although this framework is underpinned by complexity science [232], the interpersonal dynamic it proposes is vague, reflecting the terminological quagmire undermining much of the empirical literature exploring collaboration [334]. Combining InterPACT with the Cynefin Framework enables classification of both setting and related team dynamic.

Using the InterPACT, IDT statements demonstrated '*teamwork*'. This is the optimal organisational approach in complex settings [231, 236]. In contrast MDT statements classified as '*networking*'. '*Networking*' is suitable for predictable tasks in a context where the task is unimportant or simple and participants do not require regular or geographical contact [2, 231]. When the setting is complex, requiring a highly interactional experimental dynamic, a networking approach will leave clinicians feeling isolated and ill-equipped [231]. This is what MDT participants reported.

The MDT is distinct from the IDT as it retains an occupational demarcation; each profession pursues its own goals [134]. This demarcation retains cultural and professional barriers between professions [328, 330, 338], with some arguing that MDTs encourage professionalised tribalism between clinical domains [333, 341]. This was also expressed by [participants](#) in this study.

The historical analysis in Section 1 recognised the way in which military systems moved towards more integrated models of operating to manage growing strategic complexity [42]. In highly complex industries barriers to collaboration isolate workers and inhibit the very processes needed to manage uncertainty – the exchange of ideas [52, 342]. In contrast, the removal of professional boundaries within an IDT removes the power of one profession over another, as the clinical setting is defined around an occupational collective to meet patient need [328]. The patient must, therefore, be co-opted onto the team as their goal's direct activity and measurement; patient needs determine team composition. A Bourdieusian perspective argues

that such a shift in team culture, collaboration became the *cultural capital* at DMRC Headley Court [256, 261]. Patient outcome became the measure of success and how influence was earned.

Whilst the IDT culture was dominant at DMRC, this model only involved therapy departments. For those remaining in the MDT system, the disciplinary autonomous structure did not reward collaboration [258]. Collaborative *capital* was denied to these teams, their activity instead being directed by hierarchy, preventing their involvement in interactive and innovative initiatives. As such, they were unable to evaluate their team's contribution positively without altering their work context [426]. Some left the workplace and others distanced themselves from the IDT setting. [Table 9.5](#) provides clear evidence of this process within mental health. Mental health clinicians perceived a threat from the dominant physical health culture and sought to protect their service from interference. They created their own division and departmental sub-culture, controlling access through formal referral mechanisms [253, 282]. As a geographically distanced and distinct clinical service the demarcation between mental health and IDT enabled those in mental health to perform self-enhancing evaluations of their team's performance. Turner [282] observed this team process helped members gain a sense of value from their membership. However, it left the IDT without a collaborative contribution for those patients with psychological need. Statements ([Table 9.5](#)) show how this compromised clinicians' sense of competence and/or capability [282, 285]. Evidence in [Figure 9.11](#) illustrate their sense of inadequacy and a lack of appreciation for their efforts. The collective resilience displayed within IDT accounts is notably lacking within MDT data. The resulting embitterment and high staff turnover reported by MDT participants reflects patterns found in the literature [430].

The association between high staff turnover and low staff resilience is well established [430-433]. The high cost of staff turnover is widely documented [430-433]. Evidence, most notably from the field of mental health, also reveals a relationship between patient outcome and staff turnover [434]. One study in NHS secondary care found that suicide risk is lower for patients admitted to mental health units with low staff turnover [434]. Evidence varies in quality, but moderate quality studies from UK and US show that patient outcome is influenced by staff turnover, staff dissatisfaction, stress, and low-density staffing. [431, 435, 436].

Experiential accounts from IDT clinicians in this thesis do not underplay the stress or challenge they faced. A social identity perspective (SIP) suggests why IDT leadership and culture collectively resourced clinicians to manage uncertainty [437]. IDT, as a social dynamic, is characterised by sharing, partnership and creativity [328, 330, 400, 438, 439]. This dynamic enhances the process of social identification and social connection whilst skill diversity magnifies creative potential when facing problems [236, 254, 330, 437, 439]. The positive impact of these social components upon individual satisfaction and measures of team performance have been cited in the literature [328] and evidenced in the *IDT joint approach* conceptual map ([Figures 9.3-9.8](#)). The main priority theme, *IDT joint working* is a product of *leadership* and *proximity*; linked to what Schein [305] refers to as organisational *artifacts* or visible features of the culture (joint planning, joint timetabling of treatment and open plan offices) and *basic assumptions* (solution focus, holistic approach,

collective learning, idea generation and peer support) represented as priority themes ([Figure 9.2](#)). The social process of joint working enables an IDT culture, but this culture also enables joint working (through *proximity* and *leadership*). Social and cultural components interweave ([Figure 6.1](#)). Despite cultural artifacts and basic assumptions, a SIP would argue that this dynamic only occurs if an individual socially categorises and identifies with the group, otherwise they will remain on the periphery or even exclude themselves [285].

The process of social categorisation requires *proximity* so individuals can identify similarities with others. As individuals categorise themselves with others, they adopt common modes of behaviour and cultural expression, but this process must be nurtured and entered into voluntarily [282]. Schein's [440] work identifies three cultural layers within an organisation; this insight illustrates how the *leader* can nurture this process by influencing the organisation. For example, a clinician entering CT for the first time will bring their unconscious assumptions of how clinical delivery is conducted. Visible manifestations or artifacts (seen in the theme *IDT joint approach*) will require them to participate in and adopt a culture of visible interaction, for instance, joint treatment. Those not participating in this process will not socially identify with the group.

Second, basic assumptions, values or shared beliefs develop. These are ways of thinking that sustain visible manifestations [441, 442]. Clinician accounts illustrate how joint working (initially an artifact or timetabled entity) becomes a basic assumption, or a shared belief. Despite their different theoretical perspectives, Schein [440] and Turner [282] agree that voluntary adoption of shared values, will cause these values to embed, becoming unconscious assumptions. This process is visible in [clinician accounts](#).

Turner (1999) refers to this advance stage of social identification as *de-personalisation*. Group values are internally adopted, re-framing their self-concept around the group. In [IDT accounts](#), they no longer referred to themselves by profession, but their team; *I am a Complex Trauma Physiotherapist*. These accounts describe individual identity moving behind collective team identity and in doing so discovering a collective resilience. Collective resilience has been described as '*...the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function..*' [443] (p1). Snowden [231] underlines the importance of a broad skill base as the means by which a team is resourced to tackle uncertainty, freely experiment, and pursue innovative solutions.

Innovation is a widely used term in healthcare, often ill-defined and rarely achieved [444]. It is a collective output, not an individual pursuit ([Figure 6.1](#)), hence it is seen in the literature as a product of organisational culture [82]. It is defined as a process that drives change [444]; described as a complex, non-linear and potentially disruptive process [82], key to managing complexity [14].

Whilst Schein [440] takes an organisational view of innovation, Martins [82] argues it arises from a combination of structural features within an organisation's culture, and socialisation (communication, learning, sharing, interdependence), through which shared values are attained (group practice, procedures, habits). Martins' [82] open system framework (Appendix 3) and its view of innovation and cultural

determinants have been widely adopted within business contexts [445]; the pillars of strategy, structure, support mechanism, encourages innovation and communication reflect key components of care prioritised by clinicians and clinical managers:

IDT Approach: Providing a vision and process for collaboration, empowerment, and open communication / skill sharing.

Solution Focus: Creative approach is driven by a clear vision to satisfy individual patient goals, allowing for risk taking and positive mistake handling, and one that is resourced.

Goal Centred Resourcing: Targets resources to individual need and ensures technology, staff and time is adequate for the task.

Holistic Adaptable Approach: Applies a flexible holistic needs-based interpretation of clinical treatment.

Peer Support: Provides an interdisciplinary mechanism to share skills, insights and responsibility allowing novel ideas to arise from diverse conversations.

A complexity view would critique this model for its linear flow of influence. Findings in the previous chapter demonstrate that social and cultural process interact and influence one another. By shedding direct reference to cultural organisational layers, Martins [82] fails to draw distinction between visual, assumed and unconscious processes. A complexity view seeks to provide such insight; [Figure 6.1](#) has been proposed as an adaptation of Martins model. Descriptions of the *IDT joint approach*, as an enabler of the other priority themes, together with accounts showing it moving from artifacts to unconscious, or espoused values, supports the interpretation of social and cultural factors represented in this adapted model. This dynamic may also explain differences in IDT/MDT attitudinal data.

Where creativity and complexity coexist in balance, the IDT appears to thrive ([LINK](#)), not just survive.

Learning enhances capability and capacity, and so is closely associated with the concept of thriving [446].

Accounts present the IDT as a learning community from which a collective sense of competence is developed, and personal growth experienced. In essence, IDT descriptions show it to be a [community of practice \(CoP\)](#).

Communities of practice (CoP)

The CoP [304] concept has been described in Chapter 6 ([Figure 6.2](#)). Observing combat casualty amputees at DMRC, Neal [162] recognised a similar dynamic occurring as military patients came together to share practice and develop living skills. CoP is a social learning theory and aligns closely with processes described above by Schein [306] and Turner [284] and IDT accounts. *Proximity and social identification* help participants form community around collective purpose. Purpose, proximity and common identity with a

willingness to collaborate initiates a social learning phenomena as a team develops and shares skills needed to tackle issues [304].

Both CoP and IDT are collective entities, relying on individuals voluntarily taking part. Self-determination theory (SDT) would argue that participation will only occur if clinicians achieve an internal sense of well-being through their involvement, despite setting uncertainty [292]. IDT clinicians recalled the uncertainty they faced when starting in CT, and the assurance gained as they became embedded within the team. Synergy between these descriptions, findings in the literature and empirically tested theoretical concepts propose a hypothesis, therefore, in which the complex demands of a clinical setting imposed upon an individual are met through participation within CoP. The cultural dynamic within the IDT, facilitates this process of exploration and discovery. And through this participation, individuals meet their intrinsic needs to feel competent, capable and autonomous [292]. The transferability of this theory is provided by MDT accounts showing the opposite occurring when connection and collective competence are not achieved.

Given the IDT is a critical component of success, understanding what enabled this process will provide a full explanatory account of the CT rehabilitation service. A conceptual analysis of the IDT identified two enablers; *proximity* and *leadership* [134, 330, 356]. Nancarrow [330] conducted a systematic review of IDT practice and a survey of 253 rehabilitation professionals. Ten key characteristics of good IDT practice were identified, commencing with leadership. Participants in this thesis also recognised *leadership* and *proximity* as the only two enablers of the *IDT joint approach* (Figure 9.2). *Leadership*, although not recognised in the voting results, was heavily [coded and referenced](#).

Leadership

When discussing leadership, statements coded to members of the MDT largely expressed distrust and negativity; IDT members were broadly positive and trusting (Figure 9.10). Leadership is a fundamental determinant of organisational culture and styles of leadership influence member satisfaction [160, 229, 234, 238, 270]. The leader determines the artifacts within an organisational culture; they nurture basic assumptions and set espoused values (Figure 6.1). In so doing, they define patterns of socialisation, group norms and beliefs [306, 447]. The leader must also manage a dual tension; nurturing team dynamics (intrinsic view) whilst anticipating future direction (extrinsic view) [448]. These competing demands, and recognition that in highly complex environments (i.e. software / technology companies) this is more than one person can effectively accomplish, lead to hierarchical leadership being replaced by distributed or shared leadership [430, 447, 449].

Shared, distributed and collaborative leadership arise from a similar conceptual view in which responsibility for leadership is shared throughout the organisation or team [450, 451]. Evidence has shown that non-hierarchical teams perform better in such circumstances because of the connection and support individuals

share [452]. Collaborative forms of leadership offer competitive advantage as delegated responsibility allows workers to gain a sense of outcome ownership, encouraging open dialogue and idea generation [453].

The COVID-19 crisis has proven a catalyst in this way of thinking [449]. In much the same way as the influx of casualties from Afghanistan and Iraq challenged Newtonian models of military and civilian trauma care ([Section 1](#)), traditional sectors such as healthcare, public health, education have been overwhelmed by the complexity of COVID-19 and forced to consider alternative models of leadership and teamwork [339, 405, 449, 454]. Many sectors faced a highly complex and uncertain predicaments [449]; some have considered more distributed and shared styles of leadership [449, 454-456].

A study comparing healthcare units with high and low staff COVID-19 infection rates found contrasting social dynamic and leadership approaches [449]. Units with high infection rates shared similar characteristics: distrust and conflict pre-dated the pandemic; leadership was authoritarian; and clinical staff felt they lacked autonomy [449]. Salas' [449] findings support Snowden's [231] danger of applying hierarchical leadership in highly complex settings. Where staff's infection rates were low Salas [449] showed that the culture in these units operated a distributed leadership model with leaders promoting participatory decision making, autonomy and trust.

At DMRC, clinical oversight was provided by the military consultant with team leadership provided by a civilian clinical manager. In both cases, study participants likened these roles to that of a coach, nurturing the ecosystem and team and providing what they needed to fulfil their mission. A case study exploring the transformation of US Special Forces in Afghanistan articulated a similar approach, adopting the analogy of the gardener [52]:

'The temptation to lead as a chess player, controlling every move of the organisation, must give way to an approach as a gardener, enabling rather than directing. A gardening approach to leadership is anything but passive. The leader acts as an 'Eyes-On, Hands-Off' enabler who creates and maintains an ecosystem in which the organisation operates.' [52] (p 232)

Both analogies of coach and gardener point to the importance of the leader appreciating their role as one who develops a culture in which collaboration and trust can grow, nurturing the individual [52]. This ubiquitous concept of trust is widely cited as a key ingredient enabling collaboration [330, 356], and so understanding how it can be fostered as well as undermined will support the leader to perform their role. A SIP recognises the bonds individuals form around common identity or purpose; a clear strategy, enabling identification around a common purpose, clarity of roles, managing disharmony and elevating a sense of equivalence is important [134].

A further systematic review of health system response was conducted 12 months after the pandemic hit [457]. In respect to healthcare leadership, a collaborative management style was consistently reported, in

which greater distribution of responsibility occurred in the face of uncertainty [452]. Increased autonomy of healthcare workers, role clarity and IDTs resulted in improved care coordination and information sharing [457]. Other sectors also report similar findings. The following quotation could equally be applied to the events reported in Section 1, as well as the pandemic:

'Through absolute necessity, rather than by design, effective school leadership is now connected, collaborative, creative and responsive... distributed leadership is a necessity to survive.'[455] (p246)

The impact of COVID-19 upon teams and leadership appears to mirror the case of CT rehabilitation reported in section 2. The differences noted between MDT and IDT accounts may also arise from structural differences in leadership, unique to the military setting. Unusually, CT was led by a static civilian team manager and military consultant. This dual leadership structure provided resilience, breadth, and continuity. Whilst their roles were distinct, they were accessible and frequently present in the clinical setting.

In contrast, MDT leadership was a single military post; the postholder changed every 2 years. Future career prospects of the incumbent relied upon a commanding officer's appraisal of their command and leadership. Using Bourdieu's theory of practice as a conceptual lens, the incumbent would be expected to adopt practices to earn social and cultural capital and gain influence with their military commander. Their assessment of required capital would in part be derived from previous military experience. Schein [440] asserts that an individual's assessment of need will be viewed through their past experience. The MDT leader recently posted into DMRC would be unfamiliar with the IDT approach, as well as the complex and shifting demands being placed on the clinical team. Whilst their role and department appeared organisationally identical to any other position they had fulfilled, as did the social and cultural capital needed to be successful in post, the needs of the service and team were in fact very different. This interpretation finds support in parallel settings, where the development of business leadership has shown exactly this pattern [447]. The newly arrived business leader will assess the social, symbolic, and cultural capital required based on previous experience. Leaders then develop through a process of social and relational learning, but relationships centre around those they perceive are important to enhance their influence, and their focus is on the knowledge and skills they believe are important for the needs of the business [447, 453]. In this case, an MDT leader might adopt a distant and hierarchical approach, maintaining relationships with military colleagues. This hypothesis may explain [MDT accounts](#), supported by verification data, claiming MDT leaders were detached from the clinical reality.

Clinicians felt MDT leaders did not to adjust their approach and capitalise on collaborative opportunities. Their organisational style was also out of kilter with the needs of a complex setting, resulting in the negative cycle of distrust seen within the conceptual map ([Figure 9.9](#)). Whilst leadership appears as an enabler of IDT collaboration, hierarchical (MDT) leadership action profoundly disabled collaboration across clinical

disciplines ([Figure 9.9](#)). MDT [Clinician accounts](#) suggest this style undermined the resilience of those within the team; discussed further below using mental health as an example.

Mental Health

Clinicians highlighted the mental health service as the second most important component of care to be included in any future rehabilitation pathway for military lower limb amputees. Attitudinal coding revealed 61% of references for mental health were negative and 39% positive. There was no demarcation according to IDT/MDT team. Mental health clinicians did not volunteer for focus group consultations, but following voting results, three interviews (one to one) were conducted with mental health leads in military secondary care.

Prior to the campaign in Afghanistan and Iraq, mental health existed as a community service. The intense nature of combat operations, frequent deployments and the devastating nature of combat injuries created a focus on mental health service provision [458, 459]. Reportedly high rates of post-traumatic stress disorder (PTSD) amongst US troops as well as mild traumatic brain injury (MTBI) caused growing concern for the mental health status of UK service personnel returning from operations [460, 461]. Scrutiny upon medical services and a lack of clear evidence about the identification and management of PTSD and MTBI, created a confused picture in which mental health services were rapidly introduced at DMRC and RCDM. Into this complex setting, two of the three interviewees were tasked to establish a mental health service.

This case illustrates the importance of empowerment, clarity of role, and peer support when nurturing collaboration and trust [134]. [Accounts](#) of those tasked to establish mental health services show that their role was ill-defined, contributions directed by senior clinicians or consultants and devoid of peer support or accessible senior guidance. A Self Determination Theory (SDT) view would argue that their intrinsic needs to feel competent, autonomous and connected were not met; in turn compromising their resilience [462, 463]. Their accounts support this assertion.

Mental Health and DMRC

DMRC was a physical rehabilitation centre, whose model of care was built around the concept of enabling physiological adaptation. Interviewees described how they felt this dominant culture and senior scrutiny of their practice, placed expectations upon mental health to deliver care in a similar manner to physical rehabilitation.

When facing challenge, Turner [285] argues that if it is perceived to be unmanageable, individuals will not engage in the process of social identification, potentially removing themselves from the process altogether.

Bourdieu [260] adds that some may also seek to change the rules in a field if not conducive to their success. For one mental health interviewee, this scrutiny and direction led to the geographically relocating of mental health services away from physical rehabilitation setting. So, as the IDT sought to lower professional barriers and to bring proximity, mental health sought to regain control by creating referral criteria and distancing themselves from other services.

When IDT and MDT clinicians discussed mental health a framework analysis ([Appendix 23](#)) of this coded data showed their negativity arose from a sense of feeling ill-equipped to provide what patients needed. The CoP that existed in the IDT through joint working, sharing knowledge and collaborative planning was avoided by mental health. Clinicians felt ill-equipped to manage patient with mental health needs, hence the anxiety expressed in focus group accounts. To reiterate:

'I think we did really well to not crumble and just say, "Do you know what? I can't do this, this is too much, I've had enough..."' (Participant verification 1, p5)

The conceptual map ([Figure 9.8](#)) illustrates this dynamic between *mental health*, *joint working*, and *peer support*. The map and data informing it, proposes that the model of provision mental health enacted, resulted from a failure of senior leadership to support, and empower this service, represented by the negative interaction between leadership and mental health. Alternative mechanisms may have also contributed to this dynamic. For example, language use has been shown to differ between professional groups and indeed, between IDT and MDT models [464]. Sheehan [464] analysed conversational transcripts of health professionals, finding that IDT language is more inclusive, using common phrases with a shared meaning. Within MDTs, language has less overlap and is often specific to clinical areas [464]. Language and team rituals create a sense of inclusion for members (similarities around which they can identify) but exclude those outside of it [341]. The role each profession fulfils will also affect language use. Allied health professionals, for example, adopt more inclusive language, given their role integrates with many other professional groups [464]. As mental health workers fulfil a more consultative function; their language is consequently more distinct with reference to their autonomous role [464]. These differences between professions and groups can influence perception and result in the mental health worker appearing less communicative because their communication ritual differs from an allied health professional. Equally, an MDT member may find the language and rituals within an IDT compounds a sense of exclusion [341].

Reeves [326] develops this point further, noting that highly collaborative team rituals can make an IDT appear exclusive. Within the business literature this is a recognised downside of highly collaborative systems [465, 466]. One case study presented how Spotify, the online audio streaming site, used special interest

groups (called Guilds) to overcome this issue [467]. These groups operated across the organisation and united employees around common interests beyond their immediate place of work [467].

Mental Health as a Community of Practice.

Following the establishment of mental health at DMRC, and the arrival of the third interviewee, treatment teams had supplemented their own mental health provision with a psychologist and mental health OTs. This additional layer of provision meant there was no unified approach for mental health, and critically, no direct link to community mental health provision. For those delivering mental health strategies, there was a need to create a common language and approach, as well as to provide mutual support. Weekly meetings started to bring clinicians together who shared a common interest in mental health. This MDT (as it was referred to) fulfilled the description of a CoP. Moreover, as with the example of Spotify, it stretched beyond the clinical team, drawing practitioners from across DMRC around a common interest [467]. This simple initiative turned mental health from a remote silo, into a principal unifier [323]. With the service delegated across the unit, and coordinated through the MDT, the interviewee was released to focus upon two key requirements. Firstly, the tension between the chain of command and clinicians running the service, an issue voiced by the first two interviewees. Second, mental health needed to be de-centralised into the community. There was recognition that the rehabilitation could unwittingly set back recovery, if both physical and mental health were not coordinated. mental health, therefore, took on a coordinating function, networking with community mental health, and liaising with physical rehabilitation, ensuring vital information was received by DMRC clinicians.

Mental health presents somewhat of an anomaly in this analysis. During its inception at DMRC, pressure for it to reflect the structures and mechanism of physical rehabilitation (IDT) delivery caused mental health to distance itself and adopt an MDT structure. However, the form it eventually took does not easily conform with either MDT or IDT structure. Its eventual unit-based function provided interdisciplinary support across all teams. Community-based coordination performed a networking function. Xyrichis [2] contends that labelling teamwork in categories denies the manager freedom to consider hybrid alternatives which better suit a range of functions or settings. The anomaly of mental health reveals an interaction between psychological, physical, and social domains of health in which teamwork should be considered as a continuum with *networking* at one end and *teamwork* at the other (fig 10.2).

InterPACT Evaluation of the teamwork continuum		Teamwork ←————→ Networking								
			collaboration	consultative collaboration	collaborative partnership	coordination	coordinated collaboration	delegative coordination	consultative coordination	
Dimensions of interdisciplinary / interprofessional practice	Shared commitment	★★★★	★★★★	★★★★	★★★★	★★★	★★★	★★	★★	★★
	shared identity	★★★★	★★★	★★★	★★★	★★★	★★★	★★	★★	★★
	clear team goals	★★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★
	clear roles and responsibilities	★★★★	★★★	★★★	★★★	★★	★★	★★	★★	★
	interdependence between members	★★★★	★★★	★★	★	★★	★	★		★
	integration between practices	★★★★	★★★	★★	★★	★★	★	★	★	★

Figure 10-1 Continuum of teamwork using the InterPACT [2] (p423) Self-evaluation of interdisciplinary intensity: ★★★★★ very high, ★★★★ high, ★★ moderate, ★ low

Assisted by the InterPACT (Figure 10.2), the manager’s role is to consider where their team sits on the dimensions of interprofessional activity and how this corresponds to requirements [2]. In complex settings such as defence rehabilitation, this approach requires the leader to purposefully consider the dimensions of collaborative work (Figure 10.2) and appraise task and setting. The case of mental health illustrates the negative impact upon clinicians, and potentially patients, of adopting rigid system delivery in a complex setting. Rehabilitation is a biopsychosocial system, and there can be deleterious implications upon patient care when one domain dominates another [134]. An organisational system is needed which does not blindly apply team structure without considering setting, task or people [2, 338]. A continuum view provides the flexibility to adjust procedures and respond to changing needs. It enables a dynamic system, in which psychological, physical, and social domains of health may interact in varying degrees depending on the needs of the patient and their stage in recovery.

Methodological issues

There are several methodological issues relating to clinician and clinical manager data. Although, extended group consultations and verification interviews have been used in this part of the study, the potential for recall issues is accepted. The insider perspective of the researcher may also have biased data collection, analysis, and interpretation, although multiple verification points have been included to minimise this affect. Some of the principal findings arise from the differences between IDT and MDT accounts of teamwork. Yet,

MDT participant numbers (n=13) are low compared IDT representatives (n=28). Further, professional composition of teams may have also influenced data collected. Nursing was the main profession represented within MDT accounts whilst allied health professionals, as a minority group at DMRC, were the main IDT clinicians represented. However, verification interviews did confirm issues relating to leadership style and continuity and this is supported in the wider literature.

Summary

When clinicians and clinical managers were asked to draw upon their experience treating military lower limb amputees highlighting what they felt were the key components required to manage the patient's complex rehabilitation needs, they focussed upon a social process known as the IDT. This approach equipped clinicians to manage the complex demands of their setting by connecting them together. This connection provided them with a collective competence and sense of autonomy [303].

Central to this process is a concept known as CoP [318]. In this thesis, patients and clinicians worked together to create mutual systems of support, learning and innovation. With goal centred resourcing, these system attributes appear to have created highly resilient and innovative delivery mechanisms. Deprived of CoP, those within MDTs did not share the same resilience or positivity. Monodisciplinary departments lacked disciplinary breadth to resolve complex clinical issues. Hierarchical leadership directed clinical developments, rather than enabling bottom-up solutions.

Leadership is the key enabler of these social processes and ultimately the organisational culture in which these processes exist. The case of mental health illustrates the implications upon the clinical resilience of the team when the setting and social dynamic are not considered in leadership decision making. Attempts to impose a style and manner of service delivery for mental health led to a breakdown in collaboration with the wider team. The situation was only remedied when a weekly mental health forum brought clinicians of all specialities together, under a mental health banner. This CoP brought a common approach, offering support to practitioners of all disciplines and provides an example of a tactical initiative overcoming misplaced strategic thinking. It also provides an example of how physical, psychological, and social domains of health can interact and co-exist within complex rehabilitation environments. Complex rehabilitation has and will be shown to be a biopsychosocial phenomenon. A reframing of the term rehabilitation is, therefore needed in both the military and civilian setting, to afford greater equivalence and synergy between physical, psychological, and social domains of health.

Based on this discursive analysis four key components are proposed to support the management of the complex rehabilitation needs of the military lower limb amputee.

Leadership. Whilst *IDT Joint working* was the principal component highlighted by clinicians and clinical managers, leadership is the key determinant of working and collaborative practice, and organisational process. The role of leadership in recognising the setting, and attuning the team and organisational culture to it, is vital. Difficulties reported by participants in this study stem from a misaligned team approach with the context. Failures also arose where barriers existed between departments and/or organisations. Greater synergy is needed between domains of healthcare, particularly between physical and mental health.

Creativity, collaboration, and community. The IDT approach encapsulates all priority themes, through the community dynamic and process of social learning inherent within it. This component can be defined as *a*

collaborative interdisciplinary team, empowered to pursue innovative solutions, and resourced to promote a community of learning. The importance of *proximity* as an enabler of collaboration is recognised, as well as the central role *leadership* plays. Current trends, brought about by the COVID-19 pandemic, have increased complexity within healthcare, creating situations which more than ever require a collaborative interdisciplinary response. The pandemic has also challenged our ability to achieve proximity.

Teamwork. The case of mental health emphasises two points relating to teamwork. First, the removal of barriers between domains of care is critical; physical, psychological, and social domains need to coexist on an equal basis. Second, complexity demands a more refined view of teamwork. The InterPACT may enable leadership (a principal enabler) to adopt a more reasoned approach as it constructs teams designed to meet the setting. Evidence has been presented supporting the assertion that resilience centres upon a sense of competence and autonomy that clinicians achieve through connection within a diversely skilled and trusted team. This collective provides the individual with resilience in their task. This is achieved when the dynamics of the setting, team process and leadership style are compatible. If they are not, a clinician's resilience and potentially their effectiveness will be compromised.

Resourcing. Complex settings needs to be adequately resourced [231]. The IDT is often critiqued for its expense [134]. However, case examples are also documented, where complexity has not been adequately managed at great cost to those involved [40]. Even operational difficulties continued in Afghanistan until sufficient troop numbers were supplied [40]. Clinicians and clinical managers in this study recognised the importance of having an efficient model of funding to enable a goal centred approach with complex patients [17].

CHAPTER 11 Veteran Results

Introduction

Twenty-two veterans participated in six focus groups and two interviews ([Figure 8.5](#)). The NGT was used to structure focus groups and facilitate finding consensus. Two prior one-to-one interviews were conducted to capture individual journeys in more detail and help frame specific focus group questions. Focus group and interview data were audio-recorded and transcribed. Data were organised, coded, and categorised to create surface themes and sub-themes using NVIVO 12 software.

The thematic structure emerging from this analysis is presented using a conceptual map. This map provides an overview and outline of how veterans discussed components of rehabilitation, and how they interacted with one another. The map is complex, so this chapter focuses on key quadrants within it, for instance, prosthetics. The focus of analytical attention has been determined by those components of rehabilitation rated most highly during the participant voting exercise.

In contrast with the clinician and clinical manager group, verification took place within each focus group as the researcher built on the interpretation gained from previous focus groups and presented ideas back to subsequent groups. Quantitative verification of themes using Armed Services Trauma Rehabilitation Outcome Study (ADVANCE) data is presented at the end of the chapter and provides a wider veteran cohort view of well-being.

Demographics

Table 11.1 outlines the demographics of participants in the veteran consultation. The cohort is predominantly currently employed male, bilateral amputee, prosthetic users.

Veteran Focus Group	Amputation Profile:		Prosthetic User		Failed to attend	Comments: Location / group composition	Military Rank (at discharge)			Working		Sex		
			Yes	No			Officer	SNCO	OR	Yes	No	Male	Female	
Interview 1	Bilateral	1	1			London	1			1		1		
Interview 2	Triple	1	1			London		1		1		1		
Focus Group 1	Unilateral	2	2		2	DMRC Headley Court One participant in Service, one participant was a veteran.		1	1	2		2		
	Bilateral													
	Triple													
Focus Group 2	Unilateral				1	Southwest England								
	Bilateral	2	2				1	1	2		2			
	Triple	1	1					1	1		1			
Focus Group 3	Unilateral	1	1		2	Midlands			1	1			1	
	Bilateral	1	1				1		1		1			
	Triple													
Focus Group 4	Unilateral	1	1		1	Preston Prosthetic Centre								
	Bilateral	4	4				1	2	2	4	1	5		
	Triple													
Focus Group 5	Unilateral				1	Tidworth: Tedworth House			1		1	1		
	Bilateral	5	4	1				1	3	2	2	4		
	Triple													
Focus Group 6	Unilateral	3	3		1	Imperial College London	1	2	1	2	2	4		
	Bilateral	1	1											
	Triple	1		1					1	1		1		
Total		24	22 (92)	2 (8)	8	N/A	5 (20)	9 (37)	10 (43)	18 (75)	6 (25)	23	1	

Table 11.1 Demographic data of interview and focus group participants. *Total data is as a n (%)*.

Overview of findings

This overview presents surface themes and constituent sub-themes. A referencing count, indicating those themes dominating veteran discussions is provided in Table 11.2. Priority themes are identified as the most voted for components of care. A conceptual map is presented, into which surface themes, sub-themes and priority themes are shown (Figure 11.2). Interactions between themes illustrate the construction of each priority theme. Explanatory accounts detail why particular components of care are prioritised by veterans.

Key Themes

Using the analytical process ([Figure 8.6](#)) statements relevant to key rehabilitation components have been grouped into themes. All coded data were reviewed within each specific theme to ensure correct attribution. Veterans highlighted nine key surface themes when discussing rehabilitation experience as lower limb amputees:

- Attitude
- Clinical Team Dynamics
- Goal centred resourcing
- IDT organisational Culture
- Intervention
- Necessity the mother of invention
- Philosophy of care
- Military Fairy tale
- Patient modelling recovery

To understand the relationship between each theme and subtheme and how they interact, a referencing table is presented below (Table 11.2).

Thematic Referencing Count

Table 11.2 lists surface themes and their meaning, alongside related sub-themes together with a count of how many times they have been coded and in how many files. This referencing count provides an indication of how often these themes were raised and their comparative prevalence across all six focus groups; 14 key sub-themes are highlighted in blue. These include *Transition to the NHS*, *Prosthetic provision*, *Peer support* and *Transition into Civilian Community*). *Attitude* appears more heavily coded because it combines with other themes to illustrate emotion within coded statements.

Surface Theme	Sub-theme	Files	References	
Attitude A viewpoint or emotion the participant expresses towards a person, situation, organisation, or process.	Abandoned	6	59	
	Distrust	3	54	
	Negative	6	211	
	Positive	4	142	
	Trust	6	37	
	Not ready for rehabilitation	6	14	
	Taking control	6	84	
Clinical Team Dynamics Interaction of approaches and circumstance noted across the clinical teams at DMRC	Communication within the IDT and MDT	1	2	
	Equality vs Hierarchy	2	7	
	IDT - the joint approach	3	20	
	Mix of military and civilian staff	1	1	
	Proximity	2	17	
	Views of working together	3	13	
Goal Centred Resourcing A service resourced and designed to achieve individual patient goals.	Continuity of staff	5	11	
	Optimal Staffing – enabling time to build trust	1	1	
	Required resource (equip and funding)	1	1	
	The setting (infrastructure - outdoor space - gyms)	3	6	
	Time	4	14	
IDT Organisational Culture Influence of the IDT approach upon the team culture	Black box thinking (positively learning from failure)	4	9	
	Clinical Coordination Roles	2	5	
	Networking beyond the IDT	2	4	
	Peer Support - Clinician - Patient – Manager	6	54	
Interventions Clinical services highlighted by veteran participants	Health Promotion - health education	2	3	
	Mental Health	Buddy buddy	3	9
		Loss - grief – anger – adjusting	5	17
		Resilience Training	2	2
		Pain Management	6	20
	Managing my medication	6	44	
	Physical Therapy (OT, ERI, Physio)	3	12	
	Prosthetic Provision	6	54	

	Social Work	3	3
	Use of Sport and Adventure Training	4	15
	Welfare	3	6
	Education Centre	1	3
Leadership (of clinical team)	Consistent Leadership	1	3
	Leadership role (MDT / IDT)	1	1
Necessity the mother of invention Accidental Innovation driven by necessity	Active Case Management	1	2
	Group therapy – working with others with similar injuries	5	21
	Periodic Intensive Residential Rehab (PIRR)	6	19
	The ticking clock	6	18
Perceptions Veteran perceptions expressed about service provision	NHS Approach	6	58
	Patient approach	2	21
	Patient expectation	5	24
	Third sector	1	3
Philosophy of care Foundational principles upon which the military rehabilitation provision was based (incorporated within the Defence Medical Rehab Programme)	Art of the possible – whatever it takes	3	10
	Continuity of care	1	1
	Early Intervention	1	1
	Functional Vocational Skill Focus	1	3
	Holistic adaptable approach to therapy	1	2
	Military Ethos	6	40
	MSK Strength and conditioning	1	1
	Patient Centred (Goals - Intervention)	4	13
The military fairy tale Journey from injury to recovery marked by positive experiences in the military and a sense abandonment at discharge, making the assurance of	Achieving a new identity	6	47
	An uncertain future	6	29
	Veteran Health Service	3	18
	Managing their own health – healthcare	6	56
	Medical Discharge – the cliff edge	6	34
	The Hero Effect	2	5
	Patient motivation and camaraderie	6	33
	Transition – employment	6	20
Transition to the NHS / civilian healthcare experience	6	75	

support appear make believed	Transition into civilian community – the social impact	6	54
The Patient Modelling Recovery Experiences which undermined or enabled recovery	A community of suffering drives recovery	6	43
	Formalised pathway	2	8
	Managing normal life	6	43
	Physical recovery pursuing independence	6	51
	Substance abuse	2	6
	Support for or from peers and family	6	50

Table 11.2 Surface Themes and Sub-themes. Themes consistently discussed and highly coded across groups

On reviewing sub-themes listed in Table 11.2, distinct clusters are apparent (Figure 11.1), labelled as *cross-cutting categories*. Three of these categories relate to an individual’s intrinsic needs as proposed by Social Determinant Theory (SDT); the fourth category captures the organisational culture and philosophy of care – each defined below.

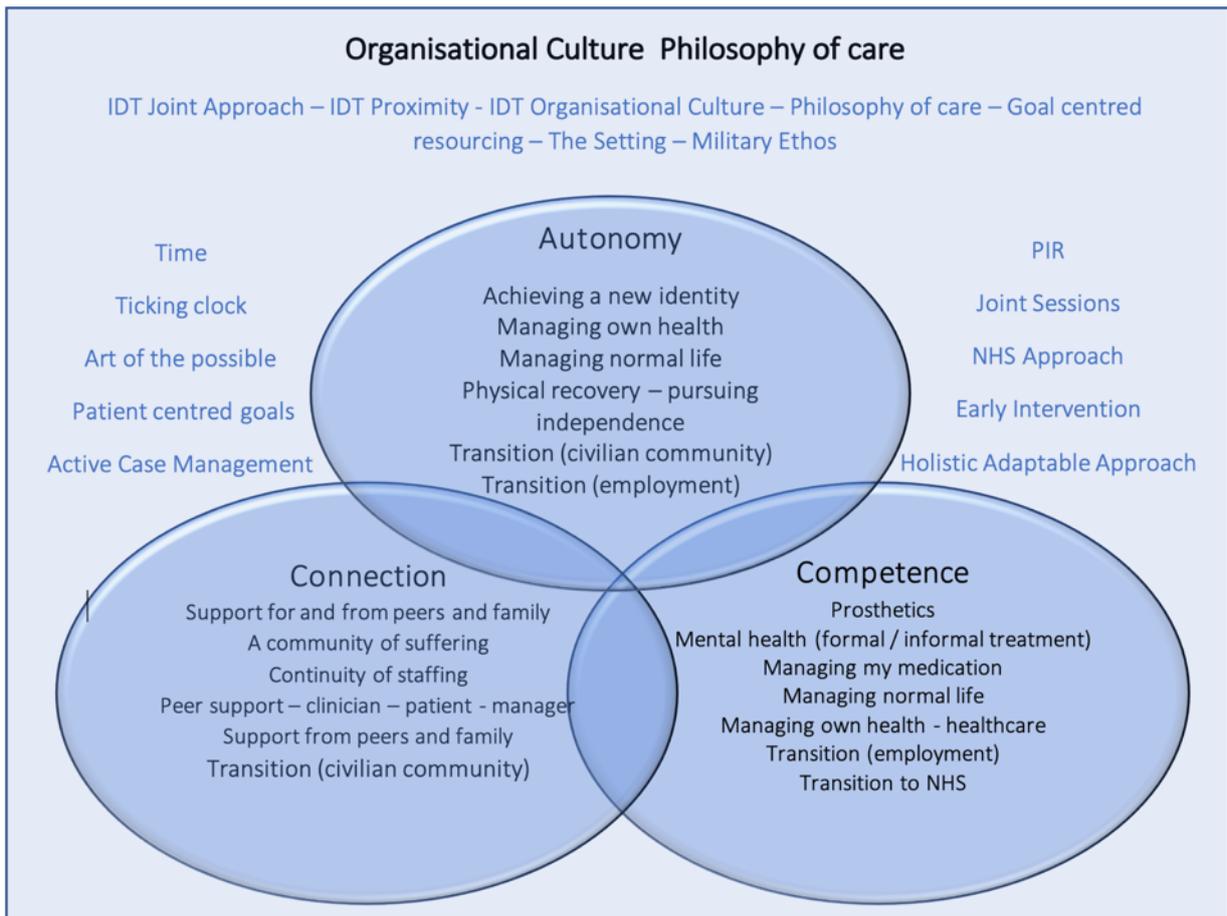


Figure 11-1 Cross cutting Categories: *Organisational culture (Philosophy of care), Autonomy, Connection and Competence.*

- **Autonomy:** Accounts of recovery and ongoing maintenance of function consistently refer to a need for control or independence (*Achieving a New Identity; Managing their Own Health; Managing Normal Life*).
- **Connection:** The importance of connection with peers, family and clinicians is emphasised across all groups (*Support for or from Peers and Family; A Community of Suffering Drives Recovery; Peer Support - Clinician - Patient – Manager*).
- **Competence:** The process of acquiring skills needed to enable connection and autonomy of action when living with a disability (*Prosthetics; Mental Health; Managing Normal Life*).
- **Organisational Culture: Philosophy of care:** The influence of the rehabilitation organisational culture, its philosophical basis and military ethos is apparent throughout the thematic structure (*IDT Joint Approach; IDT Organisational Culture; Goal Centred Resourcing*). In addition, this cluster contrasts features particular to CT seen in accounts of healthcare transition (*Art of the Possible; Patient Centred goals; NHS; Ticking Clock*).

Interactions between surface themes and sub-themes, and in particular the influence of attitudes on the recovery experience have been captured on a conceptual map (Appendix 33 / Figure 11.3-11.6).

Conceptual map

The complexity of the overall conceptual map can be seen in [Appendix 33](#). To make the information contained within it more palatable, this map has been broken down into priority themes (Figures 11.3-11.6) and these will be presented. On each map, the key on the right indicates the meaning of each symbol. Surface themes appear as diamonds. Thematic groups are colour coded; this coding helps to visualise surface themes and sub-themes, linked by lines appearing as off-shoots from a surface theme. Elsewhere, links between themes and sub-themes are shown by arrows illustrating the direction of interaction between components. Interactions between priority themes are indicated by blue arrows. Red arrows indicate negative interactions. Components of rehabilitation rated most highly during voting exercises are indicated as blue circles; these voting items are called *Priority Themes*.

Voting Scores and Priority Themes

Veterans were asked to rank what they believed to be the ten most important components of rehabilitation to be included in a rehabilitation pathway for lower limb amputees. Voting data has been calculated for each group and across all groups. A full table of voting results can be found in [Appendix 22](#). The top seven components of care scored across all six focus groups are listed in Figure 11.2 illustrating their group and cumulative score.

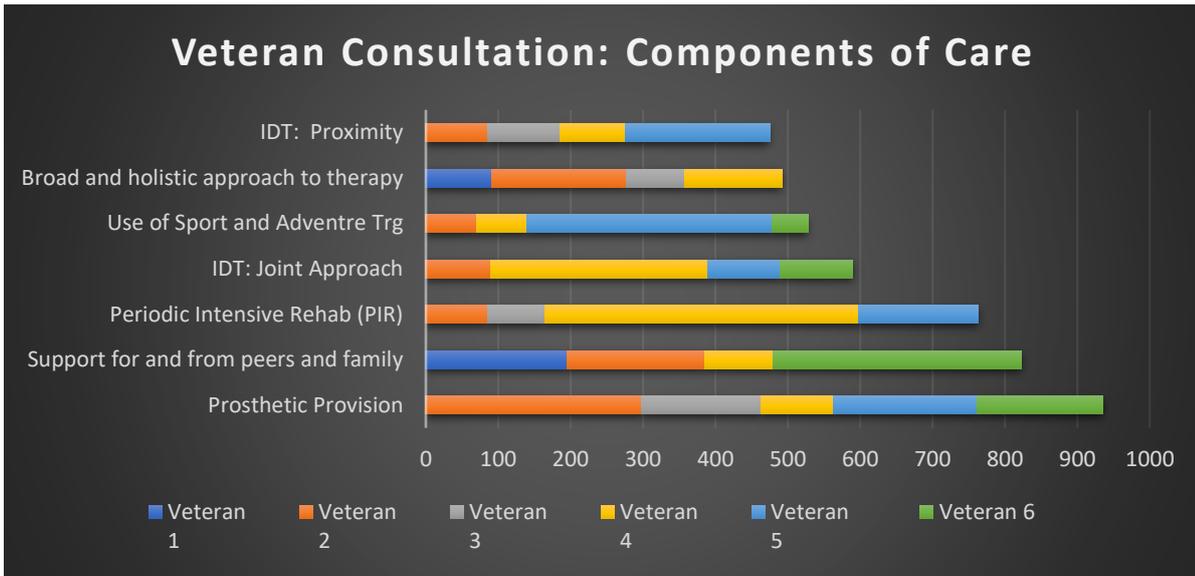


Figure 11-2 Veteran Consultation: Voting Results

None of the priority themes were scored in all six focus groups. Akin to the clinician and clinical managers group, IDT scored highly but veterans separately identified *IDT Joint approach* (the benefit of clinicians working together) and *IDT clinician proximity* (aiding joint working, continuity, and patient convenience). Overall, the most highly rated component is prosthetic provision.

Examination of the conceptual map shows that these priority themes were either ‘*process enablers*’ (defined as those whose interaction appears to facilitate others) or ‘*process enabled*’ (the interactional direction appears to facilitate the voting item). Where a theme is described in the data as having a negative influence upon a voting item, this is listed as a *process disabler*. Each priority theme is mapped separately in Figures 11.3 – 6. Sub-themes acting as process enablers and those being enabled by priority themes are listed in Tables 11.3– 7. Tables 11.3 – 11.7 cluster process enablers according to the extent to which they act upon cross-cutting categories (*Competence, Connected, Autonomous; Organisational culture*). Each priority theme is now presented.

Priority Theme: Prosthetic Provision	
Enabler / Enabled	Direct interaction with
Process Enabler (for)	Transition (civilian community) / (Employment) – Managing loss – Achieving a new identity – Taking Control – Managing normal life
Process Enabled (by): <i>Competence</i> <i>Autonomy /</i> <i>Empowerment</i>	IDT Joint Approach – Early intervention – MSK Strength and conditioning – Patient Centred Goals – Physical Therapy – Sport and AT – Trips: Via Functional skill focus
<i>Connection</i>	Art of the possible – Managing my medication – Pursuing independence Goal centred resourcing – The setting: Via Required resource
Process Disabled (by)	PIRR – Group therapy – Communication within the IDT – Community of suffering: Via Peer Support. Mental Health (via pursuing independence) – Pain Management – Sport & AT Transition (Healthcare) / (civilian community) / (employment) / Veteran Health Service / Medical Discharge / Managing normal life: Via Need for Transitional Liaison.

Table 11.3 Table of process enablers / enabled – Prosthetic Provision

1. Prosthetic Provision.

This theme represents the freedom, independence and autonomy veterans fought to regain after the shock of injury and gradual realisation of its impact upon them (Table 11.3 / Figure 11.3).

'I had this identity before I was injured...and then all of a sudden you're lying on a hospital bed and I'm getting turned onto my side so a nurse can put a bedpan under ... and wiping my arse.' (Vet FG1, p10)

'I was 24 years' old, full-screw to bang, to sitting there, falling off a 'toilet, having my arse wiped for me, you're like, "What the fuck!" (Vet FG2, p21)

Discussion of prosthetic provision centred around the military rehabilitation setting and their transitional experience as they moved into the civilian NHS healthcare. Data illustrating both settings emphasise the role prosthetics played to enable the amputee to regain or maintain their independence.

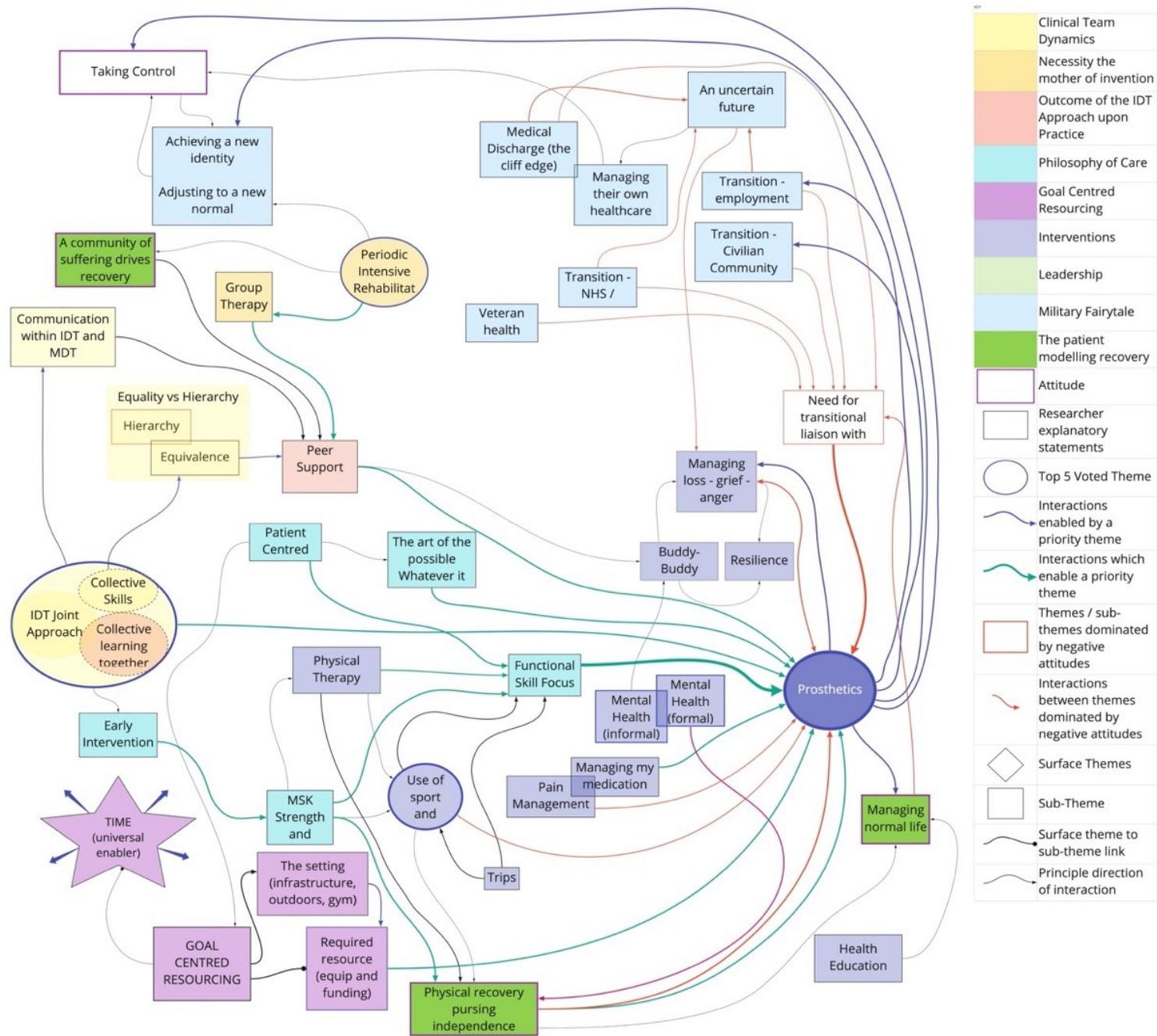


Figure 11-3 Veteran Conceptual Map - Prosthetics

'The best thing about Headley for me was getting there and seeing guys walking on legs and your sat in a wheelchair going, 'I need to get out of this chair.'" (Vet FG2, p14)

'The minute you're out of the wheelchair and you're up, you're moving, the pain stopped, you're thinking about other things, you think, "Wow," you start to learn to drive, you're doing this, your world's starting to fall back into place.' (Vet FG2, p21)

Discussion also focused on the amputee socket, comparing military and civilian prosthetic settings, its manufacture and resulting comfort/usability. In the military rehabilitation setting, prosthetic provision encompassed the process of learning to walk as they sought to discover their *new normal*, and ultimately a *new identity*. As they became accomplished prosthetic users their focus shifted. Provision of prosthetics became a means to maintain their identity and pursue chosen interests, family life and employment.

Enabler. Veterans discussed the provision of prosthetics and the ability to achieve independence as a fundamental stage of adjustment to loss, allowing them to discover a new normal. For those with families, their own adjustment was interwoven with partners and children; the prosthetic played a role in the family as well as patient adjustment.

'it's not just ...having to get used to a change in the dynamic and a change in a role and what you're able to do ...we were the breadwinners, we did things...all of a sudden I couldn't ...My eldest was thrust into this world where Daddy was hurt...And it severely damaged my relationship with him because he was that terrified of coming because he'd thought he'd hurt me ... when I first got onto prosthetic legs, he was like, 'my daddy's got a robot leg', it gave him something that no other child could brag about... 'that's my daddy, he's got a robot leg' ...all of a sudden kids were going up to him and going, 'oh, your dad's awesome.' (Vet FG1, p25)

The theme *Prosthetic Provision* was an enabler for sub-themes representing psychosocial adjustment to loss and disability and learning new practical skills of living (*Managing Loss / Grief / Anger; Achieving a New Identity; Managing Normal Life*). As veterans described the impact of becoming independently mobile on prosthetics, this enabled role focussed themes and expressions of autonomy (*Taking control; Transition: (Civilian Community) / (Employment)*).

'You've got to do certain things...to allow to you walk. But then once you've maybe got that base line in, it then became a lot more patient controlled, 'well what do you want to do today?'...as (name) has described before, you then can almost get control of your physio and your rehab, so for like me ...it's like, 'I want to learn how to run now', okay, right, so that's then, put you on this pathway, this is then now what you've got to focus on. But it was my choice...' (Vet FG1, p15)

Enabled. Prosthetic provision is enabled by a series of sub-themes providing a sense of *competence* on prosthetics, *Autonomy / Empowerment* to the user, and *Connection* with others (Table 11.3). There is considerable overlap between these themes. For example, a *functional skill-based approach* (enabled by an *IDT Joint Approach, Sport and AT, Trips*) provided opportunity to develop life skills on prosthetics. *Periodic Intensive Rehabilitation (PIRR)* and *Group Therapy*, were notable learning environments, observing how others progressed and lived life.

'... it was being with the guys, you had people at different stages of seeing where you were...I was looking at the people that had the single below, and I could see them running and I was like thinking 'Jesus I could be like that'. So, it sort of drove you to saying that is where I could be...people (in the hospital) say oh it is going to be okay, and I am thinking you have still got two legs mate, how the hell do you know? But then you get to Headley, and you see people who were the same condition as you, and at a later stage, and basically what you could achieve at the end I thought was really good.' (Vet FG4 p3)

'(arriving for the first time) there was all these people whizzing around doing stuff, it was like fucking Hogwarts...but this almost kind of subtle encouragement you were getting from everything that's going on around you.' (Vet FG2 (MS2), p24)

'...that first six weeks at Headley Court I class as one of the most important six weeks of my life.... finances... get sorted. You started getting OT reports, you start working out...you learn how to do new things, how your life's going to look.' (Vet FG2 (MS1), p24)

Collectively, patients were introduced to a supportive community that enabled them to share experiences and facilitate autonomous decision making. There were also aspects of rehabilitation which undermined progress, seen in the following process disablers.

Process Disabled. Participants recalled circumstances that undermined prosthetic progress. Whilst these disablers will be presented in more depth later in this chapter, the impact of pain medication is raised here to illustrate several features.

'But I remember, when I first got injured, I was so heavily medicated that it almost felt like life was passing me by. I was on a treadmill, and it felt like I was just going through a system. I didn't question that system because I'm in the military...' (Vet FG1, p1)

'So, that's how I felt. And I knew that that cloud was there...even though I would talk to the clinicians, and I'd say, 'I'm going to get off this stuff'(medication), and they'd go, 'oh no, no...as long as your body needs it, you'll not get addicted'...there was a lot of questions that were going there. And I get it...But deep down inside I knew I wanted to take control...' (Vet FG1, p2)

All groups reflected on the sedative impact of medication and how it undermined their ability to develop key skills. Knowing that phantom limb pain and residual limb pain, if uncontrolled, would undermine prosthetic

mobility, they were unsure whether medication was controlling pain, or just controlling them. Veterans reported feeling hazy and unable to retain information, hampering both relationships and rehabilitation.

'I felt you could progress up to a certain point, but then it was almost like this mental anchor. So, you could get up to a certain point but because, whether it was a cognitive ability just because you're so clouded, in such a zombie like state...when you were talking with your physios, when you're talking with your prosthetic specialists ...go away five minutes later and your brain kind of, just rejects all the information.' (Vet FG1, p1)

'It messed with my speech quite heavily so at one point I could formulate words in my head, but then I wouldn't actually be able to verbally process them.' (Vet FG1, p2)

Sharing these experiences made them realise they were not alone. Some chose to ignore medical advice and dispense with medication, finding they felt better afterwards; most reported their pain was no worse, if not better. This encouraged others to follow suit.

'Things did wake up you know, I had a lot of problems, don't get me wrong. But I knew that I needed to come off them. As soon as I made that conscious decision, and I'd tried a few times and lowered it down to a certain degree, my body started to scream a little bit and I was like, 'ooh maybe this ain't the right time'. But I had to just gee myself up and go, 'right, let's do this'. And I canvassed all the guys in my position...I did all the research to work out what the effects would be on my body, my mental state...And then when I came off it, it was like a roller-coaster, but then, after the four weeks I was alright. I felt like a brand-new bloke again.' (Vet FG1, p3-4)

'...that cloud kind of lifts and then you go, 'okay, right, maybe I can do this and do that now' and it opens up more of the avenues you're able to see, therefore able to explore and then you're able to talk to your clinicians... and that then allows your rehab and your recovery pathway to then increase and get better because you're able to access different avenues that you couldn't necessarily see beforehand because you were just so focused on getting from one set of meds to the next....' (Vet FG1, p3)

Adjustment issues together with medical and surgical complications also impacted their focus, engagement, and willingness to attend rehabilitation (*Loss / Grief / Adjusting*). Some acknowledged that sporting opportunities distracted them from progressing on prosthetics (*Use of Sport and AT*). However, the principal process disabler for *Prosthetics* was a collection of themes describing *Transition*. Veteran experiences of civilian based prosthetic services (*Transition: NHS / Healthcare*) will, therefore, be presented in some depth later in this chapter.

2. Support for and from peers and family

This priority theme represents the psychosocial support received in connection with close family and peers, with fellow patients providing a major source of support (Table 11.4 / Figure 11.4).

Priority Theme: Support for and from peers and family	
Enabler / Enabled	Direct interaction with
Process Enabler (for) <i>Competence</i> <i>Autonomy / Empowerment</i> <i>Connection</i>	Functional Skill focus – IDT / collective learning together – Managing normal life – Transition (employment) / (civilian community) – Managing their own healthcare – Prosthetics – Functional skill focus – buddy buddy – mental health (informal) Taking Control (inc trust and positive) – Pain Management – Managing my medication – Achieving a new identity Patient motivation/camaraderie, IDT Joint approach
Process Enabled (by) <i>(Connection)</i>	PIRR – Group Therapy – Proximity – Sport / Trips Goal Centred Resourcing – Continuity of staff – Time – Patient modelling recovery A community of suffering

Table 11.4 Table of process enablers / enabled - Support for or from peers and family

'...I never felt during Headley that I was fighting a battle myself. I always felt like it was a collective effort to make me as well as I could be, through the staff and the other patients indirectly. Even though they weren't directly helping my care and my development, they were in a way.' (Vet FG 3, p4)

'I was spending a few weekends (at Headley), because it was easier to ... what I felt at home was a lot of sympathy, and I didn't like that. What I felt at Headley Court was empathy, ... because nobody was feeling sorry for me or saying oh look at what has happened. At Headley Court it was quite professional, but it was empathy, there was yes you are going to have shit days and that was understandable, but ... at home it was oh poor you, and I didn't like that, because it made me feel weaker.'

Peer support was a two-way process involving giving and receiving, humour (banter), practical sharing of tips and mentorship.

'..But where banter's involved, is that's getting you out of your wheelchair. I mean, (name), we nicked his battery off his chair, so he had to walk. Things like that. With (name), the Marines nicked his wheelchair and spread it to the pool in Headley Court, just to get him out of his chair.' (Vet FG2, p14)

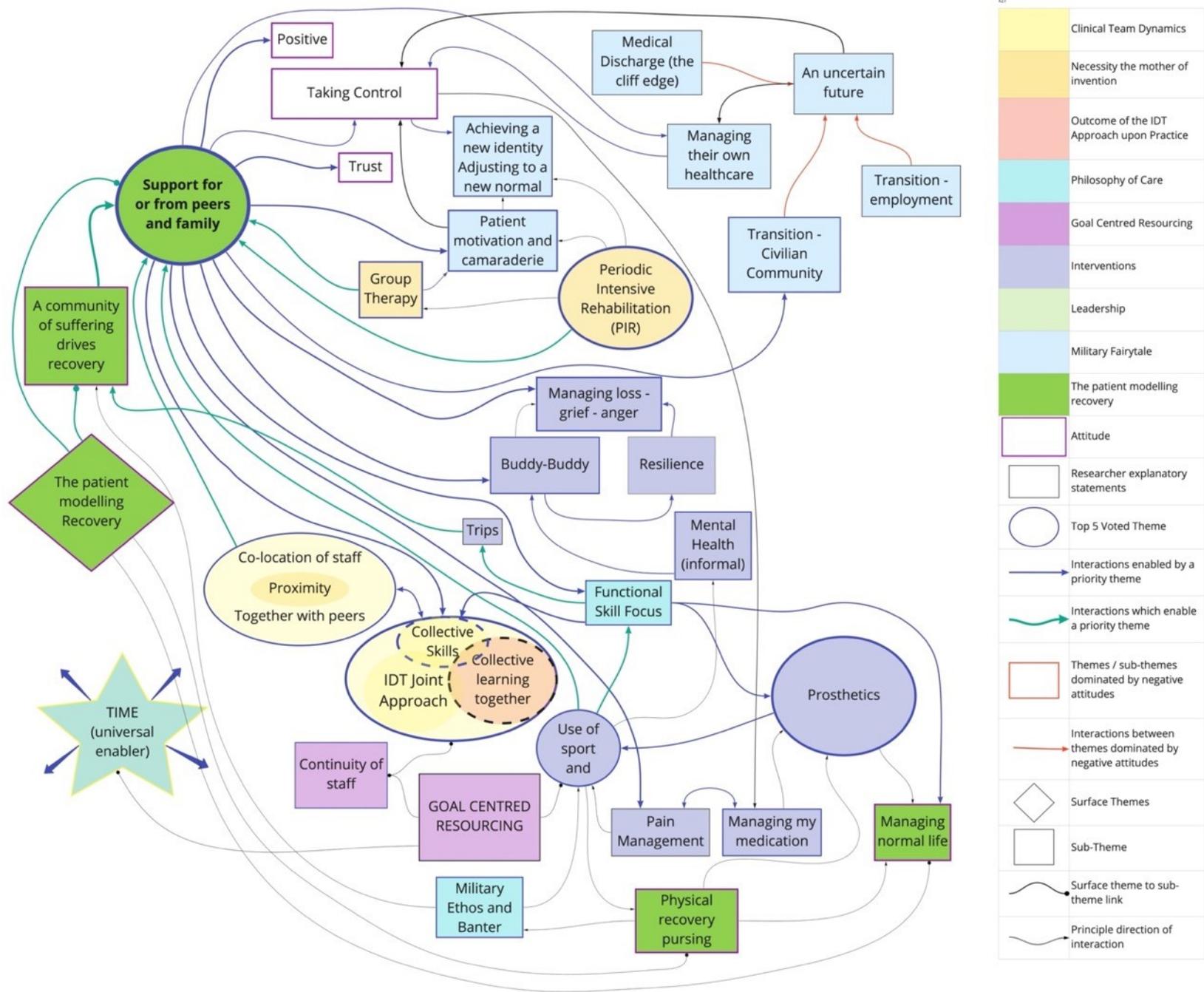


Figure 11-4 Conceptual Map - Support for and from peers and family

'...it's quite depressing when you first get there and you think, "Shit, I'm probably never going to walk again," because you're still in a wheelchair and everyone's walking around, but then when you get in them groups and everyone starts helping – you know, and just little things like you learn techniques about the slope and you can talk about it. So that's what I missed. Even now you're still learning. Like new things come up that you didn't do at Headley, and you have to just work it out yourself.' (Vet FG5, p1)

Enabler. Figure 11.4 and Table 11.4 show that this priority theme was a process enabler for sub-themes supporting skill-based acquisition (*Competence*), a sense of *Autonomy or Empowerment* and *Connection*. The example of peers supporting personal decisions about pain medication is apparent, however, the role of family and significant others was also critical.

'...I went to my wife and went, 'I'm hurting', and she said, 'you're not going back now'... for her to come back to me and say, 'you're not doing it', I felt, I've got the support here that I need. And she went, 'no, come on, let's do some distraction things', I had that support there.' (Vet FG 1, p5).'

Enabled. This priority theme is enabled by a military and sporting culture. PIRR together with social and sporting opportunities enabled community to develop (*PIRR; Trips; Sport and AT*). This community was formed around *Group Therapy* sessions mimicking military training. Operational experience and military training encouraged social proximity and teamwork. Messaging (for example 'I am watching your back', and 'never leaving a man behind') also provided social capital incentivising community integration (*Community of Suffering Drives Recovery*). *Time* during periods of residential rehabilitation and the continuity of clinical staffing enabled trusting partnerships with clinicians.

'But also, with the physios... a lot of it was plinth-based work. And ... you'd unload, and it might be stuff at home, and it could be anything...so particularly with some of my clinicians, you did form a trusting relationship where you could talk about stuff like that.' (Vet FG2, p7)

'It's like a collective attitude, isn't it?...A culture that just evolves, and it's so organic that every action by someone, and every comment, and every, you know, news article and film that you see people doing things feeds into that belief, as a corporate identity, we've got the ability to just go and do these things, and supported by the clinicians and the staff that were there.' (Vet FG3, p5)

'...look at the guys who have got PTSD ... They're toiling and you can see they're toiling inside and they're struggling really bad...But that's the good thing about having blokes like us around, because you've got that peer support and you've got that group and you can just talk it out...' (Vet FG1, p13)

3. Periodic Intensive Residential Rehabilitation (PIRR)

PIRR (Table 11.5 / Figure 11.5) is the name given to the rhythm of residential rehabilitation followed by home leave. Veterans reported this system was pivotal in helping them gain the skills needed for independent living and connect with other patients in a similar situation, as illustrated above. The length and composition

of each residential block was individually tailored. Intensive residential input over 2-4 weeks was followed by a block of home leave designed to facilitate application of learned skills.

'I sat down with consultants and (clinicians), and my programme was built...which to me was the key of it, because every week I got a programme that I had arguably a lot of input into...then at the end of the week the two consultants who would then sit me down, look at where you were...You were working to a programme that you had input into and that was produced on a weekly basis to suit your needs...'(Vet FG4, 4-5)

Enabler. As demonstrated in earlier quotations, this system of rehabilitation provided clinicians and patients with time to establish partnerships (*connection*) and time to learn meaningful skills outside of DMRC Headley Court (*Autonomy, Competency*) or find solutions to problems they faced at home. PIRR provided the time and environment where patients could connect in a deeper way over shared experience involving informal activities of daily living as well as clinical sessions.

Priority Theme: Periodic Intensive Residential Rehabilitation (PIRR)	
Enabler / Enabled	Direct interaction with
Process Enabler (for) <i>Connection</i> <i>Autonomy</i> <i>Competence</i>	Time ¹ Group therapy – prosthetics / peer support / A community of suffering / patient motivation Patient centred goals - Achieving a new identity. Interventions / Philosophy of care – Adjusting to a new normal – functional skill focus – Trips (Sport & AT)
Process Enabled (by)	IDT Joint Approach (leading to Active case management – Communication within IDT – Clinical coordination – Patient therapist support. Goal Centred Resourcing –Active case management – Philosophy of care
Process disabled (by)	Ticking clock – loss of continuity of care – Military ethos (hierarchy)

Table 11.5 Table of process enablers / enabled - Support for and from peers and family.

¹Component which is incorporated in each sub-theme or theme as an enabler

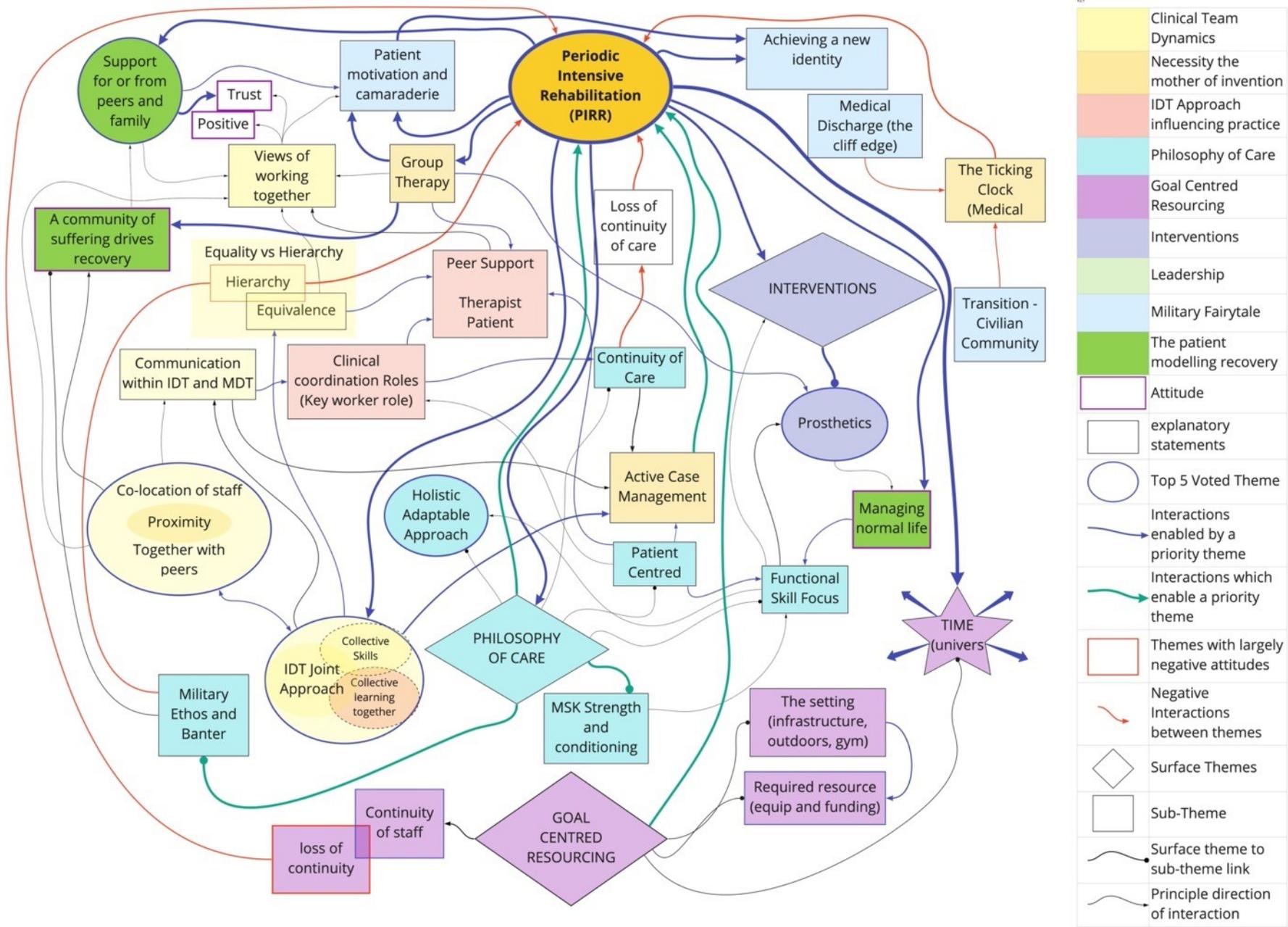


Figure 11-5 Conceptual Map - Periodic intensive residential rehabilitation (PIRR)

This rhythm of rehabilitation provided early transitional experiences, exposing patients to life challenges they now faced, as well as psychological adjustment to a new normal. PIRR was framed around these challenges ensuring it was individually goal driven and focussed on functionally relevant activity (*IDT Joint Approach; Patient Therapist Support; Active Case Management; Patient Centred Goals, Achieving a New Identity*).

'I felt quite vulnerable the first few times...when you went home, you were suddenly exposed to the real world. So, actually, that slight protection, that bubble, that insulation you got at Headley initially was probably a good thing because it consolidated your confidence, your self-belief, your identity wasn't put in question in Headley because everybody was in it...Whereas you went home and you were, kind of, the freak in the street again in a chair, and...you're quite fragile, your confidence, your identity, all of it...' (Vet FG3, p7)

'... when you're in Headley, you accept that you're operating under exceptional circumstances, so it's not normal to be there...you're recovering something, it's focused...you're dealing with a crisis. Whereas as soon as you get home, there's a reminder that that's life, it's normal. You know, you've got so many memories attached to home that were based on normal, that suddenly you've got a counterpoint to that.' (Vet FG3, p7)

'... the banter you have with the lads, it is completely different to what you can get away with in civvy street, so when you come home for that week, it is learning that kind of side of life, to know that now I am ...around my mates who are civvies who probably don't quite understand it as much, and how to learn to deal with that side of life as well... two weeks at Headley, that to me seemed more like a break, than the week I had at home trying to not be an idiot basically!' (Vet FG4, p4)

Enabled. PIRR was enabled by a cultural expectation embodied within the *Philosophy of Care* at DMRC. The *military ethos* and exercise-based approach (*MSK Strength and Conditioning*) favoured intensive periods of input and living in close proximity to enable momentum in the recovery process. This was supported by the infrastructure (*setting*).

'It was because it was so constant...for the number of weeks you were there, every part of your life involved you as a group, so from eating together, sleeping next to each other, dressing next to each other...the intensity of say you are there for two weeks...that is your life...if you were to go there for a day and then go home ...it would just be too broken up.' (Vet FG4, p3-4)

Process Disabled. The military ethos included cultural features such as hierarchy and discipline standards that presented veterans, at times, with mixed messages. They would become civilians and were transitioning, but the setting enforced compliance or discipline for minor infringements. This undermined engagement. A loss of staff continuity also undermined trust in the clinical team. Whilst intensity of input

benefited the physical component of recovery, realising their time was finite caused some to question its value when compared to their need to prepare for medical discharge.

'I have spent six years as a royal marine, to then be in a hospital, to then be treated like a fucking ten-year-old kid! And that, I found that difficult because all I felt, I felt like they were trying to hold me back rather than I am trying to get on with my life, and just live like I did before.' (Vet FG4, p9)

'... why am I playing this game when you have told me civvy street is calling...there were certain things, where yes it just seemed a little bit black and white...I think we (needed)... a grey area of 'yes, this lad is plainly transitioning...let's support him, let's get these networks set up in the northwest where he is going to be based'. Rather than this strict you will parade here, you will do this x, y and z. I think that is where I got a little bit lost really, because I just thought this is bullshit. We all know the inevitable, and I think in the end it did speed up my discharge, because I had given up.' (Vet FG4, p10)

'...chopping and changing in terms of, you know, your physios, your ERI's...you've got to get used to a new person, they've got to learn how you operate...So, you're almost starting from scratch again, and then you build up and then they go, and then you've got to start again.' (Vet FG1, p11)

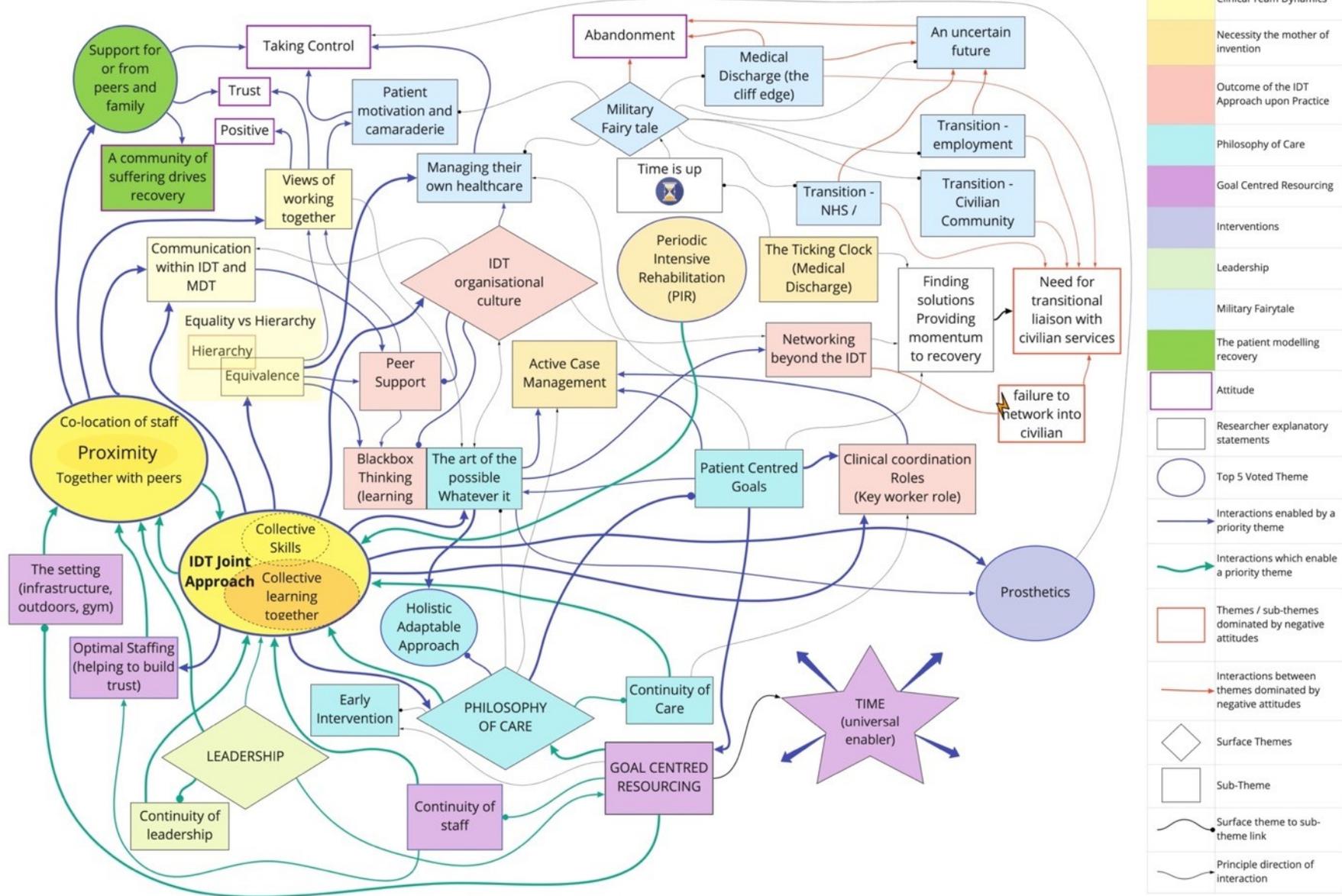


Figure 11-6 Conceptual Map - IDT Joint Approach / Proximity.

4. IDT: Joint Approach / Proximity

Both these priority themes are considered together in Figure 11.6. Veterans valued the joint process that brought clinicians and patients into partnership, noted in earlier quotations, and the convenient proximity of clinicians when mobility was limited, vital to support joint working and building relationships.

‘...at Headley Court you felt like you were part of a team’ (Vet FG6, p7)

‘The expertise that was at Headley, you know, with doctors, physios, prosthetists, it was all in one place as well. I found that really, really good. And everyone who was...there because they wanted to help.’ (Vet FG5, p3)

IDT: Joint Approach (Figure 11.6)	Process Enabler (for) <i>Connection</i>	IDT Organisational Culture – Equivalence (leading to peer support / working together / managing own healthcare). Clinical Coordination Roles (leading to Active Case Management). Proximity – Communication within IDT (leading to peer support - Networking beyond IDT – Need for transitional liaison.
	<i>Competence</i>	Philosophy of care – Black box thinking - Art of the possible – Holistic adaptable approach / Prosthetics /
	<i>Organisational culture</i>	Philosophy of care (2-way relationship) – art of the possible – IDT proximity (working together)
	Process Enabled (by)	Proximity –Continuity of leadership – Continuity of staff – Optimal staffing – PIRR – Continuity of care – Goal centred resourcing (via Philosophy of care).
IDT: Proximity (Figure 11.6)	Process Enabler (for) <i>Connection</i>	IDT Joint approach – Communication within IDT - Views of working together – Support for and from peers (leading to Trust – A Community of Suffering)
	Process Enabled (by)	Leadership – The setting - Optimal staffing – IDT approach

Table 11.6 Table of process enablers / enabled - IDT Joint Approach / IDT Proximity

Enabler. Veterans recognised that *IDT Joint Approach / Proximity* influenced the CT organisational culture (*IDT organisational culture; philosophy of care*) (Table 11.6). A sense of equivalence between clinicians and patients is evidenced in their willingness to experiment with ideas, even when unsure of the outcome. Descriptions of this interaction vary; at times the interaction is akin to coach and athlete; at others mimicking colleagues partnering in a project. Patients also learned to direct care as they progressed (*Patient Centred Goals*).

‘It’s collaborative, definitely...You dictate your pathway...you can kind of guide the way through. And that’s the good thing about this place.’ (Vet FG 1, p10)

Interdisciplinary joint working, particularly between physiotherapy and prosthetics, facilitated innovation (*Art of the Possible; Black Box Thinking*), but veterans also recognised *Proximity* and *Time* as enablers of this process.

'But it's even not just prosthetics, the physios. Going to the physio department, "Right, what's up?" "Well, my back's really hurting." And then you guys speak to the prosthetics people and go, "Right, let me try and tweak your sockets a little bit." And because that was all in one place. It was brilliant, it worked. But now you go out and you go and see your prosthetist and you're like, "My back's hurting," and they're like, "Oh, okay..." (Vet FG2, p32)

'But also, there was a...you know, particularly with my right leg, because it's such a short below-knee, they ...tried this almost quite antiquated corset sketch ...a few of us ended up getting. And it changed everything for all of us.'

'They were willing just to take risks, yeah.'

'I think that all comes from having the time to do it.'

'...it comes back to this personal relationship you've built with someone. And then you'd have the technician coming out going, "Right, what's not right," so you could talk to a person...' (Vet FG2, p40)

Enabled. *IDT: Joint Approach* was enabled by leadership, but importantly via continuity of leadership and staff and their proximity in enabling relationships to develop so that interactions flourished out of trust. *Proximity* was enabled by DMRC infrastructure (*setting*) as well as *Leadership, Optimal Staffing*, and the *IDT approach*.

'Consultants within...Headley they wanted me to be the best that I could be and as close to back to where I was before, whereas NHS, they would have just done enough so that I could manage.'

'And a lot of that is just a consequence of them being resource-constrained...I think the fact that we had the freedom at Headley to not be limited by...the time, money and effort to get the best results, whereas the NHS...is about efficiency and about money and about budgets...that drives your care pathway...and which one actually gets more productivity at the end of it?' (Vet FG3, p4)

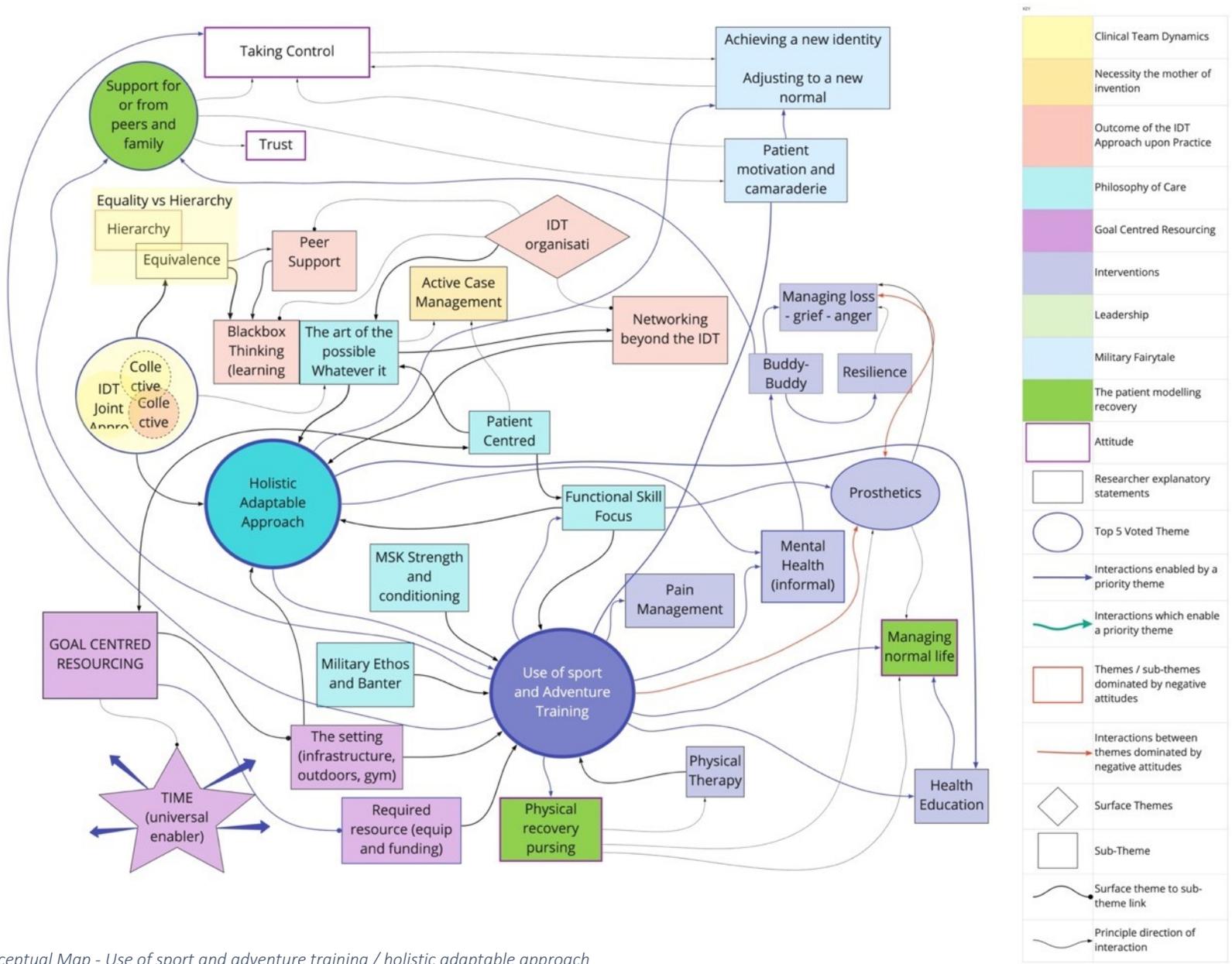


Figure 11-7 Conceptual Map - Use of sport and adventure training / holistic adaptable approach

5. Sport and Adventure Training:

Figure 11.7 illustrates the conceptual map for *Sport and AT* and *Holistic Adaptable Approach*. Battle Back was one provider of adaptive sport and adventure training. Whilst guided by clinical advice, it was organisationally distinct from the clinical service. The provision of adaptive sport and AT was seen by veterans as an important component of clinical provision.

Priority Theme: Sport and adventure training	
Enabler / Enabled	Direct interaction with
Process Enabler (for) <i>Competence</i>	Functional skill focus (leading to Prosthetics) – Managing a normal life – Physical recovery (pursing independence) –
<i>Autonomy / empowerment</i> <i>Connection</i>	Taking control – Patient motivation and camaraderie (leading to achieving a new identity – taking control) – adjusting to a new normal. Support for and from peers – Mental Health (informal) (leading to buddy buddy, managing loss – resilience).
Process Disabler (for)	Prosthetics
Process Enabled (by)	MSK Strength and conditioning – functional skill focus – physical therapy – Patient centred goals (via Required resource – The setting and functional skill focus) – IDT Organisational Culture (via Art of the possible – holistic and adaptable) – Trips – Military Ethos.

Table 11.7 Table of process enablers / enabled – Sport and Adventure Training

Enabler. Table 11.7 shows this priority theme principally enabled sub-themes relating to developing a capability (*competence*) to live with the demands of disability. It attached meaning to their rehabilitation as some discovered achievement and purpose within it. Sport was not the only activity facilitating this process, although it was the most often discussed ([Table 11.2](#)).

'...(talking about trips and social events at DMRC) (when) you are around the people you want to put the best view across. So, ...you make more of an effort in your physio sessions because you think right if I crack this today, I am going to be that much further on when I go to that, and I will enjoy it more.' (Vet FG 4, p12)

The *connection* formed with others on these activities encouraged a community of practice as they collectively faced the challenge of attending such events, taking part, and living outside of their usual routine and familiar settings.

'And the funny stories that came out of people... when it didn't quite go right...I think there is a massive part of adapting and understanding life with a disability. You are going to have to be adaptable, you are going to have to think outside the box, there are going to be loads of situations in your life where you are going to have to be a little bit smarter than the average... those situations, and sometimes even the naughty ones, we adapted and got on with life as young men with disabilities pretty well. And the humour in it that came out of it definitely helped be positive about being disabled.' (Vet FG4, p12)

Realisation that they could partake in challenging activities provided a renewed sense of autonomy. Developing skills in sports and other activities which they may not have considered or had the opportunity to previously try, contributed positively to a sense of identity, not defined by their injuries, but enabled by them. This was a critical step in accepting and adjusting to a new normal (*Loss / Grief / Anger / Adjusting*).

'when I was in Selly Oak, I didn't know what my world was looking like, but there was little subtle pictures on the wall of blokes doing stuff. And I thought to myself, "Oh, maybe I could do that," because there was a bloke skiing and there was someone swimming and something else... And then that continued when I got to Headley Court...it wasn't someone coming up to me, saying, "Oh yeah, you could do a swimming ...you could go skiing." It was subtle sort of hints that you could do stuff.' (Vet FG2, p22)

Lessons resulting from preventable injuries acquired during sport, for instance, skin breakdown, helped to teach veterans the importance of managing their own health (*Health Education – Managing Normal Life*).

Enabled. Incorporation of sport and AT within the clinical space reflected its use as a key element of military training (*Military Ethos*). Its inclusion at DMRC was driven by the collaborative approach and innovative approach of the IDT (*IDT Organisational Culture – Art of the Possible*) and the functional rehabilitation focus (*Holistic Adaptable Approach, Functional Goals*)

Process Disabled. MSK injury or soft tissue breakdown due to participation in sport, as well as complications from the original combat injuries sometimes prevented involvement in prosthetic rehabilitation. These complications taught the veteran about the importance of managing their own health. Sport could also be a distraction and hinder prosthetic progression.

'I concentrated so much on the cycling, I didn't really worry about walking too much, and I got to a level where I thought, "Ah, I can get around on my legs, that's fine,"...but I wasn't brilliant...I got it wrong, put all of my time into getting on that bike and trying to be the best cyclist I could be and I completely got it wrong. I should have concentrated more on walking.' (Vet FG5, p13)

6. Holistic Adaptable Approach

Holistic Adaptable Approach developed in recognition that treatment needed to utilise a meaningful biopsychosocial approach (Figure 11.7). This allowed the clinician to use activities that may not be defined

as ‘treatment’ but could yield social, psychological and/or physical benefit to the patient. In particular, the use of interest-based activities offered the opportunities patients may not have been able to pursue had they not suffered trauma. The inclusion of (not limited to) sport, horticultural therapy, yoga, arts-centred, and iron man activities could be found in patients’ timetables. Choices were determined by the patient.

‘I went and touched upon the charity golf and cycling. I guess I was rebellious against disabled sports...It just took me a while to come around to say it doesn’t matter if you need a bit of help...I went to the driving range, hit a ball, knew that I could do it...tried a hand bike and then...that spiralled ...opened the door to try other stuff, and just realised ... it is really enjoyable.’ (Vet FG5, p 10-11)

Priority Theme: Holistic Adaptable Approach	
Enabler / Enabled	Direct interaction with
Process Enabler (for) <i>Connection leading to</i> <i>Competence Autonomy / Empowerment</i>	Mental Health (Informal) (leading to Buddy Buddy – Resilience – Managing loss grief) Use of sport and AT - Achieving a new identity IDT Joint Approach (via Collective learning together / Equivalence – Blackbox thinking – Art of the possible)
Process Enabled (by)	Goal Centred Resourcing (via the setting - leading to patient centred goals - The art of the possible) Networking beyond the IDT Functional Skill Focus

Table 11.8 Table of process enablers / enabled – Holistic Adaptable Approach

Enabler. This priority theme was an enabler for sub-themes providing the patient with a combination of *Connection* to others; equipping (*Competence*) to manage their own recovery; *Empowerment* to pursue their choice of goal or activity (*Mental Health (Informal Treatment Options)*); and *Achieving a New Identity (Loss / Grief / Anger / Adjusting; Managing Normal Life (via Health Education))*.

‘But if it wasn’t for the Wednesday or evening activities like water skiing and stuff like that, I’d be probably sitting there thinking what job I am going to get, am I going to get a job in Tesco’s when I leave rehab or what. So yeah, it opened up another door that thankfully worked for me.’ (Vet FG5, p10)

Enabled. *Holistic Adaptable Approach* is principally enabled by themes facilitating an innovative approach (*IDT Joint Approach – Equivalence - whatever it takes; goal centred resourcing; collective learning together*) and by themes ensuring patient needs and goals are directed at a treatment plan (*Goal Centred Resourcing; (Patient Centred Goals), Functional Skill Focus*).

'...timeliness of it has a big impact... you suddenly jumped into a system that was created, that was there for you, that was very well-managed, that was holistic in its approach, so actually brought you into it and said, 'Okay,' it, kind of, normalised your injury.' (Vet FG 3, p10)

Veterans also voted on their current rehabilitation issues, as presented below.

Declared Veteran Issues

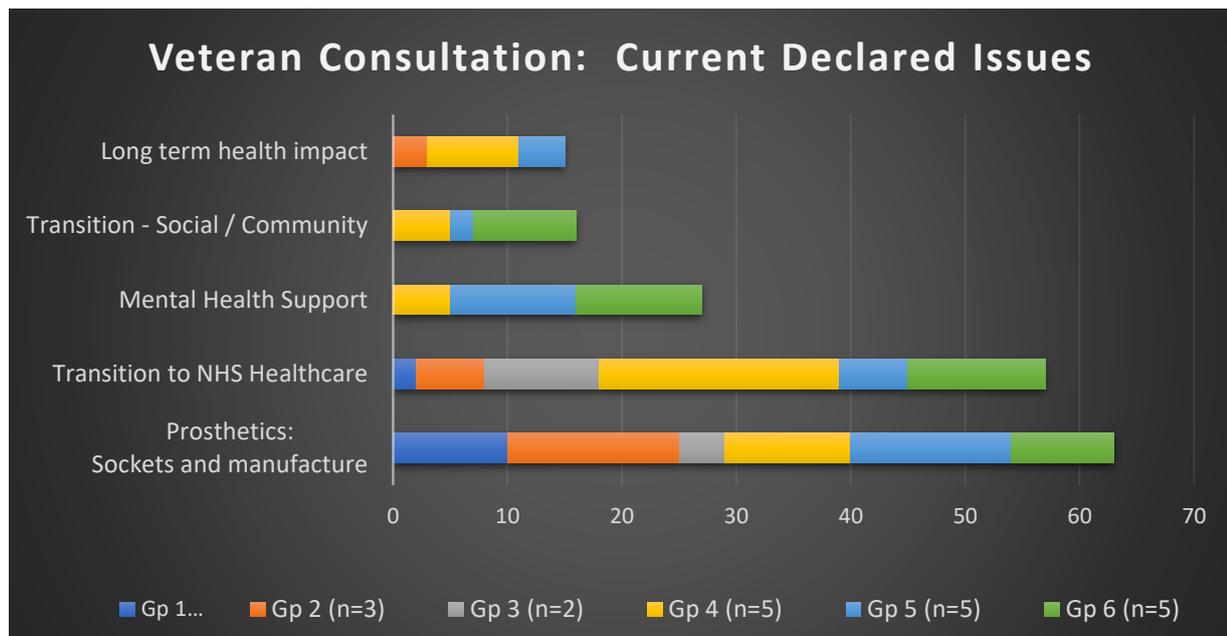


Figure 11-8 Declared Veteran Issues

Figure 11.8 displays the top five declared veteran issues. This vote was taken at the end of each focus group with the intent of capturing the elements of their recovery journey that remain a current concern. Two consistent issues were reported by all six groups; confirming the importance of prosthetics (specifically socket manufacture) and transition into NHS healthcare.

Attitudinal patterns

Current issues, priority themes, their links and thematic construction have illustrated areas of importance within the recovery process for the veteran. Clustering of sub-themes in [Figure 11.1](#) has also identified four cross-cutting categories which illustrate the importance of the organisational culture (philosophy of care) and the intrinsic needs of an individual (competence, connection, autonomy / empowerment). Clustering *enabling* sub-themes into cross-cutting categories (Table 11.3 – 11.8), helps to illustrate the role each plays in meeting the veterans' intrinsic needs, building explanatory accounts as to why particular themes gain prominence over others. For example, as noted, Table 11.3 lists the themes that enable prosthetics and

illustrate its role in generating a sense of competence in living with disability, empowering the patient with a sense of independence (autonomy) and providing connection with others.

This process relies upon coding *attitudinal patterns* as well, so that the role a theme plays identifies enablers and disablers of recovery. The conceptual map shows both positive (blue lines) and negative (red lines) interactions. Figure 11.9 is the exception and illustrates only negative interactions. These interactions are concentrated around three clusters, process, and approach (*Use of Hierarchy, Discipline, Clinician Continuity*), psychosocial impact upon prosthetics (*Adjustment, Pain and Hobbies*), and transition (*Healthcare, Employment*). Prosthetics and transition are also rated as veterans most significant *current declared issues* (Figure 11.8). Figure 11.9 would suggest that prosthetics arises as an issued due to its functional impact, but also due to its interrelationship with transition. Unusually, prosthetics also appears as a disabler of *Loss / Grief / Adjusting*.

Given the significance veterans placed on prosthetic provision in the rehabilitation process and as an on-going issue, further analysis of attitudinal coding of prosthetics and its process disablers is warranted. Raw data coded to themes highlighted as process disablers (*Loss / Grief / adjusting; Sport & AT; Pain Management; Transition with focus upon NHS / Healthcare*) were extracted. Data was placed into a framework to enable content analysis (Table 11.8).

Sub-themes connected with Prosthetics	Comments coded <i>Negative</i>	Comments coded <i>Positive</i>
<p>Loss, grief, and adjustment</p> <p><i>'The minute you accept something's happened to you, you can't do anything about it is the minute you can move on in life'</i> (Vet FG3, p16)</p>	<p>Loss of dignity and independence was significant I couldn't face the psychological aspect so focussed on physical. But some couldn't ignore their psychological injuries. Prosthetics replace legs but delay acceptance of their loss. I felt vulnerable and isolated on home leave.</p>	<p>Trips, sport, welfare activities helped me to be positive about disability. I didn't want sympathy, but military peers showed me empathy. Accepting the loss of my legs helped me move on, the example of others helped me. A consistent clinical role is like a coach, helping me get my life under control and find my purpose.</p>
<p>Pain Management (managing my medication)</p> <p><i>'You don't get educated enough on the drugs.'</i> Vet FG 5, p18)</p>	<p>Medication helped pain, but I lived in a fog. Clinical approach was unclear and weaning medication was too slow. I didn't understand why I was taking medication Medication stopped me retaining information, affecting my rehab How do we come off our medication after so long?</p>	<p>Coming off medication was like a cloud lifted and I could live again. Going cold turkey was the only way to gain control of the situation. Coming off medication was emotional Amputation gave me control so I could come off medication – then I got my life back</p>
<p>Military Ethos</p> <p><i>...you will parade here, you will do this x, y and z....I just thought this is bullshit. We all know the inevitable...I had given up.</i> (Vet FG 4, p10)</p>	<p>Discipline undermined morale. When clinicians kept changing, I gave up and asked to leave. We knew we had no future in the military, discipline caused more resentment, and made some more angry than they were. We needed accommodation which gave us more freedom and helped our transition.</p>	<p>Military ethos gave energy to the rehabilitation Lads together, we understood what was expected, it was familiar The military spirit left no stone unturned. Discipline gave important boundaries to young lads who had suddenly gone through huge trauma and were rediscovering themselves.</p>
<p>Transition (Civilian healthcare)</p> <p><i>'...you become over-reliant, over-institutionalised and, actually, you've got to make that transition back to the real world.</i></p>	<p>I feel like a number, they don't want to hear my experience. I find there is very little physio has to offer in the NHS. There is no collaboration between clinicians from different disciplines. They only think in their own silos. The isn't enough time for prosthetists to work out complex problems.</p>	<p>Positive veteran experiences of prosthetics exist where: A mutual relationship of support between amputee and prosthetic Prosthetic services accommodate employment demands of veteran. Provide responsive services enabling them to stay on legs Offer consistent treatment from the same clinicians Collaborate with other professions Seek to develop their knowledge.</p>

Table 11.9 Framework Summary of data coded attributed as process disablers of prosthetics

Prosthetic process disablers

A framework analysis of prosthetic process disablers provides both positive and negative statements jointly coded to both sub-theme and prosthetics (Table 11.8). Coded examples of data informing each summary statement can be found in [Appendix 26](#). Advances in prosthetic knowledge and rehabilitation training have already been acknowledged but these need to be contextualised beside the personal struggles many veterans report. Each sub-theme, *Loss / Grief / Adjusting*, *pain Management* and *Transition*, is now analysed in greater depth.

Loss / Grief / Adjusting. Statements coded to this sub theme refer to several causes of loss and the process of adjustment experienced. In relation to prosthetics, loss and the mental trauma suffered can act as a barrier to engaging with the process of rehabilitation.

'They were here, because their body said, 'I need to be here', but actually, mentally, upstairs they weren't ready...whether you could put that down to the trauma of what they've just been through, or whether it was medication, or whether it was something else...they weren't ready for physical rehab.'
(Vet FG 1, p1)

Focus on physical rehabilitation and prosthetics was helpful for some, and a welcome distraction for others, yet a distraction many reflected may have prevented them from facing the emotional consequences of their loss. All other statements focussed on the adjustments they faced in the immediate aftermath of their injuries, loss of independence and dignity. Veterans reported an initial scepticism about their chance of recovery, but a shift in perspective came as they met others with similar injuries and witnessed their progress. Messaging from the photographs on the walls, at DMRC, showing achievements of others in their situation has been mentioned, as have group therapy sessions, the belief bestowed by clinicians in them as well as camaraderie, banter, and competition between fellow patients. All these examples illustrate the importance of *Connection* as a cross cutting category. In this, the prosthetic was a tool that helped them normalise and find hope.

'...when (name) walked past my room in hospital and I called him back and spoke to him and saw his (prosthetic) legs, "Right, that's what I need to do."' (Vet FG 2, p16)

Some contrasted how they felt at DMRC surrounded by others in the same situation compared with a sense of isolation some recalled during home leave.

'...if you've had to deal with your injuries and the after-effect in isolation, then where do you get the ambition to set your standards higher, because ultimately, we all had someone who was just that step ahead.' (Vet FG3, p2)

Statements jointly coded with attitudinal themes of *negative or distrust* and prosthetics referred to the psychological journey for which many now admit they could not face. Prosthetics, physical exercise, medication, and diet were used as sources of comfort.

'... I think it's not a pursuit of legs from a prosthetic side, it's refusal to accept that their legs have gone... They're angry people because, yes, they're walking, but they can't accept...' (Vet FG2, p17)

'...mental wellbeing can actually have more of an adverse effect...when you're in a down place...you want to sit, eat shit food...you don't then heal properly...' (Vet FG 1, p36)

'I just wanted to walk and part of me thought maybe when I'm walking, my head will sort itself out...why did I survive and my mates didn't?...I didn't know that was what was causing me to be down and angry.' (Vet FG6, p14)

For some, the physical therapeutic approach and even prosthetics could undermine adjustment to loss when measures did not coexist to allow them to grieve. Terms such as 'seeking control', 'finding my new normal', 'feeling normal again' were commonly used by veterans. Prosthetics contributed to a sense of normality and control. When prosthetic setbacks were experienced (e.g., surgery, complications or wound infections) limiting them to wheelchairs, strong emotional reactions were evoked causing some to avoid admissions and disconnect with peers.

'You think, "Shit, I'm probably never going to walk again," because you're still in a wheelchair and everyone's walking around...' (Vet FG5, p1)

All groups acknowledged that such setbacks were now a part of their ongoing experience, requiring them to attend to their physical body; many also reflected on their wish to have had formal mental health support to equip them in psychological adjustment. Some received it but were reluctant to accept their need for it. For others, inconsistent staffing or a perceived impersonal approach put them off.

'...there was nothing mental health wise there. I mean, I think I mentioned it once and I got given a little iPod to listen to the rain or some waves.' (Vet FG 5, p22)

'...had an appointment with the CPN each time I went in to Headley which was good but at the time I was so focused on physical stuff, I was just, "Fine, I don't need any of this"...I look back and I go, I was so fucking wrong.' (Vet FG 6, p13-14)

This adjustment process was sustained through informal support rather than formal mental health treatment. When discussed, formal mental health treatment / support was associated with negative or distrusting attitudes (Figure 11.10) perceived as impersonal or lacking continuity due to high staff turnover.

'...You're taking a ridiculous amount of drugs. You don't know where you are, what you're doing...then you have this one questionnaire...scrawl it real quick, and there's no follow-up... ..having it that early on and then having nothing after that I think is a mistake.' (Vet FG 3, p22)

'So after being asked three times whether I wanted to self-harm, or commit suicide, I fucking did (laughter)... Rather than being spoken to and to assess what your thoughts are about by a professional, it was three bits of paper which were easy to bluff.' (Vet FG 2, p4)

'I remember seeing it was nine different people (CPNs), to the point I just thought, "Do you know what?' (Vet FG 6, p 13)

Informal treatment included peer support, buddy buddy, support from trusted clinicians or activities such as horticultural therapy, yoga and interest based holistic activities. Informal mental health treatment / support was generally associated with positive and trusting attitudes (Figure 11.10).

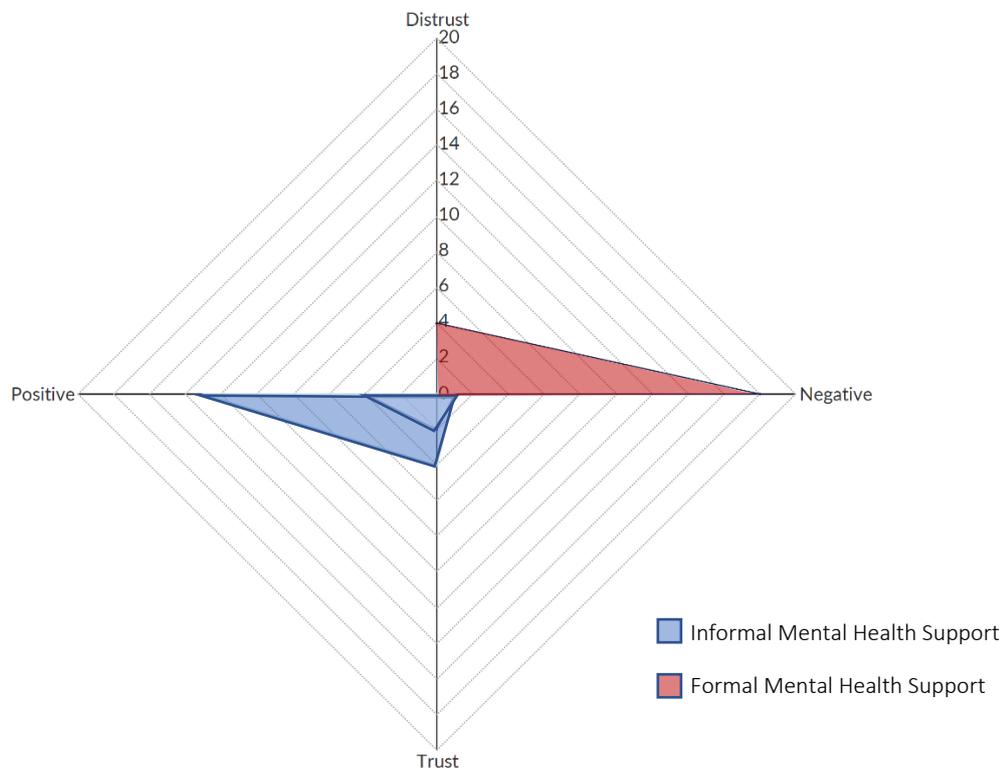


Figure 11-10 Reference count of data coded to both mental health formal / informal support and veteran attitude

Pain Management. *Pain management* and *managing medication* has already been used as an example showing the role of peer support. It is a highly referenced theme reported in all six focus groups ([Table 11.2](#)); when statements were also coded to prosthetics, participants displayed the impact pain medication had on their skills and rehabilitation ([Table 11.8](#)). Their dilemma was whether the medication was effective in controlling their pain and whether they really needed it. As noted, most took radical steps to regain control and following encouragement from others.

'I was on my pain meds for 15 months, but probably after about eight or nine months I realised I was only taking them because it was 8 o'clock at night or 8 o'clock in the morning.' (Vet FG 1, p3)

Veterans' attitudes towards medication and pain management were largely coded as negative and distrusting.



Figure 11-11 Reference count of data coded to both pain management / managing my medication and attitude

Most interviewees report going 'cold turkey'; one described the challenges he faced being unable to come off medication ([Appendix 25](#)). This is the only account capturing the complex interaction between mental health issues, medication, and the social impact when management is not coordinated, and an individual is isolated. Discussion around pain management illustrated how individuals recognised their military heritage caused them to follow direction given by clinicians; they recognised the complexity of their situation, but as they connected within a peer group, they felt more confident to experiment despite the uncertainty. This can be seen in the following extracts taken from focus group 1:

'I didn't question that system because I'm in the military and actually I trust that people know best for me.' (p 1)

'...that medication thing, clouds that judgement' (p8)

'...it just didn't seem right. Intuitively, when you're going through it, for the medical profession it is the prescribed way ...But, when you're living it, you're like, 'no, I want to be off it tomorrow...it seems the most intuitive thing to do. (p9).

'...if you're just taking a step into the unknown going, I don't know what's going to come from this, that can be psychologically hard... (p8)

'...When I was here (Headley), there must've been nearly 20 amputees and all of them went, 'nah go cold turkey man, that's the way ahead'. (p8)

'...as soon as I stopped all my medication, all my phantom sensation stopped. I didn't get any. And I'm on no medication now. (p8)

'...from a clinician's standpoint they're looking at it solely from a medical standpoint... our output is always...more personal. (p8)

(Extracts from FG 1, p1-9)

Transition.

Transition was a significant topic of discussion for veterans, and transition of healthcare was singled out as a current ongoing issue (Figure 11.8). A count of statements coded to both *Transition: Healthcare* and *Attitude* found most were coded as negative (n=37) or distrustful (n=11), as opposed to positive (n=6) or trusting (n=1) (Figure 11.12).

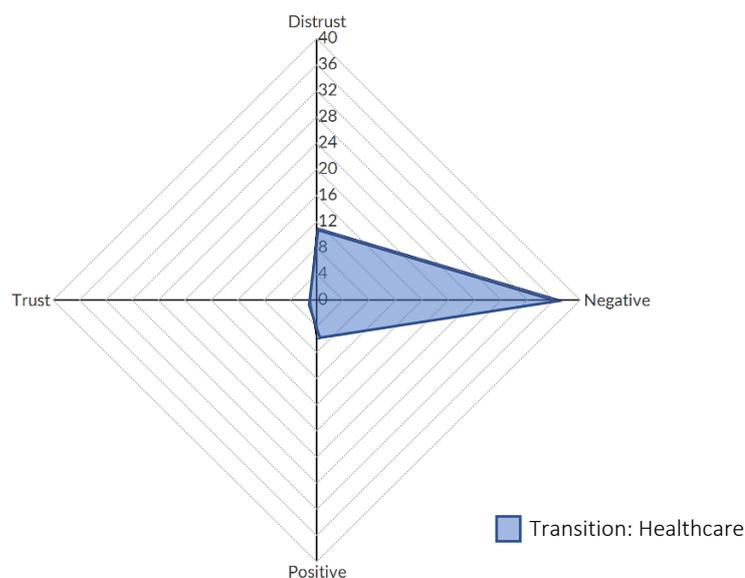


Figure 11-12 Reference count for 'Transition: Healthcare' and 'Attitude'

Negative sentiment aimed at transition arose from the following four experiences, reported across all groups:

1. Unprepared for civilian life (lacking competence):

'Headley had such a focus on the physical attainment, that became the defining factor as to whether you were well enough to go out into life, whereas, actually, they didn't equip you with all the other stuff, necessarily, and that was, kind of, left to third parties.' (Vet FG3, p25)

2. Feeling abandoned (disconnected):

'The med board...felt quite an oppressive process. Not just that you were getting churned out by the machine... panic that came with that of, have I got everything I can from Headley ...support ...sockets?...then you do the transition and realise how drastic the drop off is...' (Vet FG 3 p14).

3. Out of control (lacking autonomy):

'... they treat the fact that you need prosthetics as a luxury item. You've got your fucking legs, now I need my fucking legs as much as you do. We've got stuff to get on with. It's not a luxury, it's not, "Oh, you should be grateful for the service you get." No, it's not that. And then they turn round sockets that aren't good enough, and they say, "Oh, we're over-stretched"' (Vet FG 2 p37)

4. Transition service was disconnected from rehabilitation provision (Organisational culture):

'...having the injuries, you've got makes (transition) a little bit more difficult...and it's scary...but would that be considered one of Headley's responsibilities as a rehab, or actually has it gone beyond the scope of that to the PRUs and the units to manage that? And that's the grey area...I don't know if that transition to the PRUs and away from Headley control, was that well-managed.' (Vet FG3, p13-14)

Transition into healthcare (prosthetics). Prosthetic provision remains veterans' key ongoing issue (Figure 11.8). Veterans recognised the recovery they had made and their reliance upon prosthetics to maintain independence. For those content with civilian prosthetic provision, they report positively on the following:

1. A sense of mutual partnership:

'it comes back to this personal relationship you've built with someone...the technician coming out going, "Right, what's not right," so you could talk to a person.' (Vet FG 2, p40)

2. Consultant – as leader:

'...he understands me, and I understand him... We talk honestly...it's all about getting to know people personally.' (Vet FG 1, p26)

3. To be known – to be looked out for.

'If I needed an appointment she'd get me in in the next few days ...she was pretty quick turnaround on the sockets...She'd do like they do at Headley. (Vet FG 5, p34)

4. IDT collaboration and problem solving.

'I can remember being in the gym...seeing (name) (ERI) with my prosthetist, ...squatting quite a heavy weight ...and I wanted to go heavier, but there were no legs to do it... So...working (with ERI and prosthetics) ...I ended up with this leg... the gym is the best place to work side by side and with sporting physios' (FG 4, p33)

5. Organisational culture.

'...the wheelchair people and the prosthetics all on one site, like a mini-Headley Court.' (Vet FG 4, p28)

However, as noted in earlier quotations, prosthetic provision is also a highly emotive subject where veterans did not feel their civilian service experience was positive. As a military population it has been shown that they had immense power to influence service provision. Now as a small complex population spread across multiple centres, they no longer retained the critical mass to influence their situation nor to ensure clinicians become familiar with their clinical and cultural needs.

'... we're quite a small population that has high expectations, and we've just been lost within the system... So, I think it's not surprising that the system can't accommodate those individuals... My prosthetist has got 1,500 patients on his list. I'm one of them, so why would he invest the time and the energy to discover the new sockets that I've got, how to deal with the leg (Vet FG 3, p19-20)

High expectations arose from the individualised care received and was further heightened by the active lives they had achieved, knowing that as they aged, capacity to walk on prosthetics diminishes.

'I know there will be a time where I will be stuck to my wheelchair and it's all about trying to push that time further and further down the line. (Vet FG 1, p32)

Yet, maintaining high activity on prosthetics requires a good socket fit. Failure to achieve this, is their principle reported concern as it reduces their comfort when walking, causing them to adapt their gait and minimise time on prosthetics. Upright ambulation therefore declines due to loss of fitness, or musculoskeletal injury from altered walking patterns. The psychological impact of being in a wheelchair may also affect wellbeing. These accounts identify the biopsychosocial impact and potential long-term consequences when unable to access simple prosthetic adjustment or satisfactory socket fit.

'There was an element where sometimes you almost feel to be a bit of failure if you did use a wheelchair for something. (Vet FG 2, p17)

'Now if you have a problem with your sockets...it is 2-3 weeks...back in my wheelchair...until the socket gets sorted.' (Vet FG 3, p27-28)

'And then that goes to more problems, doesn't it, back problems and all that sort of stuff.' (Vet FG 5, p5)

The heavy reliance upon prosthetics services was consistent across all groups, although experiences were variable. Five groups presented largely negative reports of their prosthetic experience; however, one group was largely positive. A framework has been produced to examine these differences (Appendix 24); Table 11.9 presents a summary of them. Positive and negative statements were grouped according to the cross-cutting categories of *Autonomy, Connection, Competence, and Organisational culture*. *Organisational culture together with consultant leadership* reportedly set the tone of the unit. In [Appendix 26](#), veterans associate positive features of the NHS with their experience of DMRC Headley Court.

'...like a mini-Headley Court...' (Vet FG 4, p28)

Where a connection or mutual partnership is perceived with their prosthetist, the veteran reflects positively about the service. This partnership offers the veteran greater autonomy to ensure prosthetic provision furthers their connection into wider society. Equally, when they feel disconnected from their clinician, or even ignored, statements are highly negative and distrusting.

'I started playing rugby, I came in and said look I have researched this leg...it is going to do this for me, and instead of turning around and saying well have you thought ... she just said right I will do my best and I will get it for you, and then I have got it.' (Vet FG 4, p29)

'So, I'm now still stuck, four years I've not had an appointment. I've got the same bloody socket, about five socks on, leg's due a service two years ago.' (Vet FG5, p34)

Focus group 4 identifies the veteran community which developed within their prosthetic centre, offering a mutual connection, but their sense of belonging, was reliant upon how they were treated by the staff in the centre, and the trust between them.

'They care. The funding goes through straight away. You don't go to the bottom of the pile. I am quite a priority there...' (Vet FG5, p36)

Summary of statements relating to civilian NHS prosthetics	
Focus Group 1, 2, 3, 5, 6	Focus Group 4
Mutual partnership (connection / autonomy).	
<p>Civilian prosthetics do not seem to appreciate how important our prosthetics are to us.</p> <p>NHS Prosthetics are over stretched and under resourced to offer support for highly active complex amputees.</p>	<p>A mutual relationship of support and understanding grows between amputee and prosthetist</p> <p>The veteran recognises the pressures on their clinician supporting their service planning ahead, researching options.</p>
The consultant as the leader: Setting the tone for the rest of the service (organisational culture).	
<p>The consultant is notable by their absence.</p>	<p>The consultant is present and accessible. They take an active interest in their patients</p>
To be known, to be looked out for (connection).	
<p>I feel like an inconvenience sat in a room for 2 hours while they fit me around other patients.</p> <p>I see different prosthetists, wait weeks for the socket and then it doesn't fit so we start again.</p> <p>There is no care in the way you are treated.</p> <p>Military amputee is prosthetically complex, uniquely funded, they don't get us, understand our prosthetics or our needs.</p>	<p>Prosthetic services know their patients and help minimise disruptions, solving issues as quickly as possible.</p> <p>Consistent staffing: I know my prosthetist, and they know me. We have built trust.</p> <p>I matter to them.</p> <p>The have learnt what veterans are like and take time with us.</p>
Interdisciplinary collaboration supports problem solving (competence).	
<p>Professional isolation means the prosthetist disregards MSK issues which affect my walking.</p> <p>Provision is fragmented, they look at one component in isolation and so complex issues are unresolved.</p> <p>They don't listen to my experience.</p>	<p>There is open collaboration between professions.</p> <p>ERI, prosthetists and physio's work together with the patient to work out solutions.</p> <p>The technician is part of the clinical process.</p>
Organisational Culture	
<p>I couldn't access adequate prosthetics so made my own adaptations – decided to have osseointegration</p> <p>They are very risk averse – don't like us to push boundaries</p> <p>I am careful how I speak, people are easily offended</p>	<p>Its like a mini Headley with all services in one place.</p> <p>The are willing to help and get me in asap. If I have an issues they are there to support me.</p> <p>They understand the military and help us to find solutions to stay active and involved in sport.</p>

Table 11.10 Summary framework of data coded to prosthetics relating to civilian prosthetics services.

In negative accounts, a sense of belonging is absent.

'I think it's not surprising that the system can't accommodate those individuals ... My prosthetist has got 1,500 patients on his list. I'm one of them, so why would he invest the time and the energy to discover the new sockets that I've got, how to deal with the leg.' (Vet FG 3, p19)

The consultant is a prominent figure in Focus Group 4 and when veterans refer to their military rehabilitation experience. Knowing their consultant, knowing they are committed to them enabled trust in their leadership.

'(Consultant) said I might know you for the rest of your life, or you might know me for the rest of mine... it really knocked the wind out of me... you think, it is bloody important (to) have got a good relationship.' (Vet FG4, p36)

They recount their military rehabilitation experience, and IDT collaboration at DMRC. They acknowledge their complexity and co-dependency between MSK health and prosthetic ability. Criticism of civilian services identifies how a single disciplinary approach is often taken, and so preventable issues which lie beyond the scope of practice of one discipline are ignored, compromising their prosthetic use.

'...you go and see your prosthetist ... "My back's hurting," and they're like, "Oh, okay..."...They're (only) looking at it from a prosthetic view' (Vet FG 2 p32)

Transition was described as a traumatic process, and for some it is still ongoing. Transitional issues, in part arise from different treatment cultures in military and NHS settings, leaving veterans unsure how to navigate the NHS. [Figure 11.9](#) presents the negative interactions caused by transition which potentially undermined psychosocial adjustment and prosthetic provision.

'I think the period of time in which it takes for you to fully transition is massively underestimated ...all your physical might start coming together after two years at Headley. Then you go through the process of leaving the military, leaving Headley, and you've got that first 12-18 months where you're adjusting to life. So, you're three-and-a-half year's post injury. Then a year down the line, everything's going to change again, and another year down the line, everything will be different again, and from start to finish, I, even now, six years later... I now still feel like there are things that will change to complete my transition to being a real adult.' (Vet FG 3, p35)

Veterans did not understand NHS treatment culture, and some felt NHS clinicians did not understand them. A transition period was proposed in which military and civilian clinicians would liaise. For the veteran, this offered a safety net if systems of care were lacking, and a familiar place to go, if they struggled. It also placed a requirement on military services to actively support civilian providers to understand military culture.

'...there's a date where you're no longer full-time Headley...but if there were, a six-month crossover where ...as a veteran you can access certain services ...get in contact... if the NHS side were letting the side down... then that would make things a bit easier...' (Vet FG3, p17)

Some prosthetic centres had actively sought to bridge this cultural gap.

'They're learning. When I first went there, they were not that great. But they do try...' (Vet FG5, p38)

This was not the experience of others; some veterans felt abandoned, misunderstood, and angry.

'I was stuck at this dreadful prosthetics centre, ... I went to (name) and said look I have been given this, I need a socket on it...(after) a year and a half, still haven't got my blade back...' (Vet FG 4, p16)

'...it's nothing to do with missing the military, it's to do with needing a service provided, which allows you to just get on with life and that's all that we're after, is to just get on with life. At the minute, the NHS are just frankly failing.' (Vet FG2, p42)

Summary of Qualitative Findings

Qualitative findings from a cohort of 22 veterans provide an account of military rehabilitation and recovery following traumatic limb loss. Surface and priority themes provide an overlay of the principal components of rehabilitation, whilst discussion of these components illustrate their positive and negative features. The interactions between these features and key components such as prosthetic provision have been presented as enabling or disabling actions. In so doing, four cross cutting categories have been recognised: *connection*, *competence*, *autonomy*, and *organisational culture*. They are found across the conceptual map interwoven throughout each theme. Accounts of rehabilitation can therefore be understood as a narrative of an individual's pursuit to achieve connection, competence, and autonomy, whilst organisational culture enables or disables the pursuit of these needs.

This theoretical view has been applied to prosthetics, as both the most highly rated component of rehabilitation and ongoing veteran issue. Surface and priority themes have been shown to enable an individual to develop competence in this skill, but competence also arose from the sharing of practice between patients and group working. These group activities enabled connection with others. Sharing of practice, and individual examples of achievement within this community helped individuals to gain a sense of autonomy despite their disability. This dynamic was facilitated by organisational culture, with its emphasis upon group therapy, interdisciplinary teamwork, innovation, and goal centred resourcing.

In the following section, quantitative data yielded from veterans of Afghanistan as part of the ADVANCE study will be used to verify these qualitative findings by establishing the outcomes achieved by those who

have suffered limb loss. To date, no definitive physical, psychological, and social outcomes have been published from this cohort. To do so, contextualises the qualitative findings by enabling comparison with a similar population. Previous research and veteran accounts in this study suggest personal, demographic, and clinical characteristics may influence outcome. These will be explored using outcome data. Finally, concerns voiced about current prosthetic provision and its functional impact will be examined. Study findings will be referred to as the *qualitative study*; quantitative findings will be referred to as ADVANCE.

Verification: ADVANCE Baseline Data

Three forms of verification were used to corroborate veteran group data. First, during each focus group the researcher verified what he was hearing from participants, as well as verifying conclusions made in previous groups with the current group. Appendix 26 presents a transcript portion as an example. Second, independent statements coded to the same theme or sub-theme, presented in frameworks, were compared and their interpretation and allocation to themes independently scrutinised. Third, key themes and findings have been contextualised and triangulated against functional testing and questionnaire data from the ADVANCE study. ADVANCE baseline data provides a generic picture of outcome across a wider military amputee population (n=157). Three principal outcomes will be presented:

- Physical functional outcome.
- Psychosocial outcome.
- Evidence of holistic recovery and quality of life outcome.

In line with the iterative approach in the qualitative study, a similar exploratory approach has been taken with ADVANCE data. Baseline data will be used to explore demographic and injury characteristics of the limb loss cohort. Quality of Life (QoL) will also be presented comparing limb loss subgroups and non-injured controls. QoL dimensions will highlight the importance of mobility in this cohort. For this reason, physical functional outcomes will be presented comparing limb loss subgroups, (unilateral, bilateral, and triple) against non-injured controls. Variance in outcome and injury presentation within each subgroup, together with a small sample size makes sub-group comparison difficult. The limb loss cohort will therefore be divided into two groups, community walker and non-community walker, using 6-minute-walk distance (m). Differences in injury severity, prosthetic outcome, physical activity data and body mass index will illustrate the benefit of categorising complex injuries according to function rather injury demographics.

Psychosocial outcome will be compared with walking function and limb loss. Given the emphasis placed upon socket comfort during focus groups, associations between socket comfort and residual limb pain will be investigated more fully; its relationship with prosthetic functional outcome in the bilateral limb loss group will also be presented.

Parameter	Amputee Groups				Uninjured Control
	UNI	BI	TRI	Total Amputees	
Number	82	63	12	157	157
Mean Sampling Age	24.00 (±4.5)	26.0 (±4.8)	24.8 (±4.8)	25.4.(±4.6)	25.0 (±4.1)
Mean Assessment Age	32.96 (±4.5)	33.1 (±4.8)	32.08 (±4.3)	32.95 (±4.6)	32.68 (±4.2)
Smoking Status					
Non-Smoker	39 (52.7)	27 (48.2)	5 (50.0)	71 (50.7)	50 (37.6)
Previous Smoker	23 (31.1)	17 (30.4)	4 (40.0)	44 (31.4)	46 (34.6)
Current Smoker	12 (16.2)	12 (21.4)	1 (10.0)	25 (17.9)	37 (27.8)
Military Rank					
Other Ranks	39 (47.6)	28 (44.4)	8 (66.7)	75 (47.8)	45 (28.7)
Junior NCO	30 (36.6)	18 (28.6)	2 (16.7)	50 (31.8)	84 (53.5)
Senior NCO	8 (9.8)	10 (15.9)	1 (8.3)	19 (12.1)	14 (8.9)
Officer	5 (6.1)	7 (11.1)	1 (8.3)	13 (8.3)	14 (8.9)
Years of service	9.00 (6.00-12.00)	9.00 (6.50-11.50)	9.00 (6.50-11.50)	9.00 (6.00-12.00)	11.00 (8.00-14.00)
Military Role (deployed)					
Combat	68 (82.9)	53 (84.1)	11 (91.7)	132 (84.1)	129 (82.2)
Combat Support	6 (7.3)	6 (9.5)	-	12 (7.6)	6 (3.8)
Combat Service Support	7 (8.5)	4 (6.3)	1 (8.3)	12 (7.6)	22 (14.0)
Working					
Yes	63 (81.8)	46 (74.2)	9 (75.0)	118 (78.1)	150 (97.4)
No	14 (18.2)	16 (25.8)	3 (25.0)	33 (21.9)	4 (2.6)
BMI (adjusted)	28.0 (26.16-31.1)	28.7 (25.24-31.8)	29.3 (23.48-32.24)	28.71 (25.78 – 31.6)	27.35 (25.06-29.77)
Lives Alone					
No	72 (87.8)	48 (76.2)	8 (66.7)	128 (81.5)	136 (86.6)
Yes	10 (12.2)	15 (23.8)	4 (33.3)	29 (18.5)	21 (13.4)

Table 11.11 ADVANCE Amputee Cohort Demographics

Abbreviations: UNI, unilateral amputee, BI, bilateral amputee; TRI, triple amputee; NCO, Non-commissioned officer; BMI, Body Mass Index

NOTE: Data is median (IQR) or as a n (%). Other than age, all data was non-parametric.

Demographic Data

Demographic data of veteran group participants (Table 11.1), ADVANCE exposed (amputee) and ADVANCE non-injured control populations (Table 11.11) show comparability in age, injury presentation and rank range. ADVANCE exposed participants and veteran group participants were able-bodied members of British Forces on active service prior to sustaining injury. Both study populations are drawn from the same patient group who experienced limb loss between 2006-2014, completing their rehabilitation at DMRC Headley Court during the same period.

ADVANCE Demographic. Exposed participants were male (n=157) and compared with a uninjured military male control population, frequency matched for rank and age (n=157) [196]. Limb loss included unilateral lower limb (n=82), bilateral lower limb (n=63), and triple amputation (bilateral lower limb with a single upper limb trans-radial amputation or higher) (n=12). All case participants were injured during combat in Afghanistan.

Qualitative Study Demographic. Study participants included 23 males and one female. Fourteen participants (56%) had volunteered for ADVANCE. Limb loss included unilateral lower limb (n=9), bilateral lower limb (n=12) and triple amputation (n=3). Participants were injured in combat operations in Afghanistan (n=21), Iraq (n=1), and military duty (unspecified) (n=2).

Analysis of ADVANCE data sought to establish if thematic trends from the veteran group data, such as prosthetic function, psychosocial and physical recovery existed across this larger study population. In particular, the analysis sought:

1. To quantify physical, psychological and QoL outcomes across this population;
2. To establish if an association between prosthetic outcome, QoL and psychological outcome exists;
3. And to explore if statistical data exists to support qualitative reports of deteriorating prosthetic function.

Parameter	Amputee Groups			Total Amputees	Uninjured Control
	UNI	BI	TRI		
NISS (Mean / 95%CI)	24.14 (20.65-28.12)	47.06 (42.85-51.11)	54.56 (47.56-61.67)	37.01(33.48-40.54)	n/a
EQ5D-5L Index (0.00-1.00)	0.768 (0.684-0.877)	0.751 (0.666-0.837)	0.735 (0.701-0.939)	0.767 (0.681-0.848)	0.837 (0.74-1.00)
6MWD (m) (Mean / SD)	516.86 ±131.32 (260-777) (n=72)	320.67 ± 208.92 (190-685) (n=58)	313.67 ± 208.03 (269-610) (n=9)	421.85 ± 197.96 (190.00-777.00) (n=139)	614.58 ± 120.91 (420.00-864.00) (n=137)
AMPPRO	45±3 (31-47) (n=60)	36±14 (6-46) (n=51)	38±9 (22-45) (n=9)	41±11 (6-47) (n=120)	n/a
SIGAM					
A-C	2 (3.3)	7 (13.7)	1 (11.1)	10 (8.3)	n/a
D-E (Outdoor / Aid)	20 (33.3)	25 (49.0)	4 (44.4)	49 (40.8)	
F (Outdoor / No Aid)	37 (61.7)	16 (31.4)	4 (44.4)	57 (47.5)	
GAD-7 (Anxiety)					
Score 0-9	61 (84.7)	52 (86.7)	9 (100)	122 (86.5)	115 (83.9)
Score 10-21	11 (15.3)	8 (13.3)	0 (0)	19 (13.5)	22 (16.1)
PHQ-9 (Depression)					
Score 0-9	55 (76.4)	55 (91.7)	9 (100)	118 (83.7)	108 (78.8)
Score 10-27	17 (23.6)	5 (8.3)	0 (0)	23 (16.3)	29 (21.2)
Socket Comfort Score					
0-6/10	22 (32.4)	28 (56.0)	2 (25.0)	52 (41.3)	n/a
7-10/10	46 (67.6)	22 (44.0)	6 (75.0)	74 (58.7)	
Prosthetic Satisfaction Score					
0-6/10	19 (26.4)	25 (41.7)	1 (11.1)	45 (34.6)	n/a
7-10/10	49 (68.1)	28 (46.7)	8 (88.9)	85 (65.4)	
Metabolic minutes per week (IPAQ) (median / IQR)	(n=63)	(n=42)	(n=9)	(n=114)	(n=135)
Total Vigorous Activity	840 (0-4480)	960 (0-3780)	560 (0-2880)	900 (0-4320)	2302 (520-4980)
Total Moderate Activity	3540 (720-7560)	1448 (263-4605)	1800 (630-3840)	2790 (480-5411)	2402 (866-4080)
Total Walking	2475 (693-4851)	1386 (0-3304)	2228 (132-4851)	1683 (198-4158)	1881 (800-3341)
Total All Activity	7785 (3432-15132)	5564 (1813-9934)	6104 (2301-11122)	6723 (2967-13443)	6543 (3345-11927)

Table 11.12 Summary table of ADVANCE objective measures illustrating functional outcome. Abbreviations: UNI, unilateral amputee, BI, bilateral amputee; TRI, triple amputee; Aid, Walking Aid; m, metres; Sev, severity; Freq, Frequency; IPAQ, International Physical Activity Questionnaire. Non-parametric data is presented as a median (IQR) or as a n (%). Parametric data is presented as a Mean and 95% Confidence Interval (95%CI) or Standard Deviation (SD).

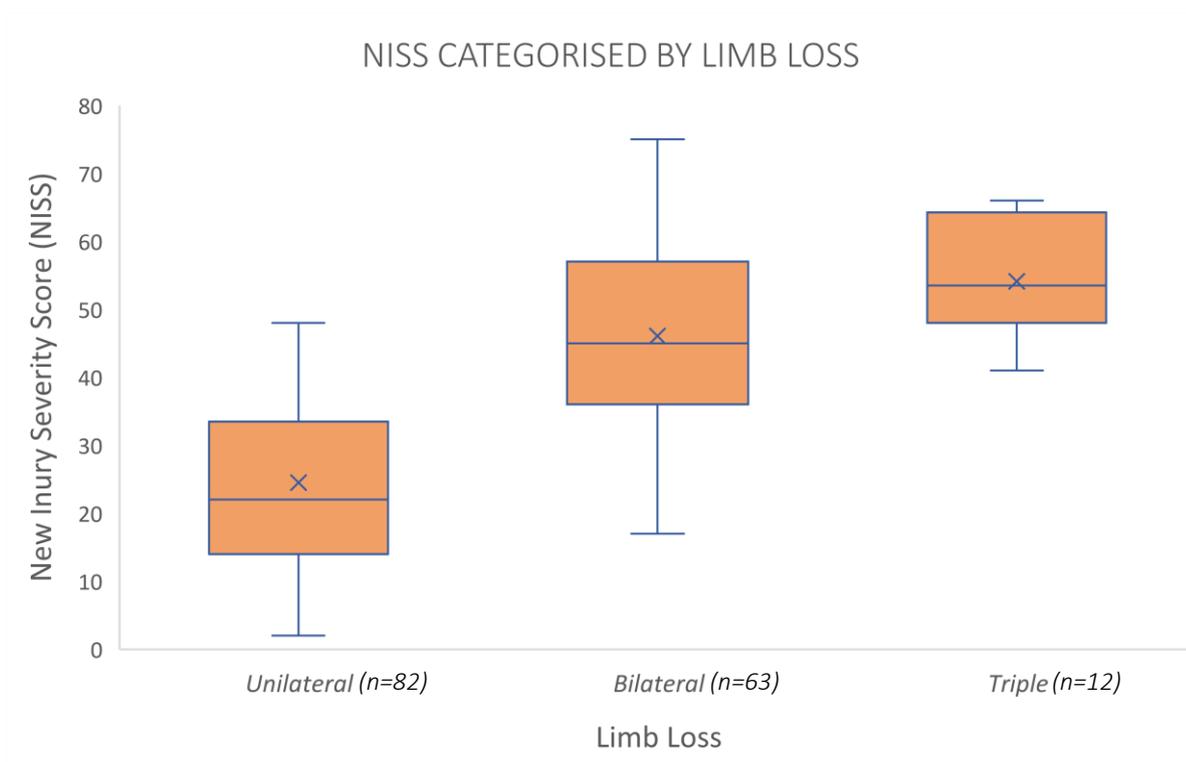


Figure 11-13 NISS compared with number of amputations

QoL, physical, psychological, and social outcomes.

Injury severity. A high mean New Injury Severity Score (NISS) of 37.01, 95% CI (33.48-40.54) was found for this population which compares with comparative NHS and DMS trauma scores from Iraq (Table 2.1). NISS is calculated by adding the square of the three most severe injury scores (according to the abbreviated injury scale (AIS)) [468]. Given the extensive wounding following blast injury, it is possible that injury severity may not capture amputation, as could be the case with the two outliers with a unilateral amputation seen in Figure 11.13. A Spearman rank order correlation confirmed a strong association between NISS and number of amputations ($r=.682$, $p<0.001$) (Table 11.11).

Quality of Life. QoL index is calculated from scores attributed to five dimensions making up EQ-5D-5L (*mobility, self-care, usual activity, pain /discomfort, depression /anxiety*). Participants score each dimension using a 5-point Likert scale ((1) no problem, (2) slight problem, (3) moderate problem, (4) severe problem, (5) extreme problem). This enables an exploration of overall perceived QoL in each dimension. The amputee cohort reported a significantly lower median QoL index score when compared with the uninjured control population (0.77 vs 0.84, $p<0.001$).

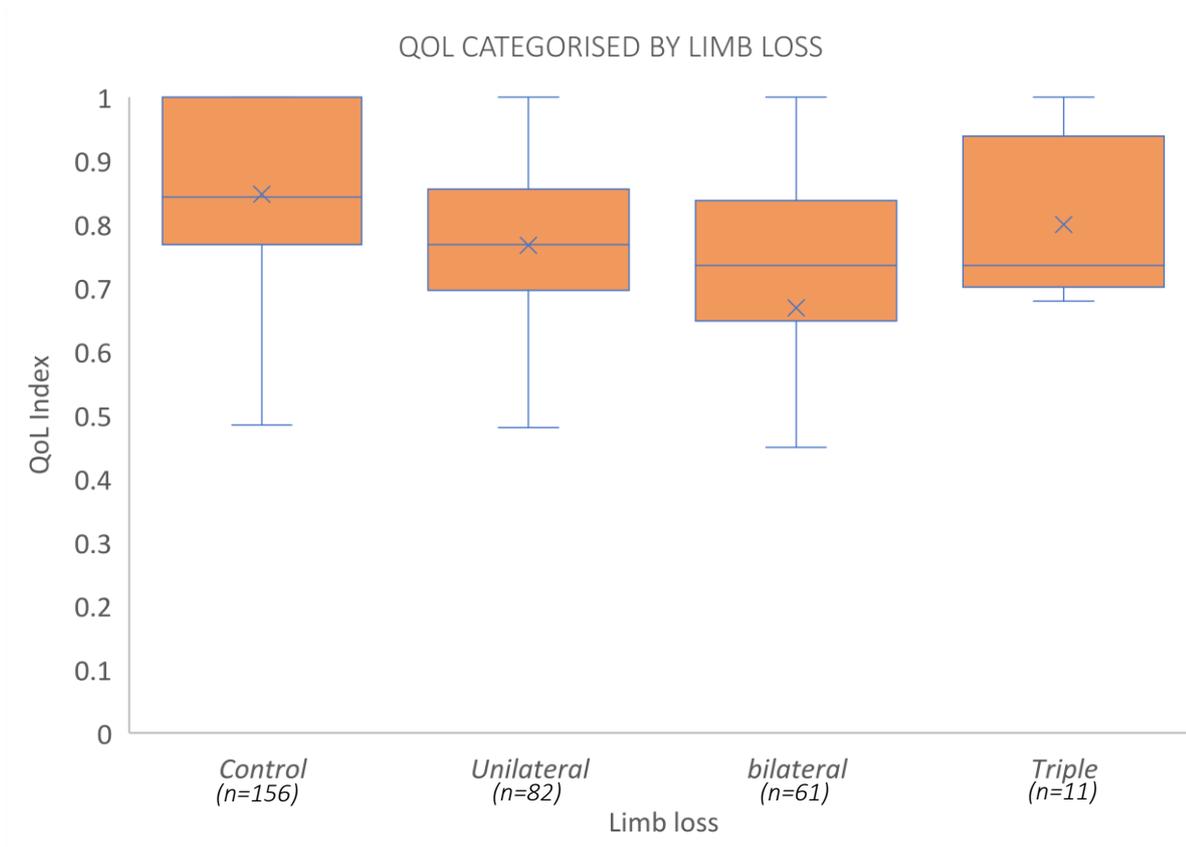


Figure 11-14 Comparison of QoL Index between amputee groups and control

Using a Kruskal Wallace H test statistically significant differences in median QoL index scores between uninjured control group (n=157), unilateral (n=82), bilateral (n=61), triple (n=11) amputee groups were observed ($p < 0.001$). A post hoc Mann Whitney test adjusted using a Bonferroni correction found statistical significance arose between unilateral amputees and control (M=.768 vs .872, $p = 0.001$) and bilateral and control (M= .735 vs .872, $p < 0.001$) groups only.

Figure 11.14 displays graphs showing between group comparisons of percentage scoring for each dimension of EQ-5D-5L. Differences between groups noted for *mobility*, *usual activity* and *pain / discomfort* dimensions were confirmed using a Kruskal Wallace test for mobility dimension ($p < 0.001$); usual activity dimension ($p = 0.006$) and pain discomfort ($p = 0.001$), but not *self-care* ($p = 0.453$) or *depression / anxiety* ($p = 0.892$) dimensions.

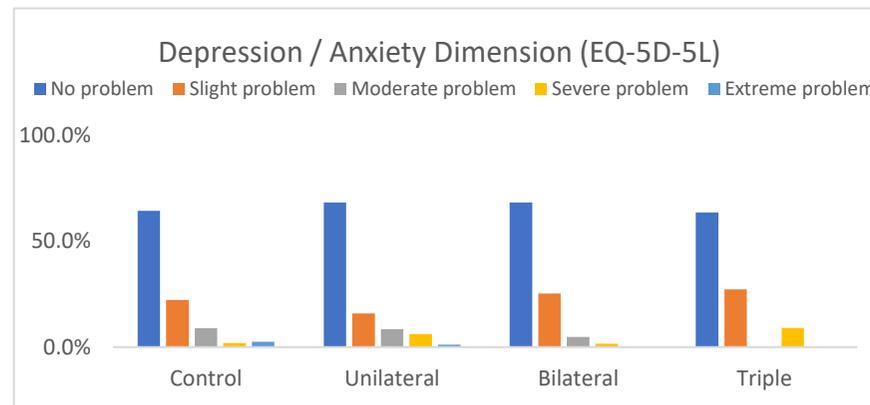
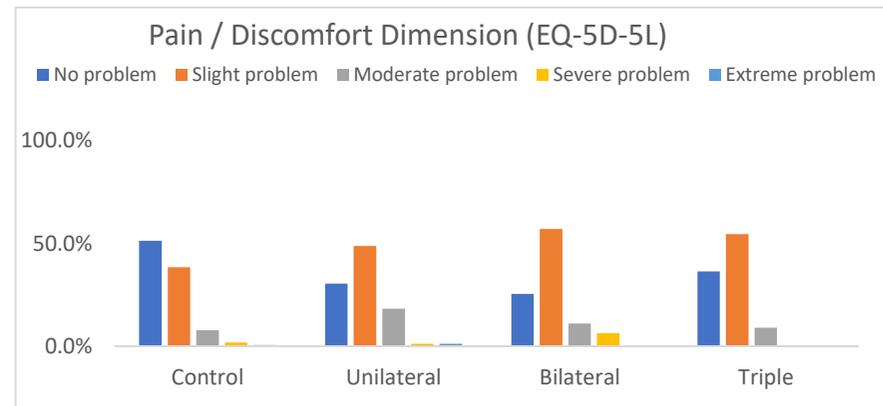
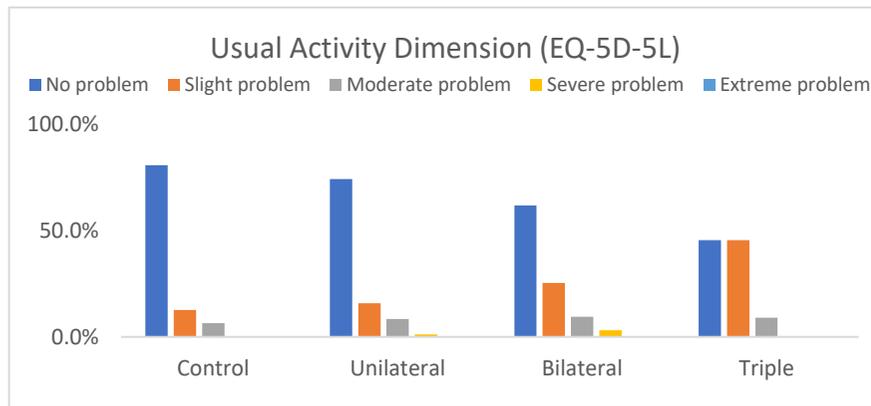
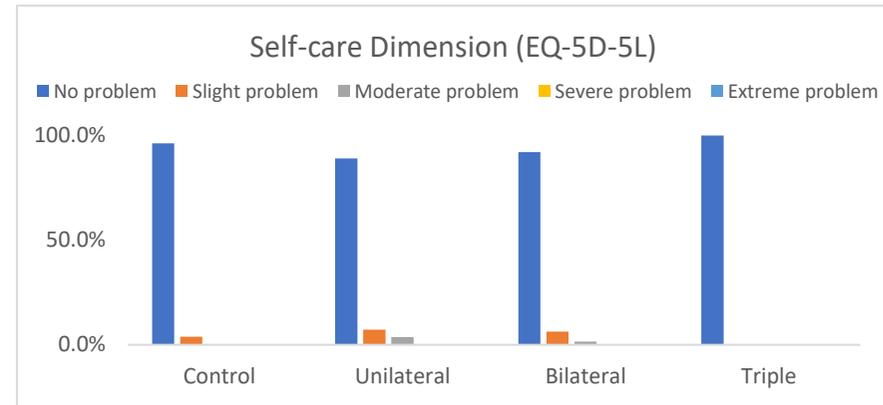
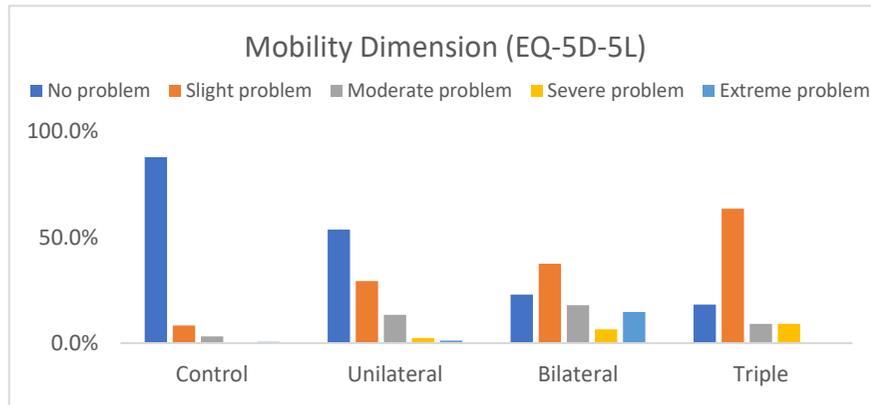


Figure 11-15 Dimensions of EQ-5D-5L categorised by limb loss (Control, n=156; Unilateral, n=82; Bilateral, n=61; Triple, n=11)

The most influential dimension upon QoL index scores for all the limb loss groups appeared to be mobility. Post hoc analysis of between group differences reveal statistically significant differences between control, unilateral and bilateral groups. The triple group did not reach significance due to its small population size and variance of the data.

Physical Outcomes: Prosthetic Function

Of the ADVANCE limb loss cohort, 92.9% (n=145) declared themselves as prosthetic users, whilst 7.1% (n=11) reported that they did not wear or use prosthetic limbs. Prosthetic function is a measure of both endurance and agility. Using 6MWT – distance (m) (6MWD) as a functional measure of endurance and prosthetic agility on a flat surface; self-reported prosthetic mobility scores (SIGAM) capture perceived agility and mobility confidence and the clinician assessed Amputee Mobility Predictor assessment tool tests static and dynamic agility (AMPPRO).

Parameter	Amputee Groups			Total Amputees	Uninjured Control
	UNI	BI	TRI		
Number (missing)	81(1)	61(2)	12(0)	154 (3)	157(0)
Community walker (%)	72 (88.9%)	27 (44.3%)	5 (41.7%)	104 (67.6%)	157 (100%)
Non-community walker (%)	9 (11.1%)	34 (55.7%)	7 (58.3%)	50 (32.4%)	0
6MWD (m)	531.56	420.49	413.61	485.03	620.01
95% CI	(509.9, 553.23)	(386.43, 454.55)	(325.09, 502.13)	(464.92, 505.13)	(606.25, 633.78)
Median (m)	540	440	427.5	510	618.0
Range					
Minimum	260	190	269	190	410
Maximum	777	685	610	777	864

Table 11.13 6MWT Distance (m) categorised by limb loss. Abbreviations: UNI, unilateral amputee, BI, bilateral amputee; TRI, triple amputee; m, metres; community walker, 6MWD >409m; non-community walker, 6MWD <410m; 6MWD, 6-minute walk distance; 6MWD is presented as a mean and 95% Confidence Interval (95%CI), median and range.

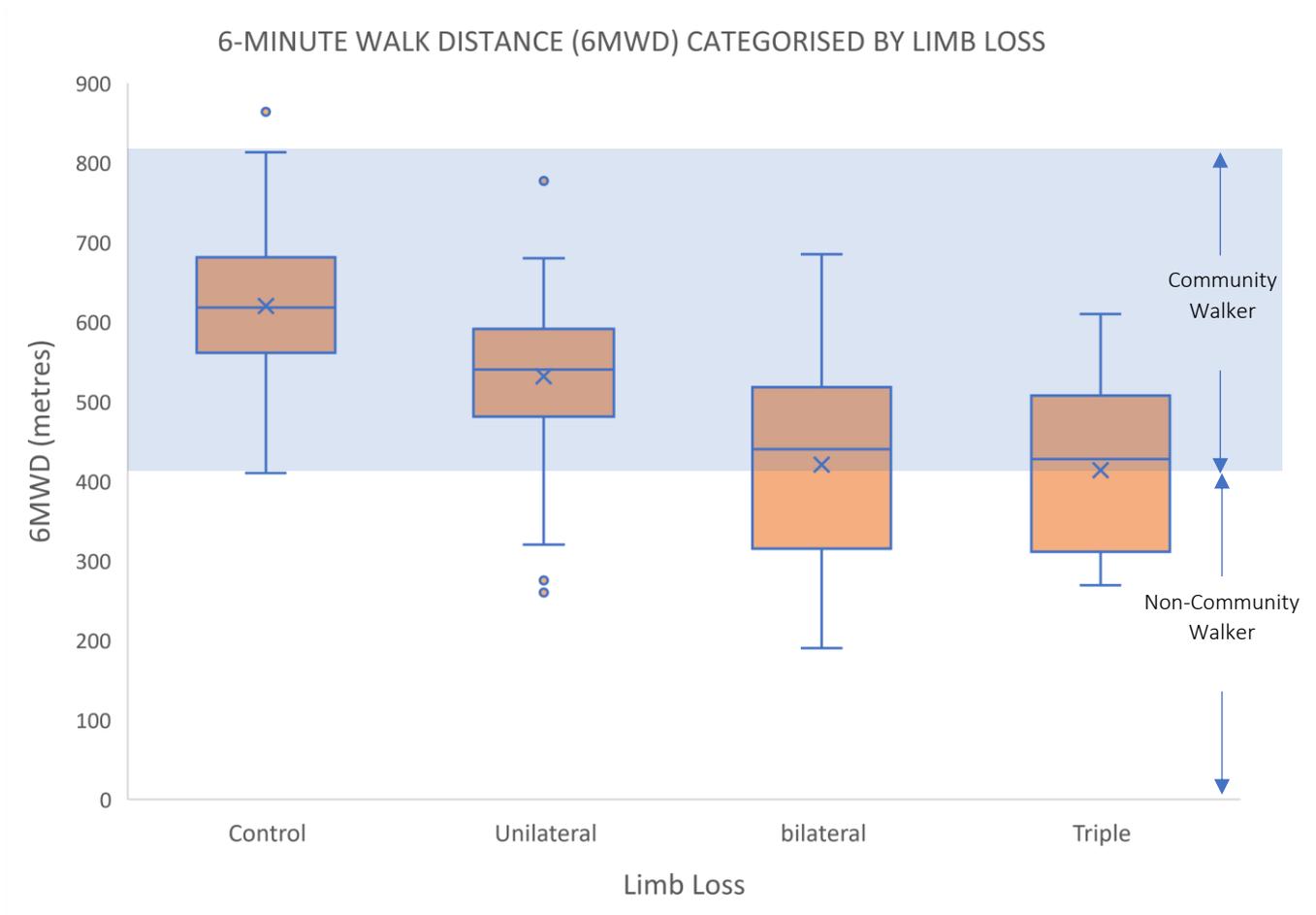


Figure 11-16 6MWD (m) according to amputation count

6-Minute Walk Distance (6MWD). Prosthetic users achieved a distance of 190m-777m (Mean 485.03 95% CI [464.92 - 505.13]) compared with uninjured controls 410m-864m (Mean 620.01 95% CI [606.25 - 633.78]). Table 11.12 presents the 6MWD mean (95%CI), median and range for each of the three amputee groups and the control. Differences in 6MWD between amputation groups and uninjured controls were statistically significant ($p < .001$). Post hoc tests showed differences between unilateral and bilateral/triple groups were statistically significant ($p < 0.006$), whilst bilateral and triple groups achieved a similar 6MWD (Table 11.12).

Comparison of outcomes between sub-groups (numbers of limbs lost) is problematic. In the tests performed, triple group sample size was low and highly varied in outcome. Injury patterns and levels of amputation differed greatly amongst subjects in the same sub-group. Using averages for the whole population was not sensitive enough. The literature indicates that physical outcome is a determinant of QoL and psychosocial outcome [176, 181, 199]. For this reason, it was decided to group limb loss cohort around physical mobility rather than number of limbs lost. Using the 6MWD achieved by the control population (410m-864m) as a measure of community walking ability, those in the limb loss cohort achieved a similar distance and were also classified as *community walkers*. Those who walked less than 410m were classified as non-community walkers (Figure 11.16).

Looking only at the exposed population, non-community walkers (n=50) were found to have a higher median NISS compared with community walkers (n=103) (48.0 vs 27.0, $p < 0.001$) (Figure 11.17). The proportion of each limb loss subgroup achieving *community walker* status is shown in Figure 11.18: unilateral (89%); bilateral (44.26%); and triple (41.7%).

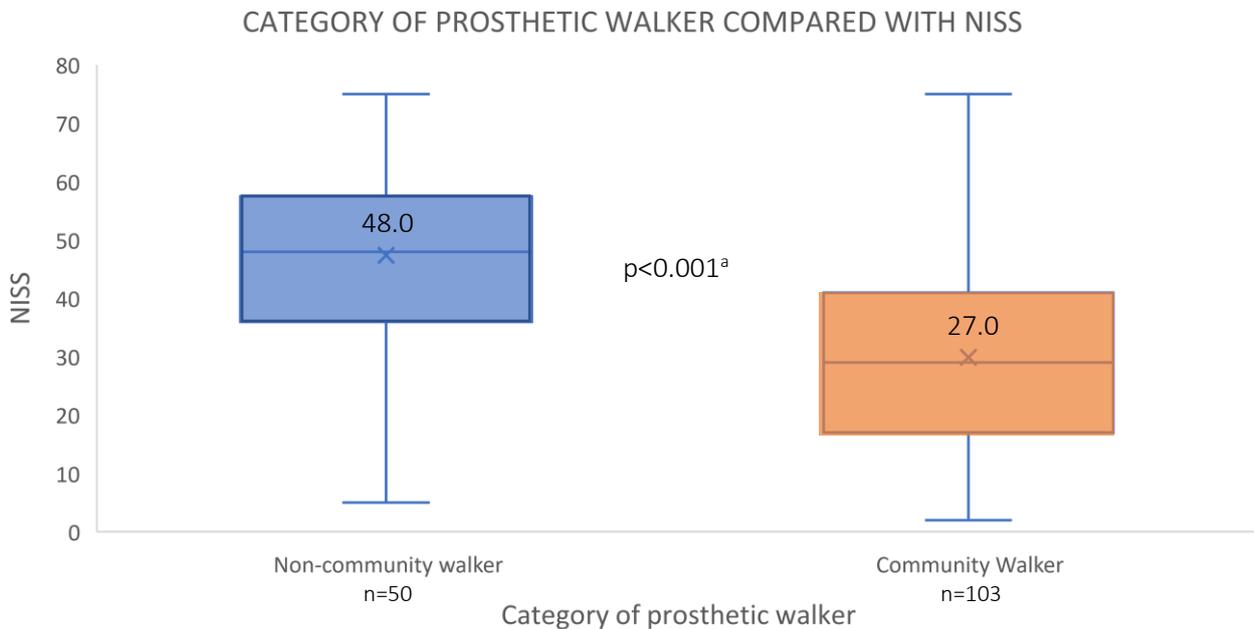


Figure 11-17 Prosthetic walking category compared with injury severity (NISS) a Mann Whitney U Test

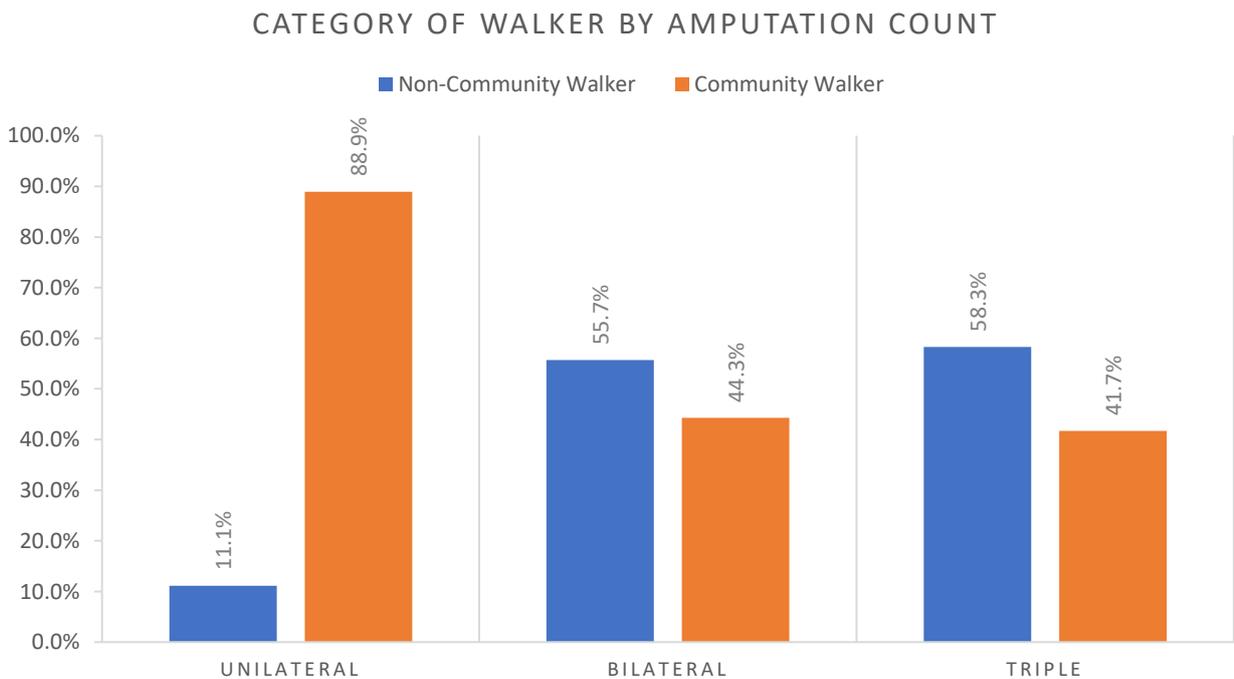


Figure 11-18 Proportion of each limb loss group classified as community walkers / non-community walkers

Self-report prosthetic agility test: SIGAM. SIGAM provides a self-assessment of prosthetic agility and confidence mobilising indoors and outdoors. The questionnaire awards a mobility grade (Table 11.14).

SIGAM Grade	Description	SIGAM Category
A	Not using limb / use for cosmesis only	0: Minimal prosthetic used.
B	Transfers / Short distances	
C	Walk indoors (\pm walking aid)	
D	Walks outdoors (walking aid)	1: Community prosthetic user
E	Walks outdoors (occasional walking aid)	
F	Walks outdoors anywhere, any weather (no walking aid)	2: Unlimited prosthetic user.

Table 11.14 SIGAM Mobility Grade Descriptions

Unrestricted outdoor prosthetic use without a walking aid demands the highest degree of skill, receiving a mobility grade F. Overall, 49.6% of the amputee population (63.3% unilateral; 34.7% bilateral; 40.0% triple) were able to walk outdoors, anywhere (Grade F). Outdoor prosthetic mobility with or without walking aids (grade D, E, F) was achieved by 89% of the amputee population (94.9% unilateral, 81.6% bilateral, 90% Triple).

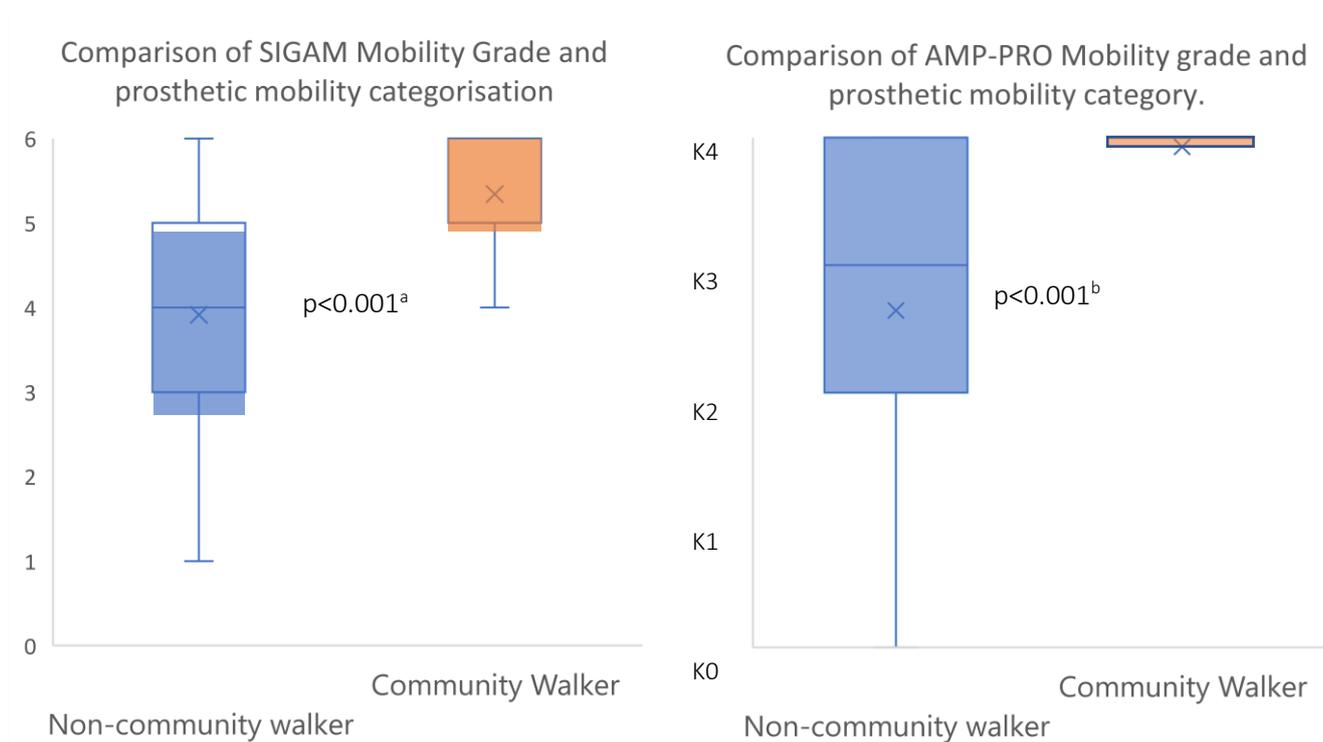


Figure 11.19a Comparison of SIGAM with prosthetic categorisation

Figure 11.19b Comparison of AMP-PRO grade with prosthetic categorisation

Figure 11-19 Comparison of measures of prosthetic agility with prosthetic categorisation. ^aKruskal Wallace H Test, ^bSpearman's rank order correlation (ρ)

Using a Kruskal Wallace H test SIGAM grades for community walkers and non-community walker were found to be statistically different ($p < 0.001$) (Figure 11.19a). A significant correlation between SIGAM and *walking category* validates the interrelationship between these variables ($r_s [117] = .397$ $p < 0.0001$).

Clinician assessed amputee mobility score: AMPPRO. Prosthetic users score up to 47 points from 21 items, assessing static and dynamic balance and prosthetic function. Scores categorise prosthetic function and agility to one of four levels [189] (Table 11.15). Level 4 was achieved by 75.7% of the amputee cohort (Unilaterals 93.9%, Bilaterals 57.1%, Triples 54.5%). A significant correlation was found between 6MWD and AMPPRO scores using Spearmans rho ($r_s [126] = .574$ $p < 0.001$) consequently, *Walking category (community or non-community walker)* and AMPPRO was also correlated ($r_s [142] = .621$ $p < 0.001$) (Figure 11.19b).

AMPPRO Level	Score	Description
Level K0	N/A	Unable or without potential to ambulate or transfer safely with or without assistance, and a prosthesis does not enhance quality of life or mobility.
Level K1	15-26	Ability or potential to use a prosthesis for transfers or ambulation in level surfaces at a fixed cadence. Typical of a household ambulator
Level K2	27-36	Ability or potential for ambulation including traversing low-level environmental barriers (curbs, stairs, or uneven surfaces). Typical of the limited community ambulator.
Level K3	37-42	Ability or potential for ambulation with variable cadence able to transverse most environmental barriers. May have vocational, therapeutic, or exercise activity that demands prosthetic use beyond simple locomotion.
Level K4	43-47	Has the ability or potential for prosthetic ambulation that exceeds basic ambulation skills, exhibiting high impact, stress, or energy levels. Typical of the prosthetic demands of the child, active adult, or athlete.

Table 11.15 AMPPRO Levels and descriptions. Taken from [189, 469].

Physical Outcomes: Physical Activity

International Physical Activity Questionnaire (IPAQ). Physical activity was measured in MET-Minutes and calculated using the IPAQ. Physical activity was categorised as total vigorous activity, moderate activity, walking activity and all-activities. A comparison between the limb loss cohort and non-injured control population found those who suffered amputation reported significantly lower levels of vigorous activity than controls (Mean weekly MET-minutes vigorous activity: 2368.1 (limb loss cohort) vs 3110.2 (control)) ($p < 0.002$). Otherwise, limb loss and control group physical activity were similar (Figure 11.20; Table 11.12). Despite differences in walking speed and walking category between limb loss subgroups, activity levels were not significantly different when comparing unilateral, bilateral, and triple groups (Figure 11.20).

TOTAL MET-MINUTES ACCORDING TO AMPUTATION COUNT

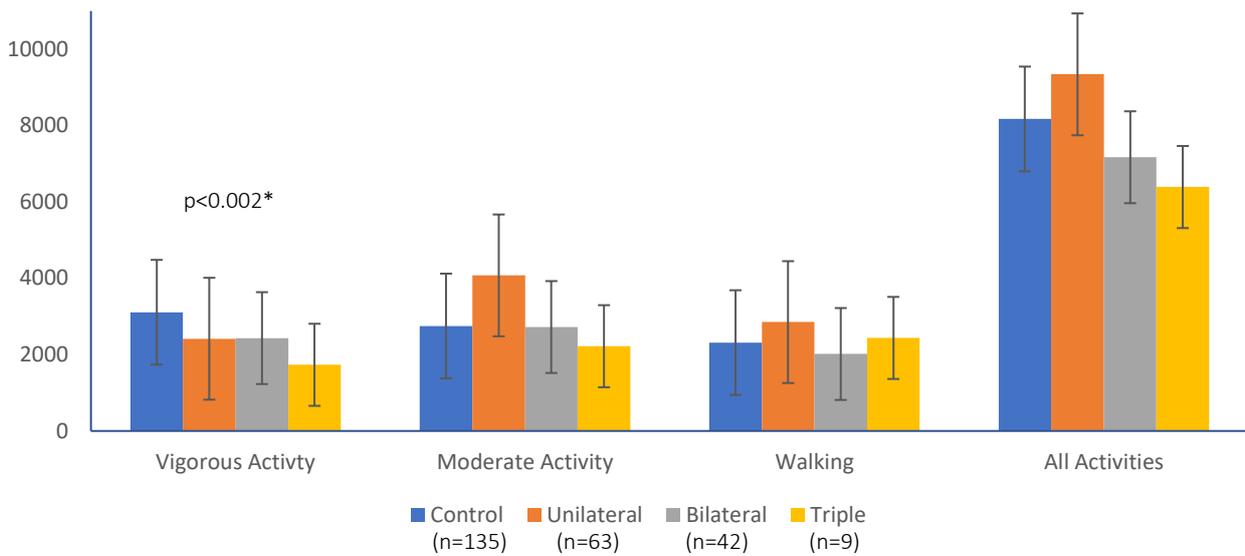


Figure 11-20 Total MET Minutes (IPAQ) compared according to amputation count *significant difference ($P<0.05$) between Control and Unilateral amputees, Kruskal Wallance test ($H(3)=8.235, p=0.041$)

When physical activity levels in MET Minutes were compared for each walking category, *community walkers* reported significantly higher levels of vigorous activity ($p=0.039$); moderate activity ($p=0.003$); walking activity ($p=0.002$) and all activity ($p=0.001$) compared with *non-community walkers* (Figure 11.21).

PHYSICAL ACTIVITY (MET-MINUTES) OF COMMUNITY WALKERS AND NON-COMMUNITY WALKERS (LIMB LOSS GROUP)

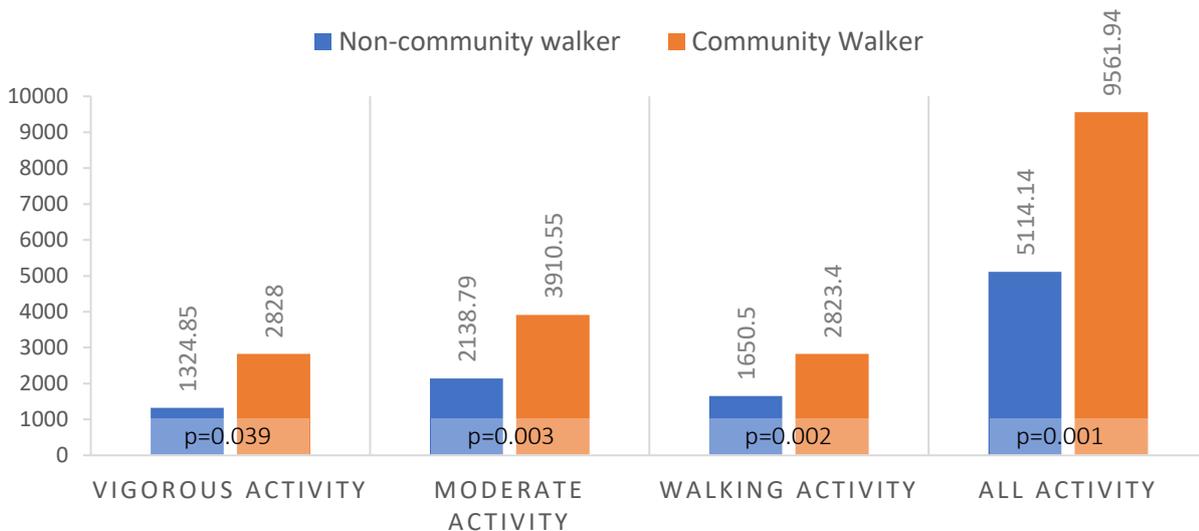


Figure 11-21 Comparison of Total MET-minutes (IPAQ) and walking category. *Using a Mann Whitney U Test, significant difference ($P<0.05$)

Reduced levels of activity is associated with weight gain and a prevalence of obesity, affecting prosthetic fit and mobility [470]. Weight gain was discussed in all veteran focus groups therefore BMI data was reviewed.

ADVANCE baseline BMI data had already been adjusted for amputation by ADVANCE researchers ([Appendix 29](#)). BMI scores were then categorised into 3 groups (*uninjured* (18.5-24.9), *overweight* (25 – 29.9), *obese* (30-39.9)) (NHS Ref). *Community walkers* were found to have significantly lower BMI than non-community walkers ($p=0.04$) (Figure 11.22). Community Walkers were classed as *overweight* (56.3%) rather than obese (27.7%). In contrast, non-community walkers were more likely to be classified as obese (48.9%) than overweight (27.2%) (Figure 11.22).

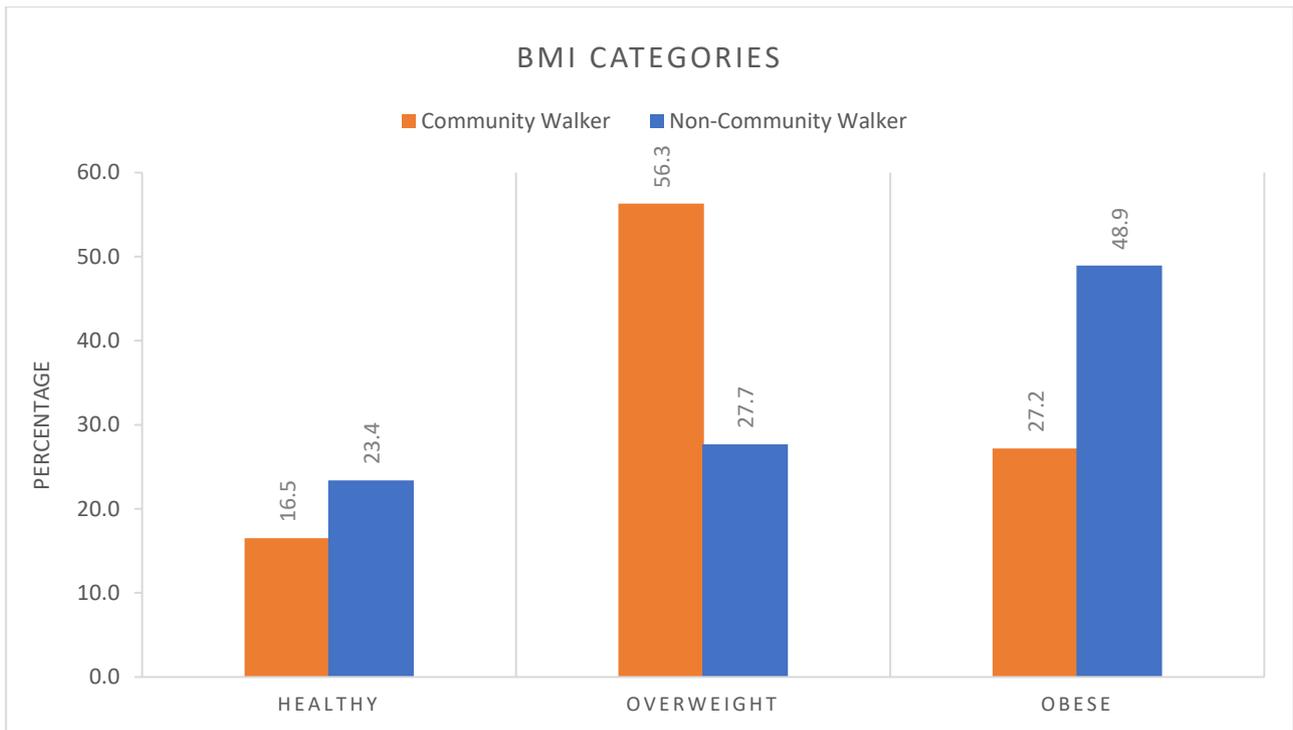


Figure 11-22 Proportion of community and non-community walkers by BMI Category.

Parameter	Amputee Groups				Uninjured Control
	UNI	BI	TRI	Total Amputees	
Number	82	63	12	157	157
Psychological					
PHQ-9 (Depression)					p=0.923^d
Score 0-9	55 (76.4)	55 (91.7)	9 (100)	118 (83.7)	(Amputee v Control)
Score 10-27	17 (23.6)	5 (8.3)	0 (0)	23 (16.3)	108 (78.8) 29 (21.2)
GAD-7 (Anxiety)					p=0.827^b
Score 0-9	61 (84.7)	52 (86.7)	9 (100)	122 (86.5)	(Amputee v Control)
Score 10-21	11 (15.3)	8 (13.3)	0 (0)	19 (13.5)	115 (83.9) 22 (16.1)
Pain					
Back Pain (Severity) (%)					p=0.043^c
0-3/10	42 (64.6)	43 (68.3)	8 (66.7)	93 (67.9)	(Amputee v Control)
4-10/10	23 (35.4)	18 (29.5)	3 (25.0)	44 (32.1)	123 (78.3) 34 (21.7)
Residual Limb Pain (Impact) (%)					
0-3/10	56 (71.8)	39 (63.9)	11 (91.7)	p=0.052 ^d	N/A
4-10/10	22 (26.8)	22 (36.1)	1 (8.3)	(UNI v Bi v Tri)	
Phantom Limb Pain (Impact) (%)					
0-3/10	66 (84.6)	51 (83.6)	11 (100)	p=0.311 ^d	N/A
4-10/10	12 (15.4)	10 (15.4)	0	(UNI v Bi v Tri)	
Social					
Multi-dimensional scale of perceived social support (MSPSS)	182.71	187.74	121.94	180.08	p=0.215^a
	[164.80, 200.61]	[167.52, 207.95]	[55.08, 188.81]	[166.82, 193.34]	(Amputee v Control)
					178.43 [166.49, 190.37]

Table 11.16 Summary table of psychological, pain and social outcome measures Abbreviations: UNI, unilateral amputee, BI, bilateral amputee; TRI, triple amputee. NOTE: Data is mean [95%CI] or as a n (%). All data was non-parametric. ^a Kruskal Wallance H Test, ^b Mann Whitney U Test, ^c Chi Square Test.

Psychological Outcomes: Pain, Anxiety and Depression.

Table 11.16 presents a summary of psychological outcomes. No significant differences were found between uninjured controls and the exposed cohort when comparing anxiety (GAD-7, p=0.827) and depression (PHQ-9, p= 0.923). Focus group participants had voiced their belief that younger soldiers, junior ranks, those who lived alone and those who were not working were more likely to have poorer social and psychological outcomes. However, no association was found between PHQ-9 / GAD-7 and amputation count (p>0.076), age (p>0.555), military rank (p>0.254), working (p>0.101, and living alone (p>0.733) ([Appendix 30](#)). Even when comparing GAD-7 and PHQ-9 scores for participants reporting to be non-prosthetic users (SIGAM Grade A) with the most able prosthetic users (SIGAM grade F), no significant differences were found (GAD-7, U=368.00, p=0.817), (PHQ-9, U=397.00, p=0.842). In short, reported anxiety and depression in this cohort was equivalent to a non-injured control population. Variance in injury severity, social and demographic factors and mobility status did not alter this finding.

Pain.

Table 11.16 presents an overview of low back pain (LBP), phantom limb pain (PLP) and residual limb pain (RLP). Measures of pain were reported using a 10-point Likert scale.

Low Back Pain. No significant differences were found between controls and the limb loss cohort for frequency and impact of LBP. Using Pearson Chi Square, reports of LBP severity was found to be significantly higher in the limb loss cohort compared with non-injured controls ($\chi^2(1)=4.107, p=0.043$).

Phantom Limb Pain (PLP). PLP was reported by 72.3% (left leg) and 66.3% (right leg). However, despite this high frequency, 50.9% (left leg) and 55.5% (right leg) rated the impact of PLP as 0/10. When the 10-point Likert scale used to report PLP scores was condensed into a binary variable (0-3/10 (mild symptoms) and 4-10/10 (moderate to severe symptoms)) and frequency and impact of PLP scores were compared between limb loss groups, 69.2% (unilateral), 73.8% (bilateral) and 81.8% (triple) reported frequency of PLP symptoms as 0-3/10. Impact of PLP symptoms was reported as mild (0-3/10) by 84.6% (unilateral), 83.6% (bilateral), 100% (triple). No associations were found between PLP and prosthetic mobility outcomes (6MWT; SIGAM; AMPPRO; SCS).

Residual Limb Pain (RLP). RLP was reported by 71.4% (left leg) and 73% (right leg). When the 10-point Likert scale used to report RLP was condensed into binary variable (0-3/10 (mild symptoms) and 4-10/10 (moderate to severe symptoms)) and frequency and impact of RLP scores were compared between groups, 64.1% (unilateral), 62.3% (bilateral), 81.8% (triple) reported frequency of RLP symptoms as 0-3/10 (mild). Impact of RLP symptoms were reported as mild (0-3/10) by 71.8% (unilateral), 63.9% (bilateral), 100% (triple). Pearson Chi Square was used to assess if prosthetic mobility outcomes were associated with RLP. Only socket comfort score (SCS) was statistically associated with RLP ($p<0.048$). Those reporting mild RLP also reported high satisfaction (67% vs 45%) with their socket comfort, whilst those reporting moderate to severe RLP were proportionately less satisfied with their sockets (55% vs 33%) (Figure 11.23). A Spearman rank order correlation confirmed a weak negative correlation between RLP (severity, frequency, and impact) and SCS ($r=-.230, p=0.006$).

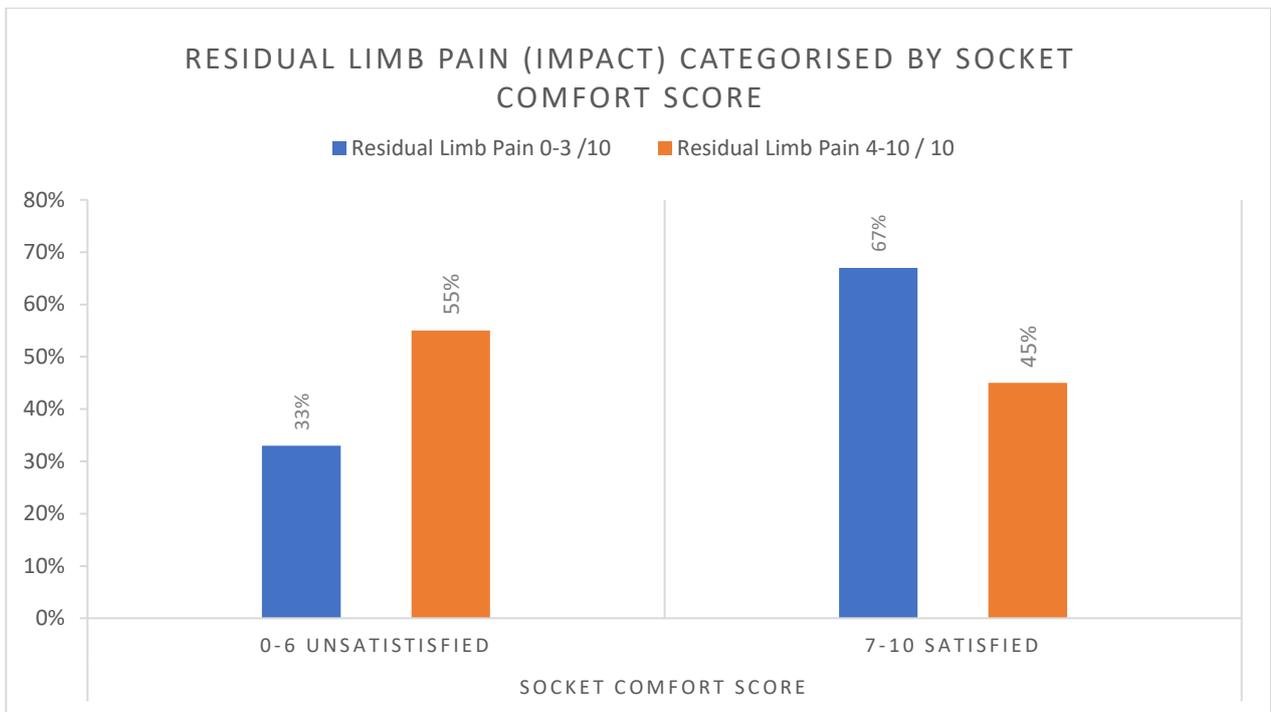


Figure 11-23 Association between the reported impact of residual limb pain and socket comfort score

Pain, anxiety, and depression. Measures of anxiety or depression in this cohort, were found to be associated with pain. [Appendix 31](#) provides a table of analysis summarising findings between GAD-7, PHQ-9, RLP, PLP and back pain. Using a Pearson Chi-Square test, those reporting clinically significant anxiety or depression scores were more likely to also report moderate to severe LBP, RLP and PLP ($p < 0.01$). A similar association between frequency of LBP and anxiety / depression was also found in the control group ($p < 0.015$).

Social Outcomes

An indication of social transition can be seen in rates of working. *Working* was defined in this study as any purposeful activity / commitment performed daily (including studying, professional sport or paid employment). Across the amputee cohort 78.1% reported to be *working*. Pearson Chi Square found no statistical differences in rates of *working* between amputee subgroups ($p = 0.54$), and between community walkers and non-community walkers ($p = 0.12$), prosthetic users and non-prosthetic users ($p = 0.10$). Table 11.16 also presents scores for the multi-dimensional scale of perceived social support (MSPSS). No statistical differences were found between the limb loss cohort and control population ($p = 0.22$). Equally, there were no statistically significant differences between non-prosthetic users, limited users, and proficient prosthetic users and MSPSS ($p = 0.992$). This would suggest the amputee cohort felt well supported and that they have managed to normalise back into civilian society finding purpose and social connections.

Parameter		Amputee Groups				P Value
		Amputee Cohort	UNI	BI	TRI	
Prosthetic Satisfaction Score (PSS) (%)	Satisfied (7-10/10)	95 (66%)	56 (72.7)	31 (54.4)	8 (80)	Amputee Cohort p=0.055 ^a
	Unsatisfied (0-6/10)	49 (34%)	21 (27.3)	26 (45.6)	2 (20)	
Socket Comfort Score (SCS) (%)	Satisfied (7-10/10)	84 (60.4)	51 (66.2)	26 (48.1)	7 (87.5)	Amputee Cohort p=0.03 ^a UNI-TRI p=0.22 ^b UNI – BI p=0.04 ^b BI – TRI p=0.04 ^b
	Unsatisfied (0-6/10)	55 (39.6)	26 (33.8)	28 (51.9)	1 (12.5)	

Table 11.17 Prosthetic Satisfaction Score and Socket Comfort Score compared between limb loss subgroups

. All data was non-parametric. ^a Chi Square Test, ^b Mann Whitney U Test.

Prosthetic Satisfaction Score / Socket Comfort Score

Prosthetic issues were highly rated in veteran focus groups, and in particular their impact upon function. Discussion around prosthetic satisfaction in focus groups centred upon satisfaction with the limb, whilst socket comfort centred upon satisfaction with socket fit and, therefore, the comfort of wearing the limb. For this reason, prosthetic satisfaction was explored in more depth. ADVANCE data captured both prosthetic satisfaction (PSS) and socket comfort score (SCS). The 10-point Likert scale for each was condensed into a binomial variable as described in Section 3 ([Appendix 18](#)).

No association was found involving PSS, pain, anxiety, or physical measures. An association, however, between RLP and SCS has already been presented. A relationship between mobility outcome and SCS was also found, and this will be presented below. Interestingly, the bilateral subgroup reported higher levels of dissatisfaction with their socket comfort when comparing the bilateral subgroup with unilateral and triple groups ($p < 0.04$) (Table 11.17 / Figure 11.24).

Association of mobility outcomes with Socket Comfort Score (SCS)				
		Unsatisfied (0-6/10)	Satisfied (7-10/10)	P value
Walking Category^c	Community walker	32 (33.3%)	64 (66.7%)	p=0.04
	Non-community walker	21 (52.5%)	19 (47.5%)	
AMP PRO^b	Score 0-47 (mean)	40.32	43.78	p=0.058
SIGAM^c	Minimal prosthetic use	7 (77.8%)	2 (22.2%)	p=0.007
	Community user	23 (51.1%)	22 (48.9%)	
	Unlimited user	16 (29.1%)	39 (70.9%)	
Oswestry Index Score^b	0-100 (mean, CI 95%)	12.36 (9.36,15.36)	9.2 (6.58,11.83)	p=0.02
Physical Activity^b (IPAQ) (Mean)	MET-Min (Vigorous)	3920.00	4187.00	p=0.89
	MET-Min (Moderate)	3702.23	4049.30	p=0.55
	MET-Min (Walking)	2921.09	3185.14	p=0.96
	MET-Min (All Activity)	8202.34	9060.04	p=0.70

Association of EQ-5D-5L with SCS

EQ-5D-5L^b	Index (mean)	0.656	0.784	p<0.001
EQ-5D-5L^c Dimensions (No problem, slight problem, moderate problem, extreme problem)	Mobility	55 (13, 22, 9, 5, 6)	84 (41, 29, 11, 1, 2)	p=0.005 (LR 0.004)
	Self-care	55 (48, 5, 2)	84 (78, 4, 2)	p=0.53 (LR 0.541)
	Usual activity	55 (29, 18, 8, 0)	84 (64, 13, 5, 2)	p=0.011 (LR 0.009)
	Pain / discomfort	55 (7,35, 12, 1, 0)	84 (32, 40, 9, 2, 1)	p=0.01 (LR 0.008)
	Depression / anxiety	55 (34, 15, 3, 2, 1)	84 (60, 14, 6, 4, 0)	p=0.40 (LR 0.366)

Association of Anxiety / depression / residual limb pain / phantom pain with SCS

		Unsatisfied (0-6/10)	Satisfied (7-10/10)	P value	
GAD-7 (Anxiety)^d	Score 0-9	47	75	p=0.599	
	Score 10-21	8	9		
PHQ-9 (Depression)^d	Score 0-9	47	71	p=0.541	
	Score 10-21	8	13		
Residual Limb Pain^c	0-3/10 (mild):	Frequency	31 (33.7%)	61 (66.3%)	p=0.05 (Frequency)
		Severity	32 (33%)	65 (67.0%)	
		Impact	29 (31.5%)	63 (68.5%)	
	4-10/10 (Mod – Sev)	Frequency	24 (55.8%)	19 (44.2%)	p=0.007 (Severity)
		Severity	23 (50%)	23 (50%)	
		Impact	26 (55.3%)	21 (44.7%)	
Phantom Pain^c (Frequency, Impact, Severity)	0-3/10 (mild)	37, 46, 38	63, 72, 56	p=0.321 (Frequency)	
	4-10/10 (Mod – Sev)	18, 9, 17	21, 12, 27	p=0.841 (Severity) p=0.738 (Impact)	

Table 11.18 Socket Comfort Score and association with ADVANCE functional outcomes

Abbreviations: UNI, unilateral amputee; BI, bilateral amputee; TRI, triple amputee; LR, Likelihood ratio; Mod, Moderate; Sev, Severe. NOTE: Data is mean [95%CI] or as a n (%). All data was non-parametric. ^a Kruskal Wallace H Test, ^b Mann Whitney U Test, ^c Chi-Square Test

SOCKET COMFORT SCORE (CONDENSED)

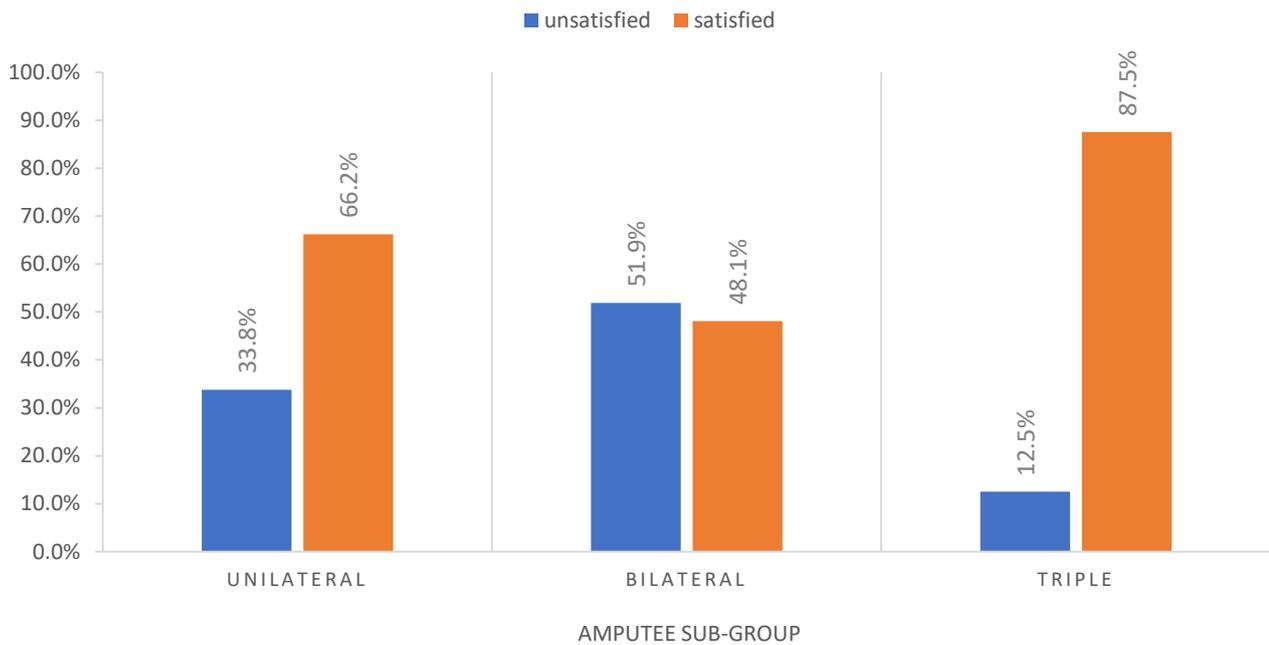


Figure 11.24 Comparison of Socket comfort score between amputee groups

Socket

Comfort Score (SCS). Using a Pearson Chi-square test, the differences in socket comfort between amputee sub-groups, noted in Figure 11.24 were found to be statistically significant ($p=0.032$). A post hoc analysis found differences between bilateral and unilateral groups, bilateral and triple groups were statistically significant ($p=0.039$). Given these results and veteran reports of the functional impact prosthetic issues were having, associations between SCS and functional outcomes were investigated further. Findings are summarised in Table 11.18 and presented below.

SCS and walking category. Community walkers were satisfied (67%) with their socket comfort, whilst 47.5% of non-community walkers reported satisfaction. Pearson Chi-square found the association between SCS categories (satisfied / unsatisfied) and walking category (community walker / non community walker) was significant ($p=0.04$).

SCS and SIGAM. Using a Pearson Chi Square, a significant association was found between SIGAM grade and SCS ($p=0.01$). For the unlimited prosthetic user (SIGAM Grade F) 70.9% were satisfied with socket comfort. For minimal prosthetic users only 22.2% were satisfied with the comfort of their socket.

SCS and Oswestry Disability Index. As a back disability index, the Oswestry index score also provides an individual's self-appraisal of their disability. Oswestry index scores were overall very low, with mean group and sub-group scores within the category of mild disability (scores 5-14). When subjects were categorised according to socket comfort, and the mean Oswestry disability score calculated for each category, it was found to be lower for those reporting socket satisfaction ($n=83$, $M=9.20$) compared with those reporting socket dissatisfaction ($n=55$, $M=12.36$) ($p=0.02$).

SCS and physical activity. No significant difference was found in mean activity levels when comparing SCS categories (Table 11.18)

SCS and EQ-5D-5L. Those reporting satisfaction with their socket comfort also reported a higher overall QoL (n=84, M=0.784 vs n=55, M=0.656) according to EQ-5D-5L index. This reached statistical significance (P<0.001) using a Mann Whitney U Test. When exploring the dimensions of EQ-5D-5L, differences in dimension scores between satisfied and unsatisfied groups were statistically significant for the mobility (p=0.005), usual activity (p=0.011), pain/discomfort dimensions (p=0.013).

SCS and anxiety / depression / limb pain. The association between RLP and SCS (p<0.05) noted earlier (Figure 11.23) did not include PLP. In addition, despite notable frustration expressed in focus groups about socket provision, SCS was not associated with anxiety and depression scores (Table 11.18).

Summary.

ADVANCE baseline data confirms that despite their complex injury presentation, this cohort has achieved a remarkable level of physical and psychological recovery, enabling social reintegration and a high QoL. For example, three quarters of the ADVANCE cohort who suffered limb loss can still walk, using prosthetics, at an equivalent speed to a non-injured control group. Having quantified the significance of these outcomes, the importance of understanding how this was achieved has been confirmed. Analysis of qualitative accounts has, therefore, been used to map the components of rehabilitation, illustrating how they interact to enable such outcomes.

This process of analysis revealed cross-cutting categories operating throughout the conceptual map. Within qualitative accounts, three of these categories, *competence*, *connection*, and *autonomy* appear to be individual needs that drive action or are fulfilled by engagement. The fourth category, *organisational culture*, characterises the rehabilitation setting and the organisational and cultural aspects influencing rehabilitation delivery. This insight has been used to analyse priority themes and highly rated discussion points, for example, transition, military, and civilian prosthetic provision.

Identification of these cross-cutting categories will be critical in the following discussion as they explain the apparent conflict of presenting both qualitative and quantitative findings together. Qualitative accounts place prosthetic provision as the foremost component of rehabilitation, yet prosthetic outcome does not appear to be a key determinant of QoL, social or psychological outcome. When comparing measures of anxiety, depression, and social integration between those who suffered limb loss and non-injured controls, no differences were found. The normalisation of these measures did not vary with prosthetic outcome, prosthetic use, or severity of injury. The following chapter will consider how this apparent conflict refocuses

attention away from an interventional view of care (i.e., prosthetic provision), towards a needs-based perspective (competence, connection, autonomy).

Analysis of ADVANCE data also raises questions about how complex clinical presentations should be compared. When examining physical outcome, comparison according to limb loss is undermined by subgroup sample size and intragroup variation of injury severity and outcome. When 6MWD was used as a functional comparator, a clear distinction was seen in activity levels, agility, and prosthetic attainment as well as measures of physical health.

Qualitative accounts also voiced concern about the difficulties experienced by veterans achieving adequate prosthetic socket fit, and the perception that this was undermining their confidence and function on prosthetics. ADVANCE data did show that a low socket comfort was associated with higher reports of RLP and lower prosthetic mobility scores. Those who suffered bilateral lower limb amputation were also more likely to be dissatisfied with socket comfort. Whilst the direction of these associations is unclear, these findings set alongside qualitative accounts require further analysis.

Together, the presentation of qualitative and quantitative findings is complementary and provides greater insight than would have been possible if only one research paradigm had been pursued. In the following chapter, these results will be discussed in relation to the published literature. The following discussion will focus on unexpected findings in the case of psychological and QoL outcomes, or those appearing to conflict with one another; most notably the debate over which components of rehabilitation hold prominence in determining a positive outcome following limb loss.

CHAPTER 12 Veteran Discussion

Introduction

Combat injured UK military personnel presented a severity of injury unseen in living memory [18]. Their recovery, documented in the experiences shared during focus groups and outcomes detailed in the previous chapter, present a remarkable achievement for both the individuals concerned and the system of healthcare in which their recovery took place. It is argued in this chapter that the holistic nature of this recovery exemplifies human thriving [446]. Key findings from veteran and ADVANCE data are now discussed in relation to the theoretical construct and the wider literature. In this discussion there are two core themes: recovery and human thriving.

Recovery

Functional and QoL outcomes from studies investigating the impact of lower limb traumatic amputation vary enormously [141, 142, 170, 173, 176]. Study comparison is problematic owing to differences in study population demographics (age, prosthetic componentry, cause of amputation and the nature of rehabilitation) [102, 121, 180, 189]. An injury severity score for traumatic amputees does enable comparisons of physical injury, although not the psychosocial aftermath. ADVANCE collected two trauma scores: The Injury Severity Score (ISS) and the New Injury Severity Score (NISS). NISS provides a more valid measure of injury severity when the trauma is widespread, and so it has been chosen as one means of comparison for this military combat population [79, 471, 472].

ADVANCE baseline data displays a high mean NISS for the limb loss cohort of 37.01 (33.48-40.54). NISS scores of this level attest to the severity of injury many lower limb amputations sustained (e.g. gastrointestinal, genital and additional skeletal trauma) [4, 92]. Despite the complex nature of these injuries in this military population, those suffering limb loss achieved highly efficient gait characteristics and activity levels [180]. These results are based upon studies of level walking in a select highly functional subset [4, 180]. Outcomes could be attributed to the prescribed state of the art prosthetic limbs, yet comparisons with age and prosthetically matched populations do not support such reasoning [121, 180]. The nature of rehabilitation provision and the psychosocial disposition of this population were postulated as two factors contributing to these outcomes [180]. Exploration of the ADVANCE baseline data in this thesis has for the first time provided a more generic picture of recovery outcome and functional attainment. This data has been utilised to understand what it was about the rehabilitation provision that enabled the successful outcomes experienced by this cohort alongside detailed qualitative accounts documenting veterans' experience of recovery. ADVANCE baseline data presented in Chapter 11 confirmed findings from earlier

work demonstrating the high functional ability and activity of this cohort who had suffered limb loss [4, 180] (Table 12.1). Figure 12.1 illustrates the similarity in 6MWD achieved by a small cohort of military amputees at the end of their rehabilitation [4] compared with ADVANCE baseline veteran data recorded at least 5 years post medical discharge (ADVANCE). This analysis suggests that veterans have maintained prosthetic mobility and continue to live physically demanding lives.

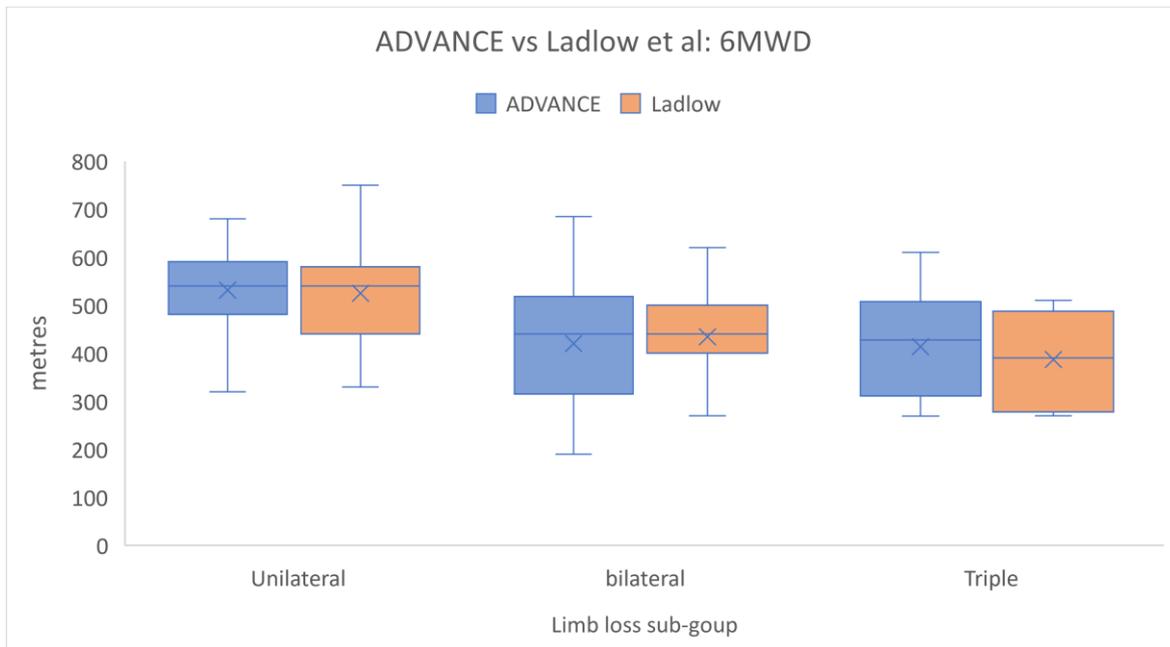


Figure 12-1 Comparison of 6MWD (ADVANCE data vs Ladlow [4])

Parameter	Amputee Groups			
	UNI	BI	TRI	Total Amputees
Population (ADVANCE)	82	63	12	157
Population (Ladlow)	23	23	8	65
NISS (ADVANCE) (Mean ±SD (range))	24.51±13 (2-75)	46.08±14 (17-75)	54.08±9.3 (41-66)	35.49±17.55 (2-75)
NISS (Ladlow) (Mean ±SD (range))	28.0 ±11 (12-51)	44±12 (22-75)	57±6 (48-66)	40±15 (12-75)
6MWD (m) (Mean ±SD (range))	516.86 ± 131.32 (260-777) (n=72)	320.67 ± 208.92 (190-685) (n=58)	313.67 ± 208.03 (269-610) (n=9)	421.85 ± 197.96 (190-777) (n=139)
6MWD (m) (Ladlow) (Mean ±SD (range))	544.00 ± 99.0 (365-750) (n=18)	445.00 ± 104 (206-620) (n=21)	387 ± 99 (270-510) (n=6)	489 ± 117 (206-760) (n=55)
AMPPRO (Mean ±SD (range))	45±2.3 (31-47) (n=77)	37±13.3 (6-46) (n=56)	39±11.7 (6-45) (n=11)	41±11 (6-47) (n=144)
AMPPRO (Ladlow) (Mean ±SD (range))	44±3 (36-47) (n=23)	42±5 (23-46) (n=23)	37±9 (24-47) (n=8)	43±5 (24-47) (n=54)
SIGAM	%	%	%	%
ADVANCE (Ladlow)				
A-C (minimal mobility)	5 (nil)	18.4 (4)	10 (25)	10.9 (??)
D-E (Outdoor / Aid)	31.7 (nil)	46.9 (5)	50(12)	39.5 (??)
F (Outdoor / No Aid)	63.3 (100)	34.7 (91)	40(63)	49.6 (??)
GAD-7	%	%	%	%
ADVANCE (Ladlow)				
Score 0-9	84.7 (91.3)	86.7 (90.9)	100 (100)	87.2 (86.9)
Score 10-21	15.3 (8.7) (n=82 (23))	13.3 (9.1) (n=63 (22))	0 (0) (n=11 (9))	12.8 (13.1) (n=156 (54))
PHQ-9				
ADVANCE (Ladlow)	%	%	%	%
Score 0-9	78 (100)	93.7 (100)	81.8 (100)	84.6 (82.1)
Score 10-27	22 (Nil) (n=82 (23))	6.3 (Nil) (n=63 (22))	18.2 (Nil) (n=11 (9))	15.4 (17.9) (n=156 (54))

Table 12.1 Comparison of ADVANCE data, with Ladlow [4].

The low incidence of psychological sequelae is also surprising. Table 12.1 compares anxiety and depression scores reported by Ladlow et al [4] with baseline ADVANCE data. Again, both datasets investigate the same military cohort but at different points in time. The low incidence of anxiety and depression and a lack of association between limb loss and psychological outcome is confirmed by ADVANCE data. Moreover, no

statistical differences in anxiety and depression exist between non-injured controls (n=157) and those with limb loss (n=157). This contrasts with other studies investigating civilian and US military amputee outcomes [199, 473, 474]. Studies of US veterans, also injured in Afghanistan, compared QoL and depression scores in 63 US combat amputees from the Wounded Warrior programme, finding that 41% of those screened had moderate to severe depression [475]. The US study used the Centre for Epidemiologic Studies Depression Scale (CESD-20) whilst ADVANCE adopted PHQ-9; there is no cross over calculation that enables direct comparison between these measures. Previous studies comparing US and UK military personnel specified the need to control for combat exposure, tour length, number of tours, and socioeconomic background [459]; this may account for some of the differences. However, US veteran studies confirm a pattern seen in civilian studies which report a higher incidence of depression, anxiety and suicide post-trauma following amputation [156, 475, 476].

Anxiety and depression scores captured in the ADVANCE cohort may result from under reporting, however they mirror those previously reported by Ladlow [4]. Associations between high levels of pain, low levels of perceived social support (MSPSS) and high levels of anxiety and depression is widely conveyed in the literature [287, 477]. If anxiety or depression had been under reported, this association would not exist in the ADVANCE Data. MSPSS, anxiety and depression scores all reflect rates reported by the non-injured control group (Table 11.16). Furthermore, in a study awaiting publication, ADVANCE mental health outcomes were compared for combat injured UK military personnel and an uninjured control group. This paper reports no significant differences in rates of probable PTSD when comparing the amputee cohort with the uninjured group (10.6% vs.10.7%). In stark contrast, the non-amputation combat injured group presented a significantly higher incidence of anxiety (23.1%, $p<0.01$), depression (26%, $p<0.0001$) and PTSD (19.5%, $p<0.0001$) when compared with the uninjured group [478].

In civilian research, an association between prosthetic use, QoL and psychosocial recovery has been noted, especially for the younger amputee [142, 173, 475, 479]. In this thesis, qualitative accounts capturing descriptions of the rehabilitation experience, suggest a mechanism of recovery centred upon the symbolic importance of the lower limb prosthetic and its ability to enable autonomy through upright ambulation. Prosthetic provision was rated by veterans as a priority component of rehabilitation (Figure 11.2).

In this study, QoL (using EQ-5D-5L) was significantly higher for the uninjured control group when compared with the limb loss group ($p<0.001$). Construct validity for the subscales of EQ-5D-5L has been shown [478]. Examination of each domain within EQ-5D-5L suggests that *mobility*, *usual activity*, and *pain* are the causes for this recorded decline in QoL. Whilst those in the limb loss cohort recognise their functional loss and its impact upon activity, their disability did not affect subscales representing depression or self-care scores. As quoted, research in an equivalent amputee population supports the view that there is a low psychosocial sequelae and impact upon QoL in those who become proficient prosthetic users [173, 174, 480]. But when prosthetic activity was examined in the ADVANCE dataset, no differences were found between non-

community walkers (those with limited or no walking capability) (n=50) and community walkers (full-time prosthetic users) (n=104) for anxiety (p=0.817), depression (p=0.842), social support (p=0.992). In fact, psychosocial outcomes were the same as for non-prosthetic users (n=11), when compared with community walkers. ADVANCE data also shows that the NISS for non-community walkers (which includes non-prosthetic users) was significantly higher when compared with community walkers (fig 11.18) (48.0 vs 27.0, p<0.001). So, neither injury severity, nor prosthetic mobility were related to measures of anxiety, depression, or perceived social support.

The literature studying US military amputee cohorts is ambivalent about whether there is an association between severity of injury and PTSD, depression, anxiety or mental health multimorbidity [481]. In one study reviewing US military casualties, high injury severity and pain was associated with high levels of PTSD [482]. However, the association found could be with pain, injury severity, or both. In contrast, a survey of 137 US casualties reported that the higher the injury severity, the lower the psychosocial sequelae [483]. This research was conducted three months after discharge from hospital; arguably too early to assess the long-term psychosocial impact of trauma.

Qualitative data suggests several reasons for the normalisation of psychosocial metrics. Public acclaim and *hero* status may have had a protective psychosocial effect in cases of severe injury resulting in minimal or no prosthetic use. Self-Determination Theory (SDT) would argue that public acclaim is an external motivator and will not lead to intrinsic fulfilment [294]. Interviews with US veterans undergoing treatment for mental health disorders support this position [484]. *Hero* for these patients carried an instrumental meaning or a political identity which did not prevent them sensing stigma attached to their presentation. Instead, their support arose from salient peer group activity [484, 485]. For the amputee cohort, social acclaim gave value to an amputation as a form of social capital. Group symbols, such as this, would also aid individual identification and categorisation with the group, encouraging cohesion [272]. Loss of limb(s), therefore, provides individuals with an affiliation to a group celebrated for their sacrifice and heroism, providing a self-enhancing sense of belonging to an individual in a time of crisis [215]. Focus group 4 (p2) referenced the *banter* which existed, suggestive of an intragroup hierarchy of wounding, with unilateral amputees referred to in humour as 'flesh wounds' while a 'triple' was esteemed

Again, Feinstein [485] observed veterans with mental health problems, a group solidarity and mutual empathy, which supported a positive individual identity and removed the stigma they felt about their condition. For the most seriously injured within the amputee cohort, it is possible that their injuries provided them a sense of identity and belonging with their peers, protecting them from the stigma of disability and resulting psychosocial sequelae.

Whilst, both this study and ADVANCE sought to recruit a representative sample of veterans with limb loss, non-prosthetic users were low in number. The non-prosthetic group had equivalent psychosocial outcomes

to the wider cohort; this requires further research. Approximately 302 amputees resulted from the Afghanistan conflict. ADVANCE recruited 157 amputee volunteers. How representative these volunteers are of the total population, is unclear. Both this study and ADVANCE may have suffered from unintentional selection bias, attracting those who feel positive about their recovery and can easily travel to study locations. The theoretical explanation for these findings based on a social dynamic has theoretical validity, particularly given contrasting outcomes from the injured non-amputee group. Further exploratory research is needed amongst the injured non-amputee group to ensure the generalisability and transferability of this explanation.

Whilst supporting earlier work demonstrating high physical functional attainment and well-being [4, 180], findings from this thesis show this attainment encompasses physical, social and psychological gains. These three outcomes of performance, wellbeing and holistic growth have been used to identify a phenomenon known as human thriving [446, 486]. It is argued that this cohort is an exemplar of human thriving. In addition, the finding that QoL, social and psychological outcome extends across the study population irrespective of their level of prosthetic function ([Table 11.16](#)), shifts the focus from the prosthetic as the enabler of thriving, to the recovery dynamic within the military rehabilitation setting. Human thriving and the recovery dynamic will now be discussed further.

Modelling a clinical approach to enable human thriving.

Biopsychosocial outcomes revealed in the ADVANCE limb loss cohort could be labelled as an example of post-traumatic growth (PTG) [487]. The choice, instead, to attribute a more generic label of human thriving arises from the fact that accounts of growth characterise both veteran and clinician data. The PTG inventory, used to assess the occurrence of PTG was not available to participants, nor is it applicable to the clinician group [488]. Human thriving is a concept arising out of performance sport. It captures performance aspects but also draws upon social theory to explain group identity and individual motivation. According to Brown [446] human thriving exists where a high level of performance is perceived, and a high level of well-being and holistic functioning is demonstrated. Analysis of ADVANCE baseline data has conclusively demonstrated all three characteristics. Its conceptual foundation appears to therefore align with the rehabilitation setting, and its characteristics are evident in qualitative and quantitative data [277, 489].

Personal and contextual enablers of human thriving

Applying Bourdieusian theory to the military culture and military to civilian transition (MCT), ([Section 2](#)) identified how shows of resilience, positivity and proactiveness are rewarded with cultural and social capital [210]. These personal enablers of thriving have been recognised during recruitment and are developed

through military training and operational experience [210]. In Section 1, the geopolitical shift causing a strategic move towards smaller scale expeditionary style of operations also demanded a different skill set from the British soldier [22]. Peace support and counter insurgency warfare require the soldier on the ground to be equipped with initiative to improvise and adapt in fluid operational settings. Operations in Afghanistan and Iraq demanded these skills, and so military training and operational experience instilled these personal enablers within this patient group [209].

In the absence of contextual enablers, personal enablers can cause an individual to make destructive choices [446]. Historically, one example of this could be the substantial minority of military personnel who leave the service and transition poorly back into society, resulting in mental health and social decline [211]. It is argued that contextual enablers needed to prevent this situation, include a challenging environment, human connection and trust, and family support [277, 446, 486]. For military personnel, it might also include Regimental belonging. Within this concept of thriving, elements of individual intrinsic need identified by SDT become apparent. Conceptually thriving is equivalent to autonomy; a challenging environment presents a test of skill (competence), which together with a need for human connection, belonging and trust will provide the military patient with the intrinsic needs required to feel fulfilled.

Veteran consultation identified these cross-cutting categories of *connection*, *competence*, and *autonomy*, running across the thematic framework of qualitative data; however, their significance only became apparent once ADVANCE baseline data revealed the holistic nature of recovery experienced by this cohort. Referring to *connection*, *competence* and *autonomy* as 'cross-cutting categories' illustrates how they are interwoven with one another and throughout the conceptual map. Yet the process of allocating components of rehabilitation to each category based upon veteran accounts, helps to illustrate how features of the rehabilitation environment either enable or disable these intrinsic needs for a patient, potentially uncovering complex interactions between components of care and recovery [237].

Building blocks for human thriving: Connection, competence, and autonomy

During the voting exercise veterans highlighted the importance, after *prosthetic provision*, of *family and peer support*, *PIRR*, *IDT joint approach*, *Sport & AT*, and *Holistic Adaptable Approach* as key components of rehabilitation supporting their recovery. These priority themes delivered contextual enablers of human thriving. For instance, group therapy during *PIRR* provided time and opportunity to form bonds with fellow patients and staff, as well as to learn and share practice. The IDT enabled connection between patient and clinician, as well as clinician and clinician. *Sport* and *AT* created a *challenge* environment around which patient community was harnessed offering both support and camaraderie.

Neal [162] recognised that this patient group formed CoP in which social learning occurred, providing skills, support, connection, and competence. In this thesis, these CoP have been shown to also include clinicians

and veterans participating together, whilst also acknowledging that degrees of participation or even non-participation were observed. These accounts are explained, using the [theoretical construct](#) developed within this thesis; a Social Identity Perspective (SIP) shows how such group participation relies upon individuals' sense of readiness, and their assessment of comparative and normative fit, to determine whether an individual identifies with a group or remains on the periphery. By identifying similarities with others (interests, cap badge, injuries, military role), social identities can form, encouraging membership of a group [490]. Neal [162] referred to this process as '*legitimate peripheral participation*' during which military patients upon arrival at Defence Medical Rehabilitation Centre, Headley Court (DMRC) assessed the group and its environment, rituals, and values, before embedding themselves within it [162] (pi66). Identification with the group offers psychosocial support as connection is formed. Individuals adopt behavioural similarities and identification with the group grows. If, however, the individual is unable to find a *fit* due to circumstance, medication or their psychological state, or they feel they are different in some way, or unable to meet the challenge, they remain on the periphery or exclude themselves altogether [318]. This theoretical explanation fits with [qualitative accounts](#).

Healthcare settings organised around group exercise have reported both health and social benefits. Work within pulmonary [491, 492] and stroke [493] rehabilitation settings illustrate how group processes are used to improve patient engagement, attendance, and ongoing social connections. In this study, veterans recognised that intensive residential blocks were a key component of rehabilitation. Residential blocks of rehabilitation were valued for their protection from the outside world, and the connection it brought with peers. In accounts, veterans reflect on the vulnerability they felt initially upon leaving this bubble to go home. Similarly, each of the groups describe how their common experience of injury created a shared story of recovery, common language and humour causing them to heavily identify and depersonalise their personal identity in favour of a group identity [279]. To reiterate:

... 'what I felt at home was a lot of sympathy, and I didn't like that. What I felt at Headley Court was empathy ...the bit I found hard at home was 'oh poor you', and I didn't like that...it made me feel weaker...' (Vet FG, male SNCO, bilateral, p6)

'*Empathy fuels connection, sympathy drives disconnection*' [494]. The strength of connection gained amongst peers can be seen in the above quotation above, to the extent, as described in this account, the participant chose not to return home at weekends. Connection with their clinician as mentor or coach also provided a trusting human connection of great value and importance as a contextual enabler [446]. Tedeschi and Calhoun [487] present the role of expert companionship as a significant facilitator during recovery following trauma. In the interdisciplinary literature this can take on a learning partnership between clinician and patient [134, 328]. For example, in palliative care, collaborative planning within an interdisciplinary ethos brought clinicians, families and patients into partnership fostering humility, trust and

respect for patient autonomy [328]. Whether this connection is via a mentorship process or a collaboration, trust is recognised as the vital ingredient needing to be nurtured [338]. Veteran accounts are positive, reporting a high degree of trust for their clinicians during their military rehabilitation. However, some [accounts warn](#) that loss of staff continuity and imposed military discipline dispelled trust causing some to disengage and request early discharge.

Human connection has so far focussed upon one-to-one connection. One unique feature of the rehabilitation context was the widespread public and media support which exemplifies a form of connection viewed both positively and negatively by veterans [59]. The attribution of the term *hero* to the combat casualty, and its association with limb loss became a powerful visual symbol of group membership. For the civilian patient with limb loss, the psychological impact of lower limb amputation has been shown to include disfigurement and altered body image, undermining acceptance, and contributing to high rates of depression [479, 495]. For this military cohort, their disfigurement gave them social and cultural capital in wider society, even within their own patient community. They did not hide their limb loss but wore it as a badge of honour.

This celebration of disability within a military sociocultural context and its association with 'heroism' has also been shown in public support for victims of terrorist atrocities or natural disasters, with authors arguing that such support has a positive influence over psychosocial adjustment following trauma [157, 159]. However, from a human thriving and SDT perspective, public acknowledgement of heroism does not offer human connection, nor trust, but a surrogate. Pursuit of public acknowledgement and recognition will not satisfy intrinsic needs. Instead, it becomes an extrinsic motivator which may act to draw individuals away from achieving their intrinsic needs, resulting in a later crisis when public acclaim is withdrawn [292]. The challenge for the clinician, given these circumstances, is how to build resilience so patients can weather public sentiment.

Human thriving comes under the disciplinary umbrella of psychological resilience. Resilience arises from connection, but also from developing a sense of capability (competence) and freedom to act (autonomy) [486]. Psychological resilience highlight goal attainment as a means of breaking down a challenge into manageable portions and measuring personal development so achieving both competence and autonomy, in the skills a patient wishes to pursue.

When a goal centred philosophy becomes a central feature of organisational culture, as it was at DMRC, the progress of the individual and their specific goals become the objective marker of service success, rather than service features (waiting lists or treatments to discharge) [2, 344]. Chapter 10 highlighted how goal centred resourcing helped to drive patient centred innovation and enable a *holistic adaptable approach* to rehabilitation. This approach led to the expansion of Sport & AT, as well as other interest-based opportunities. These functional activities, whilst not occurring within a clinical context, fulfilled a vital

support action bringing meaning to the clinical setting. Self-development through interest-based activities, facilitated connection with others, set around a common task, providing an opportunity to learn new skills, and share coping strategies; ultimately, learning together to adjust to the demands of living with [disability in the real world](#). [146, 496]. These accounts reflect published findings evidencing the effectiveness of skill-based activity used to achieve therapeutic goals in other patient groups [497, 498]. For example, in a series of studies, children suffering hemiparesis took part in magic camps, learning to perform tricks to challenge their bimanual hand function [497, 498]. Significant improvements in hand function and bimanual hand use were found; the novelty of this skill acquisition was a significant motivator, building social bonds – acquiring a skill because of their disability, rather than despite it [497, 498]. This skill offered an identity distinct from their disability.

Rehabilitation built upon a model of human thriving encompasses interest-based activity as a key component. Where clinical delivery adopts an integrated approach, the examples in the literature show how it brings synergy between physical, psychological, and social domains of care at a therapeutic level [328, 330, 499]. The organisational ethos of the CT team, and the model of rehabilitation described in this thesis is one where traditional boundaries became blurred. Interdisciplinary rehabilitation and a holistic view of clinical activity enabled this fluid interpretation, which veterans assumed was the norm. However, they recognised the dominance of the physical rehabilitation culture and the strain created by professional barriers between different domains of care (for example, mental health and the IDT; transition from military into NHS prosthetic services).

Human thriving and prosthetic provision

In the veteran group, 22 out of 24 participants were prosthetic users. As a collective, they were able to speak with authority about experiences of learning to walk again on prosthetic limbs. For many, regaining their independence helped them to regain control of aspects of their lives.

‘walking is the most basic form of human locomotion and one of the most important components of many daily physical activities; it can therefore represent a significant index of human health’.
[500](p119)

Of the ADVANCE cohort, 93% were regular prosthetic users. Analysis of veteran accounts in Table 11.3 attribute prosthetic provision as a process enabler of transition (social / employment) identity or role development, to regain their autonomy and independence and manage the daily demands of life. The prosthetic, therefore, enabled the patient to regain a sense of normality. Using the lens of human thriving,

the system of rehabilitation supports the development of competence on prosthetics, through its emphasis on function, activity, and exercise-based therapy, whilst the IDT approach supports a sense of belonging and autonomy by including the patient within clinical decision making. The system of delivery centred around group therapy with an emphasis upon physical accomplishment causes human connection and communities of learning to flourish in a cohort whose military training encourages proactivity, social connection, and exercise.

Competence: Learning to use the prosthetic. Veteran accounts highlight features of rehabilitation that enabled proficient prosthetic use. The IDT approach and patient centred goals identified meaningful targets upon which a skilled collaborative of clinicians and patient would focus. Early intervention minimised physical decline post-injury. The emphasis upon strength and conditioning, gave patients the physical resources needed to learn to walk. A joint approach between prosthetics and physiotherapy, helped achieve a good prosthetic fit and receive guided instruction needed to perfect their technique. A functional skill focus, trips and sport and AT provided non-clinical activities where groups of patients spent time on prosthetics in semi-supervised circumstances, as well as activities that motivated them to work on specific prosthetic skills during more formal therapy sessions.

Autonomy: Taking control. Service innovation documented in historical accounts of this rehabilitation system [17] was driven by an attitude the clinician group called the *art of the possible*. The clinical team would do whatever was required to enable a patient to achieve their goals. As noted, *goal centred resourcing* resourced this innovative approach. But the autonomy given to the patient and developed as a community feature is exemplified in their accounts when discussing [pain medication](#). Veterans exercised their autonomy, ignoring clinician advice when they felt clinical input undermined their acquisition of prosthetic skills.

Connection: As noted earlier, connection was achieved through the process of group therapy. Time provided by blocks of residential rehabilitation (PIRR) was vital in building trusting relationships between clinicians and patients. Earlier discussion detailed how CoP were formed, becoming a fundamental mechanism offering both connection, learning, and group autonomy.

This discussion illustrates how prosthetic provision became an important enabler of thriving, yet it also remains one of the principal issues veterans now face. To understand why, a comparison of accounts describing military and civilian prosthetic experience was conducted ([Table 11.9 / 11.10](#)). At DMRC, veterans were active partners in their care. Continuity of staff and time were identified as key factors helping to build

rapport and trust between patient and clinician. On transition into the NHS, both continuity and time were lacking, and veterans felt their injuries were assessed in both anatomical isolation (lower limb neuroma, a low back problem) and disciplinary isolation (a prosthetic view, a plastic surgical review). Multiple, separate, time-limited, clinical reviews seeing different clinicians led veterans to feel their provision was fragmented, their experience and knowledge discounted, and the outcome often suboptimal. Given their reliance on prosthetic mobility to maintain lifestyle, and their perception that current clinical provision was undermining this, their accounts are understandably emotive. ADVANCE baseline data was explored as a means of objectively verifying these concerns.

Maintaining prosthetic mobility as a veteran

Consistently, prosthetic users in this study expressed concern over the quality of prosthetic services, and the subsequent functional impact this is having on their lives. A comparison of ADVANCE baseline data with Ladlow [4] findings reveal a consistent 6MWD (Figure 12.1). Prosthetic agility outcomes (AMPPRO and SIGAM) were also comparable for the unilateral and triple group. However, the bilateral group presented a notable decline. Only 34.7% of the ADVANCE bilateral sub-group could walk outdoors in any weather without a stick (SIGAM Grade F), whereas Ladlow [4] previously reported that 91% were able to. AMPPRO scores for the bilateral sub-group were much reduced in the ADVANCE population, reporting a mean score of 37, compared with 42 [4]. The 6MWT is an indication of endurance and function, but it is also conducted on a flat indoor (undemanding) surface, whilst AMPPRO and SIGAM provide an indication of confidence and agility in real-world settings [188, 189, 195]. Although sample size is small (23 vs 63) (Table 12.1) these findings support qualitative reports and so further detailed research on those with bilateral lower limb amputation is suggested.

Analysis of ADVANCE baseline data also revealed that bilateral amputees recorded reduced socket comfort scores when compared with other prosthetic groups ($p=0.03$). Those reporting reduced socket comfort, also reported a higher frequency ($p=0.02$), severity ($p=0.01$) and impact ($p=0.02$) of RLP. Reduced socket comfort was more prevalent in non-community walkers ($p=0.04$), where an association between SCS and SIGAM was found ($p=0.01$). Qualitative accounts identify socket comfort as a reason for prosthetic functional decline, and it is understandable that this will be more pronounced for the bilateral amputee. However, socket satisfaction is a complex subjective feature which may depend upon physical factors such as socket fit, pain or prosthetic features; or psychological factors which affect limb embodiment (acceptance) [501]. Evidence also points to communication between prosthetist and patient being highly influential upon socket satisfaction [502, 503]. This social dynamic, if positive, helps trust and understanding grow, benefitting outcome [502, 503]. In this thesis, accounts indicate a relationship between a social

dynamic and socket satisfaction, but the direction of association is unclear. Further research is needed to identify the pattern of relationship between these factors and its implication for prosthetic services.

This discussion also raises the issue of comparison when complex injury presentations exist. This study defined its cohort around lower limb amputation, but the outcomes and injury demographic presented in each clinical sub-group (unilateral, bilateral, and triple) vary greatly. Comparison based on mobility outcome, was proposed creating categories of *community walker* (those accomplishing the same distance during a 6MWT as an able-bodied community) and *non-community walker* (those accomplishing less distance during 6MWT than an able-bodied community). The ADVANCE uninjured military control group (age 18-38) 6MWD (m) (410m – 864m) was in line with a multi-centre trial which found healthy male, and female (aged 40-80) completed 380m-782m. The uninjured control group 6MWD was, therefore, adopted as an age group indication of able-bodied walking speed. This means of categorisation enabled characteristics common across both groups to emerge, no matter how many amputations they had suffered. For example, non-community walkers suffered significantly higher injury severity when compared with community walkers. Non-community walkers also had lower levels of activity and a higher BMI, illustrating potential health consequences, given the association between this and Cardiovascular Disease [504].

The long-term impact of extensive trauma and particularly traumatic amputation upon the human body is unclear, but evidence suggests that severe physical trauma accelerates the onset of age-related disease, deterioration in bone health and low back pain [505-508]. There is also emerging evidence from the field of epigenetics and phenotype profiling which has found physical and metabolic stress of trauma may accelerate biological aging [509]. Although physical exercise may also curb the action of these phenotypes responsible for aging [510]. Could an active population, such as this cohort, minimise age related decline, by maintaining physical activity. Ongoing research of this cohort is needed to understand the long-term physical, psychological and pathophysiological impact of complex trauma.

Challenging Human Thriving

The conceptual map ([Figure 11.9](#)) in Chapter 11 presents *disablers*, highlighted in veteran accounts. Retaining a focus upon prosthetic provision, key disablers involve mental health (particularly referring to capacity to psychologically appraise and face a challenge), pain management and military to civilian transition (MCT).

Mental Health

Early theorists of thriving recognised the importance of *challenge* as an enabler of growth [511]. Recognising also individuals conduct a *challenge appraisal*, as identified by Bourdieu [246], before confronting challenge,

can help us interpret different responses to the same challenge. For instance, patients recalled the messaging received on arrival at DMRC, from clinicians, pictures on walls, and from seeing how others had progressed. Yet, both veteran and clinician accounts recall that not everyone engaged in rehabilitation. Setbacks and complications were also part of the rehabilitation journey. Neal [162] captured the psychosocial impact of chronic wounds in this population in which *time* was an ever-present concern as patients feared being left behind by their peers. [Veterans recall](#) some who were not ready for physical rehab and so excluded themselves. In so doing they deprive themselves of community, expert companionship and support from others in their position [487]. Self-removal from this challenge prevents them from being able access contextual enablers to thrive [446]. Further research is required to test this hypothesis, to understand this process, and to propose material ways of providing contextual enablers to the patient group, through the rehabilitation process.

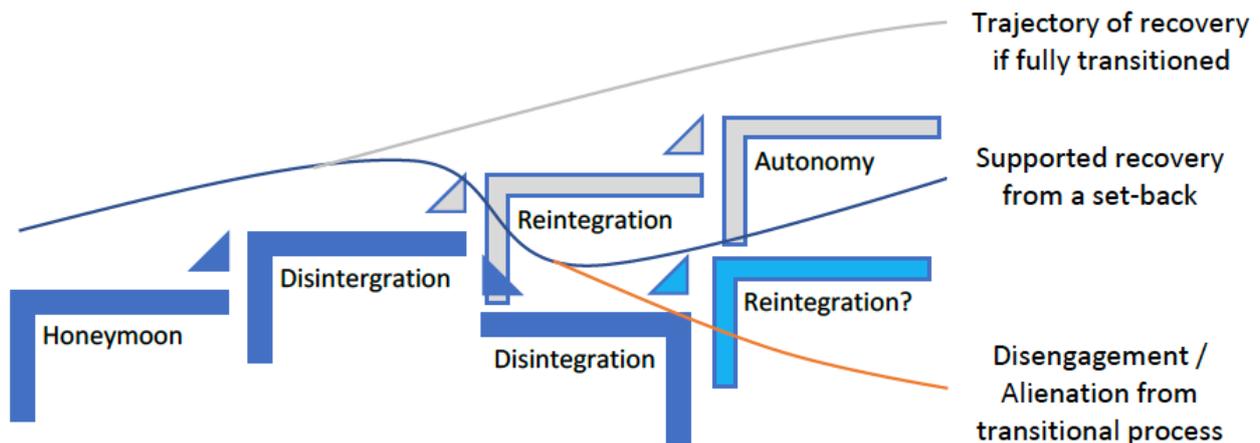
Pain Management.

PLP frequency and severity were rated as moderate to high by 28% and 32% of the limb loss cohort respectively. Only 14.7% declared the impact of PLP to be moderate to high. Whilst 35% report the frequency and severity of RLP as moderate to high, 29.3% report RLP having moderate to high impact. PLP appears to be less problematic than RLP. Prosthetic use is thought to lower incidence of PLP, and this may account a lower incidence [512]. For those interviewed, pain medication was an area of passionate debate. Veteran accounts describe the side effect of medication being a sense of disconnection from their environment and those around. Their willingness to go '[cold turkey](#)' is evidence of both a proactive disposition, and the network of peer support connecting these individuals. Pain can not only impact the rehabilitation process but also an individual's ability to thrive; accounts show the potential for pain medication to become a process disabler to human thriving. Again, this is a critical area for future research.

Transition

MCT continues to attract public, policy and academic interest. Academic study acknowledges the unique characteristics of military culture, the transformation it brings to individuals who operate within it, and the transitional challenge when military personnel move back into civilian society [209]. A military culture of ritual and practice promotes stereotypical behaviour such as physical robustness, ingenuity, camaraderie, and risk taking [161, 210]. The process of military training requires recruits to adopt a way of thinking, cultural forms of language and behaviour to facilitate function within a military context [211]. Military behaviour over time becomes subconscious [210]. Military forms of culture were represented within the *Military Ethos* theme, illustrating its influence upon rehabilitation culture, thereby underpinning the [philosophy of care](#).

Study and policy around MCT assume an individual must prepare for one transition point in time. However, accounts from every focus group, present a transitional experience beginning at the point of wounding and continuing beyond their medical discharge. This may be viewed as a continuum or as a series of setbacks/challenges as individuals adjust to new ways of living [161, 211].



Model of transition using 5-Staged model of culture shock, showing the impact of a set-back having not fully transitioned and theoretical trajectories of subsequent recovery (Bergman 2014)

Figure 12-2 Model of transition developed from Bergman et al (2014) synthesis of transitional theory

Veterans highlighted transition as one of their principal issues, whilst some refer to MTC transition, others see their transition starting [at the point of injury](#). Figure 12.2 was extrapolated from Bergman [211] analysis of MTC transition, yet it fits accounts describing both scenarios. Recognising the challenge appraisal personnel undergo as they become aware of their injuries, medical initiatives sought to support the early phases of adjustment by helping the soldier to navigate through phase of *disintegration* and *reintegration* [201, 209]. In Section 1, the concept of the [Military Bubble](#) created at Royal Centre of Defence Medicine (RCDM) was introduced. It sought to insulate the soldier and their family from discrepancies in military and civilian services and to ensure the soldier was provided for throughout their recovery. At DMRC, veterans refer to the 'Headley Bubble,' recognising that during blocks of PIRR, they felt safe to attend to their physical rehabilitation.

The prolonged rehabilitation of this patient group, on average over 34 months [4]) involved PIRR, followed by home leave. This rhythm forced patients to socially transition at home, whilst socially connecting with peers at DMRC. Bergman [211](citing Pedersen [218]) (Figure 12.2) shows how social connection, particularly when part of a social process such as [CoP](#), helps individuals to face challenges and setbacks together. Collective strength enables *reintegration* as they experiment with exercising *autonomy* in a social

setting. This hypothesis resonates with accounts describing the initial vulnerability felt when returning on home leave after their first few admissions to DMRC, confronting memories of how life was, the reaction of family and friends, the complexities of living life with a disability and feeling like the '[freak in the street](#)'. Whilst initially some felt abandoned during home leave, most recall a gradual social acclimatisation; attendance at DMRC became less important. However, this appraisal was based on their physical progress. Qualitative accounts raise the fact that physical, psychological, and social recovery did not occur in tandem. Some participants progressed in their physical rehabilitation, but they still face the [same psychological questions](#).

Some focus group accounts suggest they reached a stage of *reintegration* or *autonomy*. They also found a way to leverage the cultural and social capital they held as battle casualties to support their social transition and find new opportunities outside of the military. For others their injury and circumstances made it intolerable to remain within a military culture, and in response to their sense of disintegration, they sought control [211, 218]. [Appendix 27](#) presents a veteran's verbatim account describing the destructive choices made as the social and psychological fabric of his life unwound following discharge. Human thriving, developed within elite sport, encompasses transition recognising the challenge the full-time athlete faces when their career comes to an end [486, 489]. Destructive decision making, seen in appendix 27, occurs where individuals are proactive (internal enablers of thriving) but devoid contextual enablers of thriving, such as human connection. [Appendix 27](#) is an account of someone who existed on the periphery of the amputee cohort during rehabilitation, but from the transcript evidence is now connecting with significant others, with help from BLESMA. Others described the *disintegration* experienced during transition as a '*drop-off*' (Vet FG3 p14) and '*panic*' (Vet FG3 p14). This transition experience undermined their trust in the system and could account for their ongoing suspicion that they will one day be forgotten. Qualitative accounts describe a linear transition policy, rather than an agile, collaborative, empowered model for a complex situation [236]. Voting data also reveals that their sense of abandonment upon re-entering civilian life was not due to their social transition, but healthcare transition [437].

Healthcare Transition

Veterans' experience of healthcare transition recognises the cultural differences between defence rehabilitation, resourced to expedite recovery and orientate rehabilitation around the needs of the patient, and the NHS which provides:

'a comprehensive service available to all....access to NHS services is based on clinical need...' [84].

However, it is argued that the sense of abandonment and profound challenge appraisal did not arise from cultural change, but from a loss of connection and support as they sought to navigate this new terrain. For those interviewed, prosthetic provision presented the greatest threat. To understand this dual dynamic of transition and prosthetic provision, positive and negative examples identified by veterans have been interpreted using a framework of human thriving ([Table 11.10](#)). With prosthetic provision as the case example, a model of thriving was then constructed from this framework (Table 11.10), veteran accounts, and the theoretical construct. It acknowledges the challenge of culture shock and the need for supported reintegration [218] as well as the contextual enablers required to develop a sense of capability and autonomy (Figure 12.3). The result is a model of thriving which is intended to help plan and evaluate clinical services to enable patient thriving.

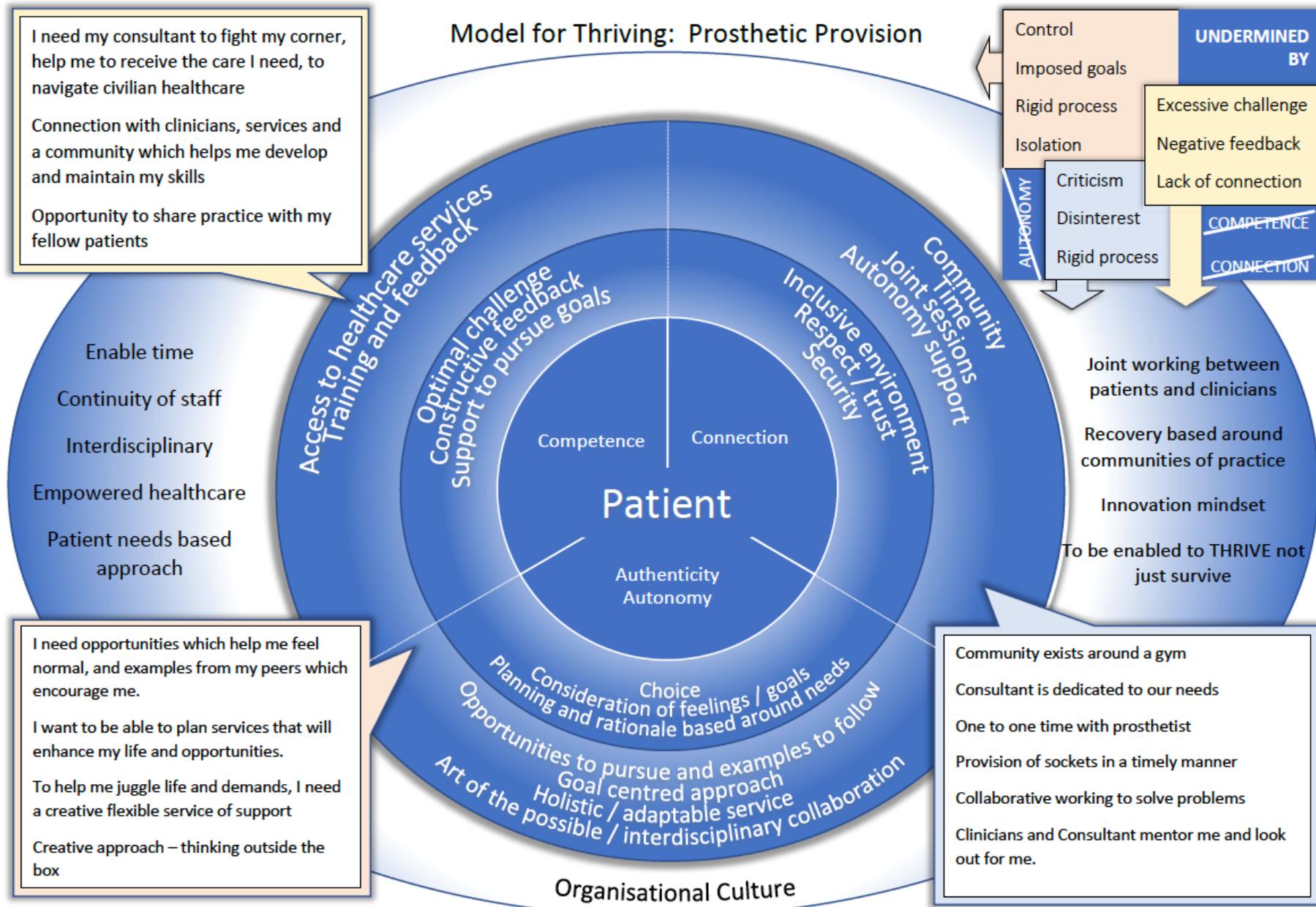


Figure 12-3 Model of Thriving: Using civilian prosthetic provision as an example of how service planning can be performed using the model of thriving, developed in this thesis.

Model for thriving

Thriving as a concept, has been modelled for the workplace, but not for a clinical service or patient group [428, 496]. Workplace models recognise the importance of learning and trusted connection with peers [430, 448, 513]. The transformational role of the leader, empowering and engendering trust is the central figure in these models [234, 451, 513]. Veteran accounts do not discuss clinical leadership in any depth. Positive and negative statements contrast the military consultant, regarded as an instrumental figure who initiated and coordinated services, with the NHS consultant who is absent ([Figure 11.9](#)). Only Focus Group 4 reports positively, otherwise, this lack of clinical leadership, left patients feeling bereft or abandoned ([Figure 11.9](#)).

This discourse fits with Bourdieu's concept of the field of struggle ([Section 2](#)). Previously, the military consultant or clinical lead was their reference point and information source as they sought to contend with uncertain outcomes and recovery challenges. Having transitioned into the NHS, uncertainty takes on new forms, but they are without a navigator. How the individual appraises this challenge will depend on their assessment of their capability and support. Figure 12.3 uses cross cutting categories ([Figure 11](#)) as a framework, into which paraphrased patient statements illustrate how service provision may be crafted to facilitate transition and human thriving. These statements, and hence this model, all centre on human and organisational process, not clinical treatment. The first step involves learning to navigate organisational culture.

Competence. In lieu of a care coordinator (overall senior clinician or consultant), each group recalled the realisation they needed to develop competence. A sense of abandonment was consistent in each focus group. Some responded with positivity, feeling they were lucky, others fought for what they wanted, some remained silent, and others disengaged. Suggestions proposed all contained a common theme, seeking an advocate or expert coach. For instance, a suggestion to phase prosthetic management into the NHS prior to medical discharge allows veterans to learn the system, knowing that if problems arise the military would be their advocate. But an advocate or coach also holds those engaged in this interaction to account, and in so doing, aids connection.

Having a mentor is so important...someone that holds you accountable for what you're doing and someone you can bounce ideas off...put(ing) a little bit of realism against what you're going to do (Vet FG2, p47)

Connected. Accountability to ensure proactive engagement between military and NHS colleagues to aid a smooth transition was felt to be missing. Models of thriving emphasise the importance of trust [513]. Prosthetic satisfaction is also believed to be related to the communication and trust held between prosthetist and patient [502, 503].

It is a little bit of a postcode lottery as to what prosthetist you get and what their attitude is, to what service you get. (Vet FG 3, p20)

An advocate, providing support to service leaver and civilian clinicians, should seek to nurture trust. But it is argued that a veteran's human need for belonging, their positive experiences at DMRC, and their identity as an amputee, caused them to seek community in their prosthetic centre. Accessible leadership is a critical part of this community. The gym was identified as neutral ground where clinicians and patients could interact on equal terms.

Autonomy. Participants want to determine their own goals, supported by clinicians who know them, and understand their social context. Many of this cohort have developing careers and growing families. They seek healthcare that does not constrain or undermine their lives but works with them. To be known, relies upon developing a relationship based upon trust. To be autonomous is not only about empowerment but being equipped to realistically appraise their own goals [292, 293].

Positive examples of health coaching and advocacy describe, for instance, clinicians and patient working jointly to explore prosthetic options to support their occupation or family requirements. It is this degree of autonomy, patient-clinician connection, and patient confidence in their capability which a service, built upon a model of thriving, seeks to achieve.

Tell me and I will forget.

Show me and I will remember.

Involve me and I will understand.

Step back and I will act.” (Chinese Proverb)

This Chinese proverb illustrates what a thriving rehabilitation context seeks to achieve. The dual challenge of transition and prosthetic provision is that the advocacy and coaching started in the military rehabilitation setting did not extend beyond it. Financial or clinical solutions are not needed for the veteran in this context, but an altered social and organisational process integrating military rehabilitation with civilian services, both adopting advocacy and health coaching as common features. Appreciating the complexity of the NHS as an organisation and the ongoing clinical complexity of the veteran, further emphasises the need for a nominated clinical lead. Veteran accounts where this is the case are positive and trusting.

This finding proposes a refinement of process and culture to make best use of NHS services. The role of advocacy and health coaching in these complex cases now forms part of NHS policy direction [514]. Given the health needs of this cohort, if such a role can enable this cohort to remain active, the benefits for the

individual and service resources may prove considerable. A cost benefit analysis would ascertain if this is the case. Wider consultation is needed involving both providers and patients.

Taken as a whole, this discussion points to an opportunity to reframe rehabilitation, structuring complex rehabilitation services around a patient's intrinsic needs. In so doing, provision becomes a synergy of physical, social, and psychological inputs, rather than the sole domain of one dominant approach.

Summary

ADVANCE data showed that veterans suffering traumatic lower limb amputation following combat injury remain highly active and proficient walkers using prosthetics. Conventional wisdom supports the importance of prosthetic mobility as an outcome determinant [113, 515-517]. Veteran focus group participants assert that prosthetic provision is, for them, the principal component of rehabilitation, and that ongoing provision is their greatest concern. ADVANCE findings suggest, however, that it was not prosthetic mobility that enabled optimal biopsychosocial recovery in this population. By triangulating different research methods, the importance of the prosthetic is not denied, but a robust explanation as to why this cohort have thrived independently of their prosthetic ability has been submitted. The mixed method research strategy has identified the occurrence of human thriving, irrespective of amputee mobility status. Apparent in veteran accounts are four cross-cutting thematic categories: *competence*, *connection*, *autonomy*, and *organisational culture*. Collectively, they reveal that a key rehabilitation component is the social dynamic within the setting, rather than simply material factors (such as prosthetic provision). This finding is consistent with published research on human thriving and PTG [277, 446, 487, 489].

Where *competence*, *connection* and *autonomy* coexist and interact (Figure 11.1), analysis of qualitative data proposes that outcomes centre upon the individual's ability to feel connected with others in a similar situation. From this connection, they seek to gain competence in the skills they perceive (from others and themselves) important to help them achieve a sense of autonomy and independence in life. Previous research on amputees recovering in isolation has identified the prosthetic as a key component of rehabilitation. Yet, the cohort in this study recovered in a group setting. They identified with each other's limb loss and the group nature of rehabilitation initiated a CoP upon which this connection rested. The final stage of their journey was not 'recovery', but discovery, and hence growth or human thriving. Enabled by the breadth of rehabilitation they were supported to pursue new opportunities. The key components of rehabilitation are, therefore, those processes and practices that enable a patient to achieve:

1. Human connection, initially within their community of suffering, and their clinical team, but later to transition this into wider society.
2. Competence and capability in their chosen pursuits, providing them with a sense of independence.

3. A sense of autonomy or independence so they can make supported choices pursuing new interests and meaningful activities, providing them with self-worth.

Further research is needed to test these categories in different settings. Rehabilitation should shift the spotlight back on the individual, driven by a goal centred approach; this demands provision is reframed to achieve synergy and interdisciplinary partnership between physical, social, and psychological domains of health. Rehabilitation no longer occurs at the end of the patient journey but starts at the point of survival.

These findings do not reduce the importance of the prosthetic or prosthetic care to those who have suffered limb loss. ADVANCE data suggests that socket discomfort is having a functional impact particularly in the bilateral limb loss group. This requires further investigation. Further, the implications on physical health are becoming increasingly apparent for this cohort, for example, bone health, OA and obesity [470, 505-508]. Maintaining their mobility and high activity appears to protect against physiological decline, and this shifts the emphasis back onto the prosthetic [142, 470, 518].

Normalisation of the limb loss cohort in contrast to their fellow combat casualty who did not suffer amputation demands further scrutiny. First, it points to a social dynamic which may have a beneficial effect upon outcome; one that is often ignored when planning clinical care. Second, exploratory work is needed to extend this research to those who did not volunteer for ADVANCE and may not have achieved proficiency on prosthetics, to confirm if human thriving is also evident.

Therefore ADVANCE, and qualitative findings may reflect an unintended selection bias. Those participants enjoying a more positive rehabilitation experience and outcome may have been more likely to volunteer for these studies. ADVANCE managed to recruit 50% of those known to have suffered amputation; the qualitative study recruited just two non-prosthetic users. Underrepresentation of non-prosthetic users in both studies means that further research is needed to establish if these findings extend beyond the current cohort.

Using human thriving as a conceptual framework for the planning of clinical care also requires further empirical testing, but it may be a useful service evaluation tool. Prosthetic provision and transition data have been scrutinised and discussed in this chapter in relation to their role in enabling or disabling human *connection, competence, and autonomy*. This fusion of theory and findings helps to build an understanding of human thriving, rehabilitation planning and evaluation which could be applied to both clinicians and veterans.

SECTION 4: Summary

*'Human beings need three basic things in order to be content:
they need to feel competent at what they do;
they need to feel authentic (and autonomous) in their lives;
they need to feel connected to others.'*

These values are considered "intrinsic" to human happiness and far outweigh "extrinsic" values such as beauty, money and status.'

Junger [185] (Ch 1, paragraph 33).

This is the first exploratory study to investigate the rehabilitation of a cohort of British military combat casualties, all of whom suffered lower limb amputation. It is also the first study to conclusively establish their physical, psychological, and social outcomes. Despite presenting with some of the highest injury severity scores ever recorded, baseline ADVANCE data reveals that 91% regularly ambulate on prosthetics, with 66% presenting equivalent walking speeds and endurance to non-injured military controls. Psychosocial metrics, in this cohort, are within normal ranges and are in line with matched uninjured controls. These positive holistic recovery outcomes present this cohort as an example of human thriving [446]. In contrast, ADVANCE data from injured non-amputees present significantly higher levels of anxiety, depression and PTSD [478]. Consequently, there is a need to understand what it was about the limb loss cohort and their experience of recovery that enabled these outcomes. The conclusion from this study, is that the key component of care enabling this outcome is the social dynamic within the rehabilitation setting. This dynamic enabled individuals to connect into a patient-led community, within which, they learned to adjust to a new way of life. This in turn, helped them to grow in confidence and pursue new directions. However, this community involved patient and clinician; the outcome of human thriving is evidenced in both participant groups. Equally important is the style of leadership employed and the organisational culture nurturing this social dynamic.

The findings of this study emerge because of the pragmatic mixed method approach enabling triangulation of qualitative and quantitative findings. Understanding the nature of a complex setting in which these events occurred, underlines the importance of adopting a mixture of research tools, although healthcare as a social CAS is rarely investigated in this way [519].

Adjustment of the MRC framework has underpinned this method and helped mould the iterative approach; illustrating the cyclical way evidence has contributed to growing understanding. The NGT focus group format provided a structured approach encouraging contributions from all participants, whilst minimising

deviation from the discussion topic. Verification using qualitative and quantitative data, has also been found to be instrumental during theory development, triangulating findings and generating robust explanatory accounts. A combination of framework analysis and conceptual mapping has aided presentation, whilst informal field notes and memos have supported ongoing hypothesis development in NVIVO 12.

In drawing together findings and discussion from veterans, clinicians and clinical managers for the implications and conclusions of this study it is clear there is significant overlap. Military rehabilitation as a social CAS is characterised by uncertainty and change. The cultural shift enabling an effective response in these circumstances occurred with the introduction of the IDT. Removal of disciplinary boundaries in favour of this collaborative approach, enabled an agile innovative spirit, peer support and an empowered group dynamic. Although engagement in any team process remains an individual choice, it is one that leaders can influence if the nature of this choice is understood.

Both veteran and clinician accounts graphically detail a process of appraisal as the trauma of their experiences thrust them into a place of uncertainty and threatened to evoke a sense of insufficiency and isolation. The collaborative emphasis within the IDT process enabled connection across disciplinary boundaries, between clinicians and patients, and across the patient group. Their collective effort enabled a response which had disciplinary breadth, facilitating learning between clinicians, patient groups, and between patients and clinicians. CoP have been identified in both groups; powerful settings where individual and collective discovery occurred, and a sense of autonomy developed. Individual engagement within an IDT enabled both patient and clinician to achieve their intrinsic need to feel *competent, connected, and autonomous*. In literature, the IDT is typically presented as a clinician forum [328, 330, 400]. Accounts in this thesis suggest a more fluid arrangement in which the patient is welcomed as an active member in goal planning and decision making. The IDT process grouped different disciplines according to patient need rather than by disciplinary specialisation. Sharing of patient goals focussed attention on patient need, and the emphasis placed upon these goals welcomed patients into this process. Whilst the IDT approach was instrumental in refining the organisational culture, both clinician and veteran recognised the role of *proximity and leadership* as enablers of collaboration, exploration, and trust.

The model of human thriving used to explain the amputee's extraordinary achievement as indicated by the ADVANCE baseline data, draws upon a similar view of intrinsic need. To thrive, following limb loss, the veteran must be able to satisfy their intrinsic needs through recovery. However, veterans and clinicians referred to patients who had excluded themselves from the military rehabilitation setting, owing to psychological trauma or dominance of the physical rehabilitation approach. Ongoing psychosocial adjustment because of trauma, may preclude them from being able to appraise the rehabilitation challenge as attainable. Equally, given the emphasis upon physical rehabilitation at DMRC, if they perceived they would not progress physically like others, they may have chosen to disengage. These negative cases illustrate the need to elevate the IDT approach to a strategic, not just clinical, level. Rehabilitation must,

therefore, be reframed with greater synergy between physical, psychological, and social domains of care. Given the potentially negative implications on those who disengage from rehabilitation and so transition without support, more research is urgently needed within this population [201, 219, 520].

Within clinical group accounts, the value of the IDT approach in a complex setting was only apparent when comparing MDT data.

MDT and IDT Accounts. In the clinician group, marked attitudinal differences were noted between MDT and IDT accounts. Evaluating accounts using the InterPACT showed that MDT clinicians, located in monodisciplinary teams felt isolated; their specialisation alone was insufficient for the task and they felt disempowered by their leadership to alter these circumstances. The psychological impact upon the MDT clinician can be seen in negativity towards team and leadership, and high staff turnover. These contrast vividly with IDT accounts, characterised by trust, camaraderie, empowered clinician-led innovation, and reports of growth. Comparative accounts serve to also highlight differences in *leadership* and *organisational culture*. IDT leadership was distributed; MDT leadership was hierarchical. In the IDT, proximity between clinicians existed; within the MDT, disciplinary boundaries created distance.

This evaluation of the team dynamic has been carefully verified. It reflects findings published within the wider literature emphasising the importance of employing an agile leadership style and fluid team structure dependent on task and context [234, 448, 513, 521]. The case of mental health adds further weight to this explanatory account.

Mental Health. Mental health, as a specialty at DMRC, was established outside of the IDT and geographically sited away from treatment areas. IDT clinicians felt they lacked access to this specialisation, creating a profound tension across the clinical team. The introduction of a weekly mental health forum brought clinicians together who shared this interest. This initiative brought mental health and the IDT into partnership, connecting clinicians with a common interest, albeit from diverse disciplinary backgrounds. This forum enabled skill sharing and supportive decision making, providing a CoP uniting clinicians from across the spectrum of IDTs within DMRC. This initiative does not fit neatly into a defined model of teamwork. Evidence presented in this thesis challenges the dichotomous definitions of teamwork (IDT, MDT) often adopted within healthcare [2, 338]. This instance supports a more fluid articulation of teamwork as a continuum, enabling the leader to adopt components relevant to task and setting [2]. As healthcare becomes increasingly complex, not least with responses to COVID-19, the adoption of fluid and innovative organisational structures is needed to achieve the synergy occurring when task and team are aligned, and professionals from different disciplinary backgrounds unify around common struggles.

Junger [185] refers to this paradox where individuals find fulfilment in a common struggle, as a *community of suffering*. For the clinician and veteran, the common struggle helped form this community. But veteran accounts recognise that cohesion came from a need to learn *and* shared empathy. Analysis of prosthetic provision and transition data, key areas of veteran recovery shed further light on this process.

Prosthetic provision. A model of thriving has been used to explore the interaction of components within the rehabilitation setting, showing how they have been enabled or disabled by features of the setting. This method of analysis revealed the centrality of the social dynamic within prosthetic fitting and use. Clinician group data centred on innovation through joint working (e.g., physiotherapist working alongside prosthetist), whilst veterans highlighted how peer support and group therapy encouraged camaraderie and competition, providing a sense of belonging, shared practice, and inspiration as they learnt to use prosthetic limbs. Group therapy provided the platform from which community could emerge and the activity provided the purpose. Sport, AT, and social trips offered real world opportunities around which connections were formed, prosthetic skills tested, and individuals shared how they lived life with disability. This skill-based approach also contributed to an identity centred around these activities, not their injuries; informed by patient goals and thereby driven by the veteran. The rhythm of admission and home leave informed this process too, significantly contributing to the formation of community.

Key disablers have been identified during this analysis, military discipline, staff continuity, and pain medication. Pain medication whilst of initial value, caused side effects leading many to act against medical advice, and *'go cold turkey'*. This action was supported from within the patient community, who reported the benefits once over any side effects. These accounts challenge clinicians' views of medication and its role, and evidence the way in which this CoP enabled patient autonomy to grow.

Following transition to civilian life, the experience of NHS prosthetic provision was not so positive. Most groups expressed a struggle to connect with civilian services; undermining their ability to maintain prosthetic function. ADVANCE data revealed that bilateral amputees recording low socket satisfaction scores had significantly lower functional scores and higher incidence of stump pain. Clear association between lower prosthetic function and higher BMI is also apparent. The implications of low activity levels on physical and functional health demand further urgent scrutiny for this population.

The importance veterans placed upon prosthetic provision and the implications from ADVANCE data, justified further scrutiny of veteran accounts relating to their prosthetic experience. By evaluating accounts using a framework of thriving, positive and negative experiences were clustered into categories representing the three intrinsic needs (*connection, competence, and autonomy*) and *organisational culture*. This demonstrated that the way the prosthetic service is delivered either enables or disables an individual's ability

to fulfil their intrinsic needs and thereby thrive ([Figure 12.3](#)). To fully appreciate issues of provision, an understanding of transition is also required.

Transition. Transition is reported as a negative experience by all veterans who participated in this study. Bergman's [211] model of cultural transition provides a theoretical view resonating with their accounts. The system of military rehabilitation supported social acclimatisation, but medical care remained within the military up until medical discharge. To understand the profoundly negative impact this sudden disconnection had from a familiar system of clinical support, differences in service and veteran views of transition need to be understood in context. The service view is that medical discharge is the point of transition when healthcare continues within the NHS. For the veteran, transition commenced at the point of injury. This journey had been about regaining autonomy. Medical discharge became a cliff edge experience, removing access to a culture of care they understood, and placed them into a system they struggled to navigate. This experience threatened all they had achieved, accentuating senses of isolation and loss [211]. It is likely that some of the frustration expressed towards civilian prosthetic care is a consequence of this transitional experience.

Veterans' solutions align with transition research in proposing that a system of advocacy or mentorship would support NHS transition prior to or during their discharge [211, 218, 489]. Such an initiative would help the veteran to navigate this different clinical system and provide a reference point for clinicians who need to understand the military culture. Further applied research is needed to evaluate such a strategy.

In conclusion, the social dynamic within the rehabilitation setting has been identified as a key enabler of veteran outcomes documented in this study in veteran and IDT clinician accounts. Data from this cohort proposes that a framework view of provision that seeks to enable a patient *'to feel competent at what they do...to feel authentic (and autonomous) in their lives...to feel connected to others'* [185] Ch1, para 33) could yield social, psychological, and physical benefits for both patient and clinicians involved in their care. Structuring the delivery of rehabilitation around a model of human thriving, shifting the focus away from anticipating the generic patient journey, towards a more agile and personal system of delivery, is vital in complex settings. Veteran and clinician accounts resonate with the literature, recognising that the ability to meet individual intrinsic needs is an output of the organisational culture, and achieved through nurturing collaborative, team-based leadership.

Conclusion, Implications and Reflections

This section commences with a summary of concluding statements and implications and is followed by the author's personal reflection of the methods, findings and implications.

Concluding Statements

This study investigated a cohort of combat casualties who should not have survived their injuries but did. These casualties should be living lives defined by their disability, but they are not. This thesis has shown that this patient group continue to exhibit remarkable physical and psychosocial performance measures, enabled by a system of care centred around a social dynamic. It is this social dynamic which allowed the veterans to meet their basic psychological needs, to feel connected, competent, and authentic, and consequently to thrive.

Concluding statement 1:

[Having suffered some of the highest injury severity scores ever recorded, this cohort has achieved and maintained mobility levels matched by few others.](#)

ADVANCE baseline data shows 67% of veterans with lower limb amputation walk at an equivalent speed to an uninjured control group. Over 75% record agility outcomes equivalent to an active adult (AMPPRO), with 89% regularly mobilising outdoors on prosthetics (with or without an aid). Significantly, these outcomes compare favourably with an earlier outcome study of a smaller cohort at their point of medical discharge [4]. [Comparing outcomes by limb loss](#) reveals that whilst those with unilateral and triple amputation have maintained their functional capability, the bilateral group shows a decline in physical function.

Concluding statement 2:

[Having suffered some of the highest injury severity scores recorded, this cohort presented with psychosocial scores equivalent to non-injured military controls.](#)

ADVANCE data revealed that psychosocial recovery occurred across the cohort irrespective of prosthetic mobility or other intragroup factors (age, rank, etc). This surprising outcome was limited to the amputee cohort. Combat casualties who did not suffer amputation reported elevated levels of depression, anxiety and PTSD when compared to non-injured military controls [478].

The findings of this thesis suggests a social group dynamic specific to the amputee cohort. In seeking to understand the *key components required to manage the complex rehabilitation needs of the military lower limb amputee* this thesis adopted a theoretical construct to inform the analysis of clinician and veteran data. This analytical process revealed a series of interactions between social, psychological, and cultural components, which were subsequently illustrated within conceptual maps. From this, four vital cross-cutting themes were identified.

Concluding statement 3:

Human connection, competence, autonomy, and organisational culture are the key cross-cutting themes displaying how components of rehabilitation interact.

Themes within each cross-cutting category illustrate how each category is enabled or disabled by rehabilitation activities or cultural features of the setting. For example, how a community of patients and clinicians formed (human connection), and which activities supported this; how this community helped them to develop the skills needed when living with limb loss (competence); how opportunities promoted in the rehabilitation developed a group identity encouraging the exploration of new skills or experiences (autonomy), and how a setting enabled or frustrated this dynamic (culture).

These cross-cutting themes illustrate how psychological needs were achieved, which in turn offers explanation for unexpected physical performance, well-being and holistic functioning. Collectively these outcomes evidence a concept known as human thriving [446]. Indeed, where cross cutting themes illustrate needs were not being met, participant accounts suggest they struggled. The concept of human thriving also helpfully explains how personal attributes of thriving, many of which are developed in military training, must also coexist with contextual enablers. Contextual enablers are those activities and settings that provide challenge, connection and skill acquisition. Explanatory theory developed in this thesis therefore presents how these cross cutting themes are a critical pre-requisite for human thriving.

Consultation with clinicians and clinical managers involved in the delivery of the rehabilitation to this group further substantiate these findings. Where clinicians felt connected with other clinicians outside of their profession, they reported a collective competence, empowering them to act freely (autonomy) with the support of their colleagues. Analysis of clinician accounts show expressions of trust, positivity, and resilience. Whilst no quantitative measure of resilience is available, qualitative reflections illustrate a sense of growth and human thriving. However, the difference between veteran and clinician accounts is the emphasis clinicians placed upon organisational culture and process determining whether they experienced the contextual enablers they needed to thrive.

Concluding statement 4:

A sense of *connection, competence, and autonomy* was reported almost entirely by clinicians and clinical managers working within the highly collaborative Interdisciplinary Team (IDT), but not those working within a Multidisciplinary Team (MDT).

The IDT and MDT are fundamentally different team constructs. Whilst the IDT share team goals and are collocated, the MDT clinical disciplines work in parallel, pursuing their own goals working within professionally defined locations or departments, their activity being coordinated by an MDT clinical lead. In this thesis, IDT clinicians reported positively on their experience of collaboration, peer support and leadership. In contrast, those working within an MDT did not report connection with those outside their professional specialty; they expressed self-doubt about their capability; and were frustrated by leadership interference. The Cynefin framework was used in this thesis to illustrate the unique approaches needed to manage the complex setting [231]. Collaboration, experimentation, empowerment, idea generation and skill diversity are essential responses, and these were seen in IDT accounts, enabling a creative and agile response in this complex setting [82, 306]. In contrast, professional boundaries maintained within the MDT approach, denied these teams with the capability to respond adequately to the demands placed upon them. Xyrich *et al* [2], however develops this point arguing that defining teamwork around a fixed binary concept, such as IDT and MDT denies the leader with the tools needed to respond in a complex situation. Instead, the social setting should be viewed as a continuum, in which concepts that make up teamwork can be adjusted to ensure the social dynamic aligns with the setting. In these circumstances, a culture of learning, experimentation, and reflection is also critical, enabling knowledge and practice to evolve [231]. Previous work studying patients in a military rehabilitation setting identified a concept of social learning known as communities of practice [162]. This thesis confirms this observation and extends it to include both clinicians *and* veterans.

Concluding statement 5:

[The vital component in managing complex rehabilitation is a culture centred around a social learning system that enables human connection; encouraging individual autonomy and competence.](#)

For both clinician and patient, this cultural approach appears to bolster resilience amid complexity and uncertainty, turning the challenge into an opportunity to thrive [277, 446, 486]. Translating key statements and findings to inform service design and evaluation has led to the development of a [patient model of human thriving](#). The central theme within this model is the creation of a learning community which exemplifies a highly collaborative non-hierarchical approach, achieving proximity between diversely skilled and empowered healthcare professionals [231, 236]. Aside from the positive accounts illustrating the value of this approach, this thesis also documents the personal and service impact when synergy between the

domains of physical, psychological, and social health is not achieved at either a tactical or strategic level. This thesis recognises that such a learning community is central to achieving the preceding five concluding statements. However, the principal enabler of this approach and organisational cultural is leadership.

Concluding statement 6:

Leadership, as the principal enabler of this culture of connection, autonomy, and competence is therefore the key component in providing effective care.

This study has shown the negative impact of hierarchical and Newtonian processes in a complex setting. The need, therefore, to train leaders to recognise and manage complexity, to nurture trust at both strategic and tactical levels, and facilitate collaboration, is critical [238, 239, 247]. To ensure future effective management of complex rehabilitation needs of military lower limb amputees, a skilled and versatile leadership approach is required that understands complexity, promotes collaboration, ensures continuity, and empowers innovation. This style of leadership will instil an organisational culture that enables human connection, and a sense of competence and autonomy for both clinician and patient.

Implications

Implication 1:

When the research setting is complex, the research design must consider the characteristics of complexity to ensure a robust conclusion is achieved.

Recognising the setting as complex and adopting complexity theory as the ontological foundation of this study has informed the research approach. A pragmatic methodological stance enabled multiple perspectives to be captured, encapsulated within an adapted Medical Research Council (MRC) framework. Adjustments made to the [MRC framework](#) in Section 2, and the sequencing considerations documented in [Section 3](#) demonstrate how this study has ensured a flexible and iterative approach whilst retaining methodological rigour.

Implication 2:

Systems of healthcare need to recognise the demands of the setting and adjust as required. Training is needed to produce versatile leaders who can respond appropriately, facilitate interprofessional collaboration and trust, incentivising a culture of empowerment and innovation.

Within the contextual and historical narrative of Section 1, the increasingly complex nature of everyday life [was presented, together with the complex challenges faced operationally in Afghanistan and Iraq](#). Similarly, recent events following the COVID-19 pandemic have brought the systemic inefficiencies in healthcare to light [83, 339, 448, 449, 456, 499]. Interaction between psychological, physical, and social aspects of health are rarely considered in service design. The overwhelming nature of COVID-19 and long COVID has caused many to question fragmented delivery systems, particularly in primary care and rehabilitation [449, 454, 456]. Using these examples, this study challenges the use of traditional hierarchy leading healthcare in complex settings. Designing provision around complexity appears to support patient outcome and employee resilience, yet it challenges the traditional role and style of leadership and financial management in healthcare. However, findings from this study warn of the detrimental effects upon individuals and outcome when the setting is ignored and leaders fail to nurture a collaborative and agile approach centred upon patient outcome.

Implication 3:

Leaders need to be trained to recognise different settings and incentivised to adjust their approach and their team's interaction. Annual reporting of military personnel must promote versatile and collaborative styles of leadership and organisational design.

Defence Medical Services demonstrated their capability to transition from a linear consultant led model of care provided within the military hospital during the Cold War, to an expeditionary deployed force able to provide UK standards of medical care across the world. The lessons presented in this study propose that organisational culture within the military must promote a more versatile leadership capability, being both commander, and enabler, determined by the setting. Teamwork in healthcare should also look beyond binary or professional definitions but must be considered as a [continuum](#) [2]. This conceptual view of teamwork provides greater role clarity particularly when personnel operate between different cultures of care and where communication is critical. It also equips the leader with the means to make fine adjustments to the team, refining operations in the face of rapid change and uncertain outcome.

Implication 4.

Defence rehabilitation must be reframed to encompass psychological, physical, and social domains of health, providing a more seamless and trusting co-dependency between clinicians and service leads.

Defence rehabilitation is a physical rehabilitation service, yet this study has shown that complex injuries require a seamless approach between psychological, physical, and social domains of care. The introduction

of a unit wide mental health special interest group at Defence Medical Rehabilitation Centre, Headley Court (DMRC) served to connect interdisciplinary teams, providing a link between physical rehabilitation and community mental health services. This initiative was identified in this thesis as an example of how psychological, physical, and social domains of care could coexist.

Implication 5.

A model of human thriving offers a novel way to categorise, plan and evaluate healthcare / rehabilitation activity around an individual's intrinsic needs. The goal of this approach is to enable the patient to experience human thriving despite the trauma they have suffered.

A model of human thriving has been used in this thesis as an explanation for the outcomes attained by military personnel suffering limb loss [446]. This model is a conceptual approach categorising activity within a rehabilitation setting around the goal of enabling the patient to achieve human connection, a sense of capability and their ability to feel independent. Application of this model to transition (from military to civilian) and the provision of civilian prosthetic services, demonstrated its theoretical utility supporting service design and evaluation based on patient need ([Figure 12.3](#)). This exercise also illustrated the need to reframe our understanding of rehabilitation adopting an overarching and inclusive definition encompassing physical, psychological and social domains of health. To achieve transferability and confirm the application of this for civilian practice requires empirical testing using different patient cohorts in military and civilian settings.

Implication 6:

The rhythm of intensive rehabilitation, together with the functional skill-based approach, drawing on non-clinical leisure-based activities, led to personal growth opportunities, supporting patient transition, and building a community of support.

Using a human thriving lens, features of the rehabilitation service which contributed to patient growth were evident. For example, periodic intensive residential rehabilitation and sport, Adventure Training and trips were highly rated due to the sense of community they fostered. Patients experienced living life together, observing each other overcoming common challenges, sharing ideas, providing mutual support and finding solutions. They also learned skills and interests built not upon their disability, but their ability. These sports and interests contributed to their developing identity. In addition, time at home during leave from rehabilitation provided opportunity to test the skills they had been taught, also confronting the social transition they must make from soldier to civilian.

Implication 7:

Supervised medical transition into the NHS with a named advocate and care coordinator is proposed for those being medically discharged from military service. Veteran mentorship, supporting transition into employment and more general societal reintegration was proposed by participants.

Healthcare transition was widely cited by veterans as a negative experience. Healthcare issues remain their principal concern, particularly prosthetic services. Veterans proposed a more progressive transition could be achieved if the Defence Medical Services, Defence rehabilitation and transition services collaborated with each other and civilian healthcare providers. A managed transition was suggested commencing 6 months prior to discharge, with military healthcare supporting civilian services and providing advocacy to the veteran should they face difficulties. These suggestions find support in the literature [211].

Reflections

The following section reflects upon both the research process and its findings. It will be written in the first person, covering five areas: method, impact of the approach, outcome, limitations and research opportunities. The research question was drawn from my own experience, and a sense that if these events were repeated, we remained ignorant about what we did well and what could have done better. In the foreword, I acknowledged that the outcome was unexpected, however the findings contained in this thesis have brought clarity to many areas of my own experience where questions existed. From a personal perspective, the research process has achieved the aims listed in Table S1-1. In this reflection I wish to present key points and debates which furthered my own understanding of this topic and how this research question was answered.

Method.

The foreword details my background and bias, and Section 3 accounts for how I sought to utilise the gift of my experience without tempering my analysis or clouding fresh insight. From the outset, the research was exploratory. It was clear that there would be qualitative component, but I was unclear which qualitative tradition I would use. I considered a phenomenological approach which would allow me to acknowledge my inside knowledge, but what would have been the phenomenon I was studying? In contrast, a grounded theory approach was attractive because it contained many of the research tools, I needed to explore the setting and develop theory. But this tradition requires theory to emerge from the data, so I must put aside my experience and knowledge, something I felt unable to do. As I started to catalogue the historical origins

of this service, the choice of research approach and direction became more opaque. I was unable to find an approach which allowed me to be true to its philosophical stance whilst remaining free to explore this complex setting. I was persuaded to explore the 'complexity', and it became a study in itself. Through complexity I came to understand the importance of the context being the determinant of the research approach, rather than the research approach dictating how I would view the context. In this, Greenhalgh [11] and Long [242] were particularly enlightening. The decision to adopt pragmatism arose from this process of questioning. The philosophical origins of pragmatism seem to share much with complexity theory, both arguing that the value of knowledge is dependent on its usefulness (Long add year) and so as the context alters so does our perspective and with it our acquisition and interpretation of knowledge. Pragmatism and complexity theory prioritise the whole system rather than taking a reductionist perspective [242]. Whilst this felt terrifying, knowing the enormity of the task, it was also liberating. The complexity view, capturing interactions within the research area to evolve an understanding of what drove these interactions was intriguing. I felt drawn, like Sherlock Holmes, to the intrigue and mystery of this style of investigation, although unclear how or if it would yield anything. A pragmatic stance aligned with this investigative style provided me with a clean slate and any number of research tools I needed to unravel this enigma.

Adopting a pragmatic stance facilitated my choice of a mixed method design. I recognised the benefit that adopting a quantitative element to my research would likely make the qualitative findings more palatable to an audience of military consultants. However, as a clinician who had worked in this service for almost its entire existence, I was genuinely interested to discover how this patient group was faring and to learn whether the service which developed had helped or hindered their progress.

This exploratory and mixed method approach enabled me to establish the boundaries of this case and to highlight areas where a more defined future research approach could be adopted.

Impact of the approach.

The method commenced by capturing the qualitative experience. In this, my knowledge of the clinician and patient culture was immensely helpful when crafting this part of the study. The James Lind Institute [408, 409] notes the importance of capturing all stakeholders; patients, clinicians and clinical managers seemed an obvious choice. Having used the Nominal Group Technique (NGT) during my MSc research and subsequently in my daily work, I was aware of its strengths and weaknesses. A focus group approach was particularly useful yielding a quantity of data in one group session, but the NGT brought additional benefits. In particular, the round robin presentation of individual ideas proved an effective way to encourage all members of the focus group to contribute. The more structured approach kept the group focussed on the research question, however there were occasions when as researcher I wished to pursue a particular

direction, which time and the structure did not allow. In addition, coordinating diaries to allow these groups to run was problematic, particularly with more senior officers. Both issues were solved by conducting some one to one interviews alongside the focus groups. These interviews allowed the exploration of avenues of interest and enabled verification of my analysis. This provided both depth and breadth to the clinician consultation. For the veteran groups, interviews proved less fruitful, and I found myself taking a more directive role possibly due to issues of recall and apprehension veterans felt about speaking with me directly, given my position as a clinician and military officer. However, neither apprehension, nor issues of recall were evident in focus groups. Individuals stimulated ideas which others developed or commented on. Self-initiated discussion in these groups allowed me, as the researcher, to adopt more observational or facilitatory role. Groups of 2-3 veterans yielded the best insights, largely due to time, but also participants were more willing to share more intimate details of their recovery experience. In future veteran research, I would choose to adopt focus groups with 2-4 individuals.

Analysis, given the quantity of data, was aided by Miles and Huberman's [375] analytical hierarchy which provided structure out of potential chaos. I was familiar with this approach, having used it during my MSc, however I marvelled at the layers of insight it provided during the development of theory and explanation.

Within the initial analysis of contextual and historical data, the dynamic of power and social transaction as a means of influence, was evident. But this was also evident as clinician focus groups discussed the interdisciplinary and multidisciplinary team, or soldier to civilian transition. Bourdieu's theory of field, capital and habitus offered insight as explained in the thesis. Having read extensively around complexity theory, I could have approached this analysis using a systems approach or action theory, however Bourdieu's structuralist sociological view offered a theory of action which balanced individual agency, past-experience, culture, and contextual rules. Use of Bourdieu's theory of practice analysing military to civilian transition also provided a helpful insight into the military setting emphasising its cultural components and how they influence and define the soldier [161]. However, other than specific instances, neither veteran nor clinician data interpreted their interaction in a transactional sense, rather their narrative described a collaborative grouping of individuals focused on learning and innovation. It was also recognised that not all individuals chose to group, some actively distancing themselves, especially when experiencing complications. Whilst theories, such as Social Fusion theory or Social Cognitive Theory explained how individual's group, they do not adequately explain why some remained on the periphery or even exclude themselves. In this respect Social Identity Perspective (SIP) provided a full explanation with social categorisation theory offering reasons why social grouping cannot be assumed. However, its theory was centred upon the group, and so it failed to adequately explain individual motivational drive which may or may not be influenced by the group.

Whilst many theories of motivation exist, Self Determination Theory (SDT) reflected the themes which had already emerged in early analysis. It explained anomalies in the data where the patient group affirmed individuals to act beyond clinical advice, for example when coming off pain medication. Its distinction

between intrinsic and extrinsic forms of motivation is unique to this theory and particularly helpful insight in a setting where individuals are describing an active and complex transition from being able bodied soldiers towards an acceptance of their disabilities as a civilian.

Integrating these theories together was not difficult but knowing how to present this integration so it appeared coherent was difficult. It was Neal [162] who showed me the way forwards. In this paper, the author recognised that her veteran interviewees were describing a Community of Practice (CoP). The social process they described within military rehabilitation was a community driven by the need to learn. Using this insight, I saw how this community was not limited to the patient, but it incorporated both clinician and patient. I could also see how the cultural structures actively encouraged this process, into which Bourdieu's structuralist view, and Turners Social identity perspective helped individuals to fulfil their basic psychological need to feel connected, competent, and authentic.

But whilst this felt like a breakthrough, I did not foresee the depth of insight which would be gained by allying both a qualitative and quantitative approach. If I had conducted only a qualitative study without the quantitative analysis, I would have presented these findings identifying the prosthetic as the source of social identification and therefore the most important component of care. If I had only presented the quantitative data I would have, in contrast, found the prosthetic was of no significance to psychosocial outcome. However, when I put the two together, limb loss instead became the means of social identification, but the prosthetic was an important artifact illustrating the outcome achieved by this social dynamic.

The outcome of the CoP was to learn, and this is the prerequisite of growth. Basic psychological need fulfilment (connection, competence and authenticity) is also a pre-requisite for psychological growth [522]. Therefore, combining both the theoretical construct which had emerged from the qualitative analysis, with quantitative outcomes illustrating holistic biopsychosocial performance, evidenced a cohort who were examples of thriving. But equally important, this insight also showed where culture, individual choice, and organisational process undermined thriving. My own surprise at this finding provided me some comfort that my background and insider knowledge had not prevented me from achieving a fresh insight.

Outcome.

Positive psychology is a trending topic with much focus upon resilience and post-traumatic growth. However, resilience refers to maintaining performance in the face of adversity, but the veterans and IDT clinicians did not maintain, they excelled. Post traumatic growth meanwhile was applicable to veterans, but not the clinician group. Thriving, was chosen because as a concept its definition aligned with qualitative data expressing holistic growth, veteran quantitative outcomes showing biopsychosocial performance and the thematic emphasis upon community. Indeed, the emphasis upon human connection as an extrinsic enabler

of thriving affirms the value participants placed on it in their accounts, but it raises profound questions about how we facilitate resilience, thriving and psychological growth.

Much focus in psychological growth or resilience is upon one-to-one interventional treatment, or personal lifestyle habits, but participants in this study appear to have not just survived but thrived because they were part of community with others facing a similar challenge, and this community was actively endorsed by the organisational culture. This finding reflects my own experience working as part of the IDT, observing the patient group, and it explains why those in the MDT did not share this feeling of community.

Accepting the importance of individual basic psychological need fulfilment places implications upon leadership and organisational culture and how they enable individuals to achieve a sense of connection, competence, and authenticity. However, it would be easy to adopt the findings from this thesis and embrace an interdisciplinary approach without considering the whole picture. The Cynefin framework reminds us that contextual awareness is needed to ensure the team and leadership approach satisfies the needs of the setting. I have experienced mass-casualty scenarios in both Iraq and Afghanistan, and in such chaos, I would always opt for hierarchical leadership. Equally, MDT accounts detail the destructive application of hierarchical leadership in this complex setting, undermining the very creativity and problem solving which was needed. The findings of this research, identifying the contextual, social, and interpersonal ingredients needed to enable a workforce and patient group to thrive, place a profound responsibility and need for leadership to become contextually aware, socially competent, and versatile in their approach.

As I reflect on my own experience working in Complex Trauma, compared with other teams, I note two distinct differences relating to leadership. Firstly, complex trauma adopted dual leadership, with a civilian manager and a military clinical lead, each with their own role, but both able offering support and advice to the other, but also with access to a senior mentor. This gave them capacity to be accessible to the team, visible and part of the day-to-day action. They also adopted a coaching style which was non-hierarchical. Their focus was upon equipping and enabling the team, ensuring a focus upon interpersonal growth.

Reflecting upon this experience and the findings in this thesis, I am drawn to the concept of servant leadership, which I believe reflects the approach adopted within complex trauma and that which is needed in a complex setting. Its graphic representation using the Catalonian human pyramid provides a stark illustration representing leadership as an enabler (or support) of the clinical team and patient, rather than the traditional view of the leader directing from above (Figure 13.1). This model also recognises that leadership is not a solitary position, but one which must also be supported.

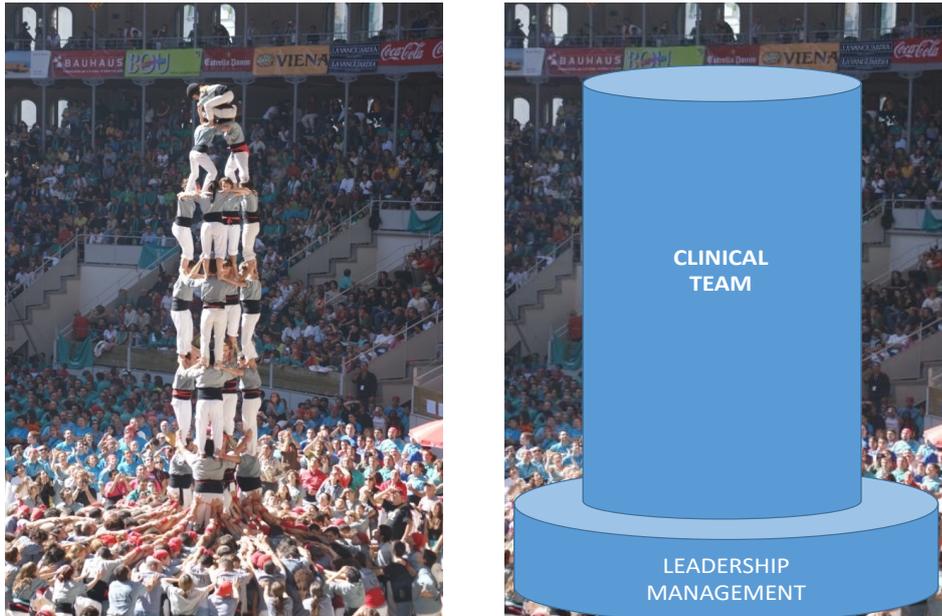


Figure 13.1 Model of Servant Leadership illustrated using the Catalan human tower

Limitations and research opportunities.

Interestingly, the focus upon connection may also be a limitation in this study. Veterans recognise the rhythm of admissions provided opportunities for connection to be affirmed. These accounts mirror the description of emergent social identity in disaster and emergency settings [523, 524]. Authors note that regular reunions enable these supporting relationships to endure [523, 524]. Many of the veterans who were interviewed were actively engaged in veteran activities which facilitated regular reunions. This could account for their wellbeing and high perception of function. However, such individuals who are actively engaged in social activities are more likely to also volunteer to take part in a study such as this, especially if their friends do so as well. Further work is needed to explore those who do not readily take part in veteran activities, or do not present with such elevated physical, or psychosocial outcome. This study presents a positive dynamic, and the inclusion of ADVANCE data, involving a population of 156 individuals, does support this view. However, ADVANCE only recruited 50% of those who suffered amputation in Afghanistan. The non-prosthetic user is underrepresented in both ADVANCE and in this thesis, as are those with a poor psychosocial outcome. More work is needed to refute concerns of selection bias. However, future research can now take a more defined route, adopting a case study approach, for example assessing the outcome of the non-prosthetic user. In this case an interpretive phenomenological stance would be appropriate.

Similarly, critique of the MDT teamwork approach in this setting appears to have both construct and theoretical validity, but MDT accounts arose from only 8 of the 22 clinicians. That said, they accounted for most one-to-one interviews. The implications of this finding for the workplace, particularly in a healthcare setting is profound. Interdisciplinary civilian research has been cited, but there are no known studies within

a civilian rehabilitation setting, nor from a civilian healthcare setting which analyse both clinical provider and patient. Nevertheless, recent research of the team experience in NHS the first and second lock down report that disciplinary teams quickly dissolved forming an adhoc interdisciplinary arrangement [525]. Interviewees cite the enabling influence of local leadership in situ on the ward, and the interpersonal benefits these teams then provided. Further team based interventional studies, such as these, are needed to prove the transferability of findings from the military setting into wider civilian practice.

My own personal interest lies in the opportunity to structure provision and evaluation of rehabilitation around enabling patient thriving. Veteran prosthetic provision continues to attract much criticism, yet using a model of thriving, this study has framed veteran accounts to illustrate where it is succeeding and how the service could be developed. A more comprehensive service evaluation using this approach would help to validate this model. Equally conditions such as *Long COVID* present an opportunity to conduct an interventional study comparing patient outcomes from those participating in a rehabilitation approach which uses a thriving approach, versus standard care provision.

Finally, ADVANCE also continues to collect outcome data and offers a significant opportunity to scrutinise longitudinal outcomes. Veteran accounts draw attention to disablers of thriving. I was intrigued when they identified pain medication as one example. This thesis also recognised potential declines in prosthetic function in the bilateral sub-group, which may be the result of inadequate prosthetic provision. ADVANCE data should be scrutinised to explore and evaluate longitudinal trends in these two areas with a focus on developing regression models allied with qualitative capture.

Concluding statement

The focus of this thesis has been on the survival of a remarkable cohort and their subsequent thriving. The headline finding could have been their exceptional physical recovery following traumatic amputation. Or perhaps a more outstanding psychosocial recovery, presented as scores of anxiety, depression and perceived social support, equivalent to non-injured military controls. Instead, the headline finding is about a social dynamic that enabled this rehabilitation and recovery, as distinct from a clinical artefact or feature.

Clinicians and veterans identified the inclusivity they experienced within the IDT; they describe the formation of communities of practice where they could experiment and generate ideas, learn, and reflect. Both clinicians and veterans articulate how this learning community was a *leveller*. From this community, both groups of clinicians and veterans found that the collective gave them a sense of capability in a setting characterised by its uncertainty. Both groups reported feeling empowered to take action: veterans emboldened by their peers; clinicians supported by team leadership.

But accounts also reported that when veterans were unable to connect and identify with their peers, they did not experience this cascade. The same was true for clinicians. Those in an MDT organisation did not benefit from similar collective support and empowerment, nor did they join in the community of practice formed with patients. The findings from this study show that a focus upon enabling a patient to thrive introduces a social dynamic which in a collaborative setting, will also support the clinician to thrive. However, strategic and tactical leadership hold the keys, as it is their action which establishes the organisational culture and conditions enabling collaboration, facilitating resourcing and empowering experimentation and innovation.

The words of John Donne at the start of this thesis remind us that 'no man is an island', human kind is stronger together than in isolation. However, often the patient experience, especially following trauma, can lead them to feel isolated, and alone. Equally the worker facing situations they feel are beyond them, may choose to retreat. To seek connection at such a time may create a sense of vulnerability. The message in this thesis provided by those who experienced life changing injuries in Afghanistan and Iraq, and those involved in their care, shows that from their connection with others, they were able to discover the skills they needed and to rediscover their place and independence. In so doing they were stronger, they were able to thrive. But this thesis also shows that it is the leader who has influence over the culture and approach which determines whether nurturing connection will occur and so whether a process of thriving will either flourish or demise.

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Appendix 1: Operational care pathway

The patient healthcare cycle outlines the scope of the Defence Medical Services (DMS). It serves to distinguish between provision within the firm base (UK medical care) and the operational setting (Figure 1.1). The operational patient care pathway provides further detail for the deployed setting (Figure 1.2).

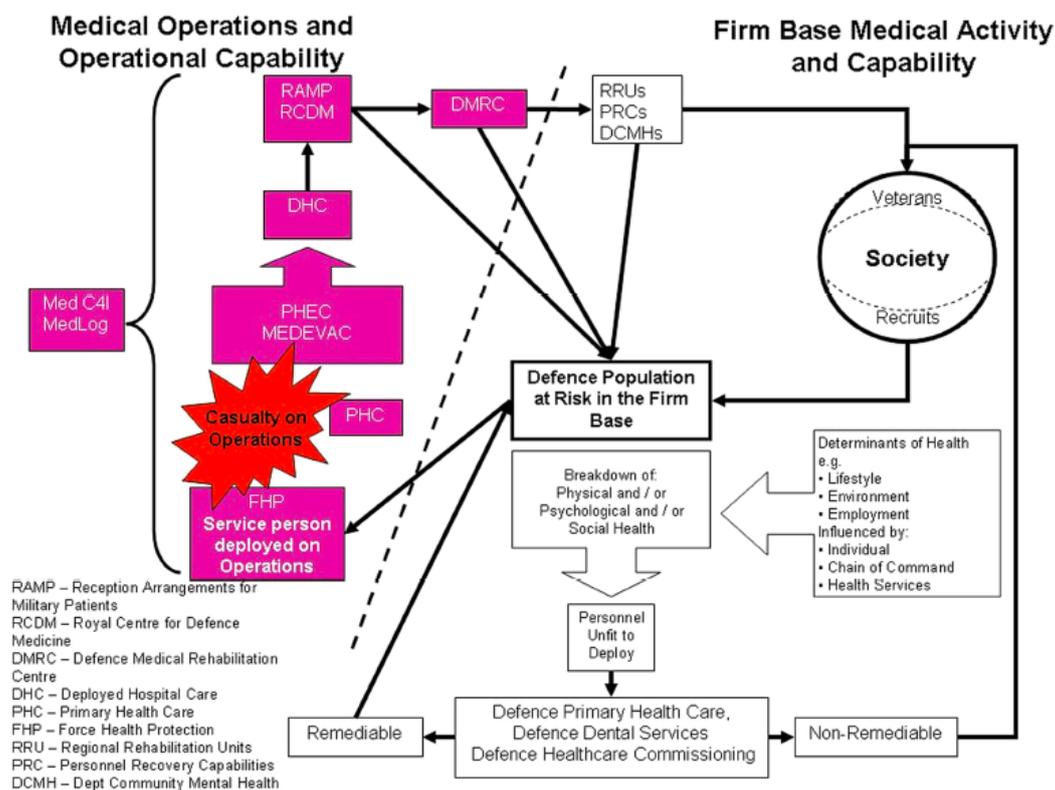


Figure 1.1 The healthcare cycle (Bricknell 2014, p75). DMS operational capability is shaded in purple.

The operational care pathway (Figure 1.2) provides a conceptual of medical provision from point of injury within the hot zone (active combat operations), forward evacuation (Fwd MEDEVAC), through casualty clearing and into deployed hospital care. Strategic evacuation (STRATEVAC) then transports the patient to Role 4 (definitive hospital care).

The operational patient care pathway is a linear representation of existing deployable provision. Laydown of medical provision will depend on the operational circumstances and the medical estimate of what is needed.

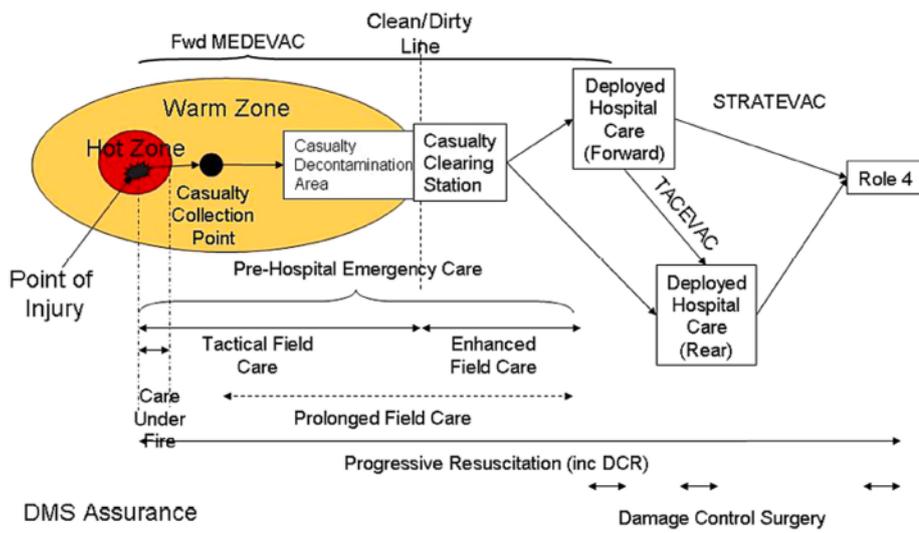


Figure 1.2 Operational Patient Care Pathway

Appendix 2: Characteristics of blast injury

The IED is the weapon of choice for the insurgent. Exposure to blast is the principal cause of amputation, but amputation rarely occurs in isolation [9]. This section briefly outlines the mechanisms of blast injury, in order to explain why exposure to blast results in such complex presentations.

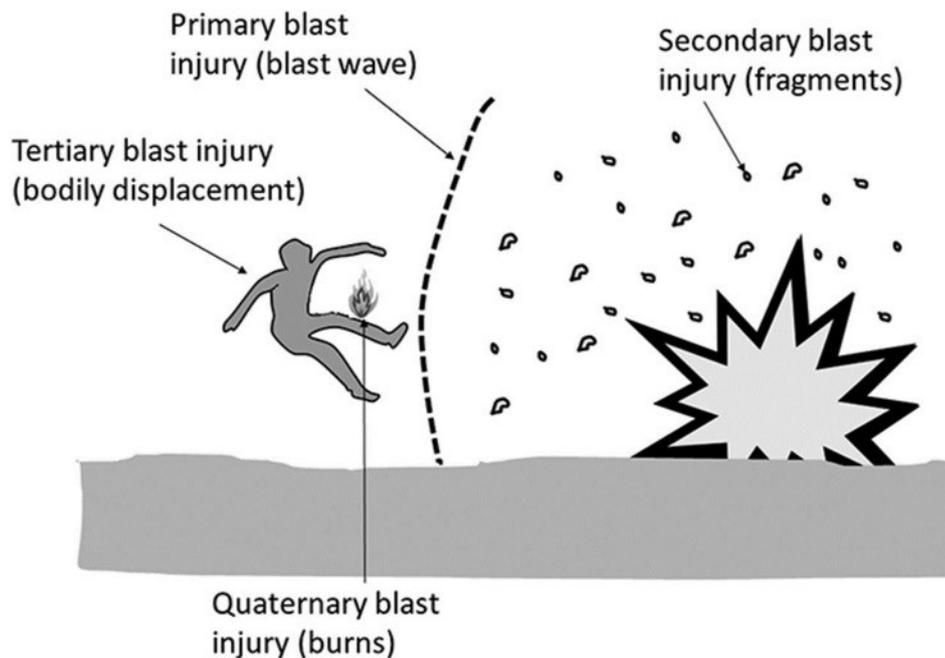


Figure 2.1 Four categories of blast injury [103] (page e25(2))

The four categories of blast injury (primary, secondary, tertiary and quaternary) relate to the physical phases of blast following detonation [526]. Furthermore, the method of explosive delivery, environmental conditions and the nature of protective barriers partitioning the blast from the recipient all influence final injury presentation [526]. Ramasamy [103] illustrates each category in Figure 2.1.

Primary Blast Injury: An abrupt pressure change occurs as the device detonates resulting in a blast wave. Over-pressure, followed by under-pressure disrupts gas filled organs such as the lungs, middle ear, eye, and abdominal regions [103, 526-528].

Secondary Blast Injury: Projectiles from the surrounding environment are energised and penetrate soft tissue causing contamination, soft tissue injuries, haemorrhage, and amputation [527, 528].

Tertiary Blast Injury: Propulsion of the body or displacement and destruction of structures around the victim will result in what is known as 'blunt trauma'. Such injuries do not penetrate soft tissue, but they will cause internal soft tissue, skeletal damage, or head injuries [104, 527, 528].

Quaternary Blast Injury: This encompasses any related injury or illness resulting from the effects of the blast but not primarily due to it. Examples may include infection, burns or respiratory conditions.

[Chapter 3](#) details characteristic injuries resulting from combat settings. The soldiers on a mounted patrol will be protected from the secondary effects of blast (fragmentation), but they will receive injury from body displacement and quaternary blast injury [526]. Injury characteristics for the soldier on foot patrol result from fragmentation or secondary blast injury, as well as body displacement [103].

A primary blast injury from a blast wave is more likely in confined spaces (indoors, in vehicle) or within proximity of high explosive weaponry as opposed to an IED [526].

Appendix 3: Influence of organisational culture on creativity and innovation [82]

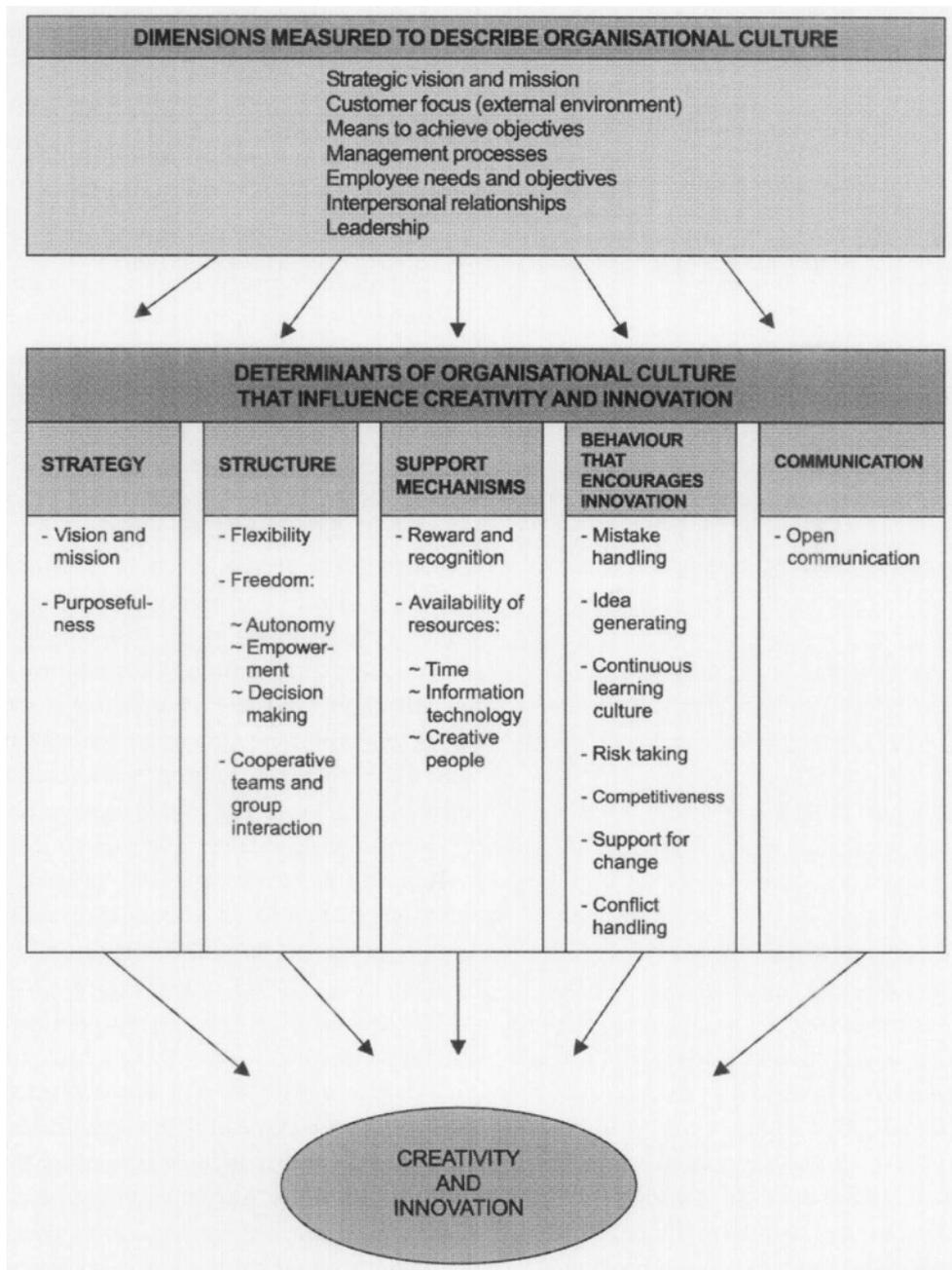


Figure 3.1 Influence of organisational culture on creativity and innovation [82] (p3)

Martins [82] representation of organisational culture and its influence upon innovation (Figure 3.1) provides the backbone of the *Light Bulb model of innovation* (Chapter 6, Figure 6.5)

Appendix 4: Traditions and approaches in qualitative research [355]

Traditions and approaches in qualitative research		
Research tradition	Disciplinary origins	Aims
Ethnography	Sociology, anthropology	Understanding the social world of people being studied through immersion in their community to produce detailed descriptions of their culture and beliefs.
Phenomenology/ ethnomethodology	Philosophy/ sociology	Understanding the 'constructs', concepts or ideas people use in everyday life to make sense of their world. Uncovering meanings contained within conversation or text.
Leading to Conversation analysis	Sociology/ linguistics	Analysing the way in which talk is structurally organised, focusing on sequencing and turn-taking which demonstrate the way people give meaning to situations.
Discourse analysis	Sociology	Examining the way knowledge is produced within different discourses and the performances, linguistic styles and rhetorical devices used in particular accounts.
Protocol analysis	Psychology	Examining and drawing inference about the cognitive processes that underlie the performance of tasks.
Interpretive phenomenological analysis (IPA)	Psychology	Exploring the meaning and significance of a relevant experience to given participant – what it is like for them – in order to gain insights into psychosocial processes.
Symbolic interactionism	Sociology/ social psychology	Exploring behaviour and social roles to understand how people interpret and react to their environment.
Leading to Grounded theory	Sociology	Developing 'emergent' theories of social action through the identification of analytical categories from the data and the relationships between them.
Ethogenics	Social psychology	Exploring the underlying structure of behavioural acts by investigating the meaning people attach to them.
Hermeneutics	Theology/ philosophy/ literary criticism, linguistics	Exploring the conditions under which a human product (e.g. a text) was produced or act took place in order to interpret its meanings.
Narrative analysis	Sociology, social history, literary criticism	Analysing what a narrative reveals about the person and their world. Studying the way people tell stories and the structure of narratives.
Constructionism	Sociology	Displaying 'constructed realities' of people in a particular setting, exploring their meanings and explanations.

Figure 4 Qualitative traditions and disciplinary origins [355] (p18).

As stated in Section 3, this study takes a pragmatic view in its research design. This appendix acknowledges the qualitative traditions, some of which are described in the table taken from Richie and Spencer (p18). Complexity theory, which informs the research design would argue that there is not one truth. Understanding complexity is gained from multiple perspectives from which a pattern of interaction may emerge. Hence, a pragmatic stance has been adopted in the research design of this thesis.

Appendix 5: Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

This thesis has been self-assessed by the author using the COREQ Checklist:

Developed by:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
<i>Personal Characteristics</i>		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Le Feuvre; except for one concurrent focus group. See Ch. 8 (Sequencing of Focus groups and Interviews).
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	MSc, BA (Hons), BSc (Hons) – see Foreword.
3. Occupation	What was their occupation at the time of the study?	Military physiotherapist – see Foreword.
4. Gender	Was the researcher male or female?	Male – see Foreword
5. Experience and training	What experience or training did the researcher have?	MSc, BA (Hons), BSc (Hons) research modules and dissertations. NVivo training – see Ch. 8 Qualitative analysis).
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	Yes, in military deployment and Defence rehabilitation roles – see Foreword.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Military physiotherapist.
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic.	See Foreword and Ch. 8 (Saturation and Researcher bias).
Domain 2: study design		
<i>Theoretical framework</i>		

9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Theoretical underpinnings explained in Section 2; methodological considerations in Ch. 7.
<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive. See Ch. 8 (Consultation sample and recruitment).
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	See Ch. 8 (Consultation sample and recruitment).
12. Sample size	How many participants were in the study?	64 – see Table 9.1.
13. Non-participation	How many people refused to participate or dropped out? Reasons?	8 Veterans failed to attend (see Table 11.1)
<i>Setting</i>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Multiple settings as appropriate. See Ch. 8 (Sequencing of Focus Groups and Interviews).
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	See answer to 1.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	See Table 9.1.
<i>Data collection</i>		
17. Interview/focus group guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Yes to both. See Ch. 8 (NGT Focus Group Format and Semi-structured Interview Format).
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Yes. See Ch. 8 (Recording and transcription of NGT Focus Group and Interviews).
20. Field notes	Were field notes made during and/or after the interview or focus group?	Yes, recorded in NVivo (see Ch. 8 Qualitative analysis and Appendices 9-11).
21. Duration	What was the duration of the interviews or focus group?	Various. 3 hours max.
22. Data saturation	Was data saturation discussed?	Yes – see answer to 8.
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: analysis and findings		
<i>Data analysis</i>		
24. Number of data coders	How many data coders coded the data?	Coders: Author.

		Verified by: Director of nursing (IC NHS Trust) and Post grad research group (see Ch 8)
25. Description of the coding tree	Did authors provide a description of the coding tree?	Yes, in the form of conceptual maps. See Ch. 9 and 11 (Overview of Findings).
26. Derivation of themes	Were themes identified in advance or derived from the data?	See answer to 26.
27. Software	What software, if applicable, was used to manage the data?	NVivo. See Ch. 8 (Qualitative analysis).
28. Participant checking	Did participants provide feedback on the findings?	Inherent in study design and use of NGT format. See Ch. 8 (Consultation method).
<i>Reporting</i>		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Yes. Each quotation has been identifiably referenced to a group, interview and page number (Ch. 9 and 11).
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes. Consistency is apparent in voting scores and key findings (See Section 4). Relationship to existing knowledge is also presented (Ch. 10 and 12).
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes. See Ch. 9 and 11 (Overview of Findings).
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes. Discussion of negative cases and anomalies in Chas. 10 and 12).

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Appendix 6: Ethical Approval

1. Imperial College London Research Ethics Committee
2. Ministry of Defence Research Ethics Committee (MoDREC)

Peter Le Feuvre
Department Surgery and Cancer
Fulham Palace Road
Room 7L13 Charing Cross Hospital
London W6 8RF

10th May 2018

Dear Major Peter Le Feuvre

Study Title: Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees.

ICREC reference: 18IC4492

The above study was approved by your Head of Department on 5/4/18 and by the Joint Research Compliance Office on 10/5/18.

Under the Imperial College Research Ethics Committee process, a study that has been reviewed by the Joint Research Compliance Office and Head of Division/Department (or Principal), where no significant ethical issues have been identified in the protocol or ethics application, can be approved without requiring it to go to full committee.

Documents

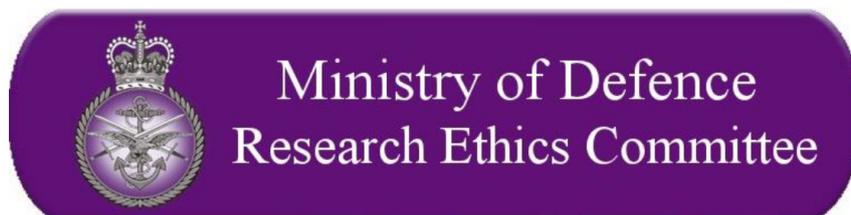
The documents reviewed were:

- ICREC Application form
- Protocol (v3 10/05/18)
- Advert for Volunteers (v3 10/05/18)
- Consent Form Interviews (v2 04/05/2018)
- Consent form NGT (v2 04/05/2018)
- Interview Questions (v1 13/03/2018)
- Invitation Letter (v1 13/03/2018)
- PIS – Clinician Manager (v2 04/05/2018)
- PIS – Interview (v2 04/05/2018)
- PIS – Veteran (v2 04/05/2018)
- Study Sponsorship and Insurance
- Mental Health Outcome Tool

Yours sincerely,



Gary Roper,
Head of Regulatory Compliance,
Imperial College London



From the MODREC Secretariat
Building 5, G02
Defence Science and Technology Laboratory
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Major Peter Le Feuvre
Centre for Blast Injury Studies
Imperial College London
Biodynamics Laboratory, 7th Floor
Charing Cross Hospital Campus
Fulham Palace Road
London
W6 8RF

Our Reference: 866/MODREC/18

Date: 22/05/2018

Tel: 07956 446829

Email: p.le-feuvre18@imperial.ac.uk

Dear Major Le Feuvre,

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees

Thank you for submitting your revised Protocol 866/MODREC/18 with tracked changes and the covering letter with detailed responses to the MODREC letter. I can confirm that the revised protocol has been given favourable opinion ex-Committee.

This favourable opinion is valid for the duration of the research and is conditional upon adherence to the protocol – please let the Secretariat know if any amendment becomes necessary.

Please ensure you notify the Secretariat of the commencement date of the research and submit annual and final/termination reports in accordance with the instructions and templates in JSP536.

Yours sincerely

A handwritten signature in black ink, appearing to read "S. Kolstoe".

Dr Simon Kolstoe
MODREC Chair

Appendix 7: Interviews not transcribed

Due to time, budgetary and logistical constraints, it was necessary to only transcribe consultations likely to contribute to the overall thematic content. Field notes and audio recordings were retained, and recordings were reviewed. Where content of interest existed in non-transcribed interviews, these were recorded in field notes and coded in NVIVO 12 to ensure they were not lost.

The following interviews were not transcribed (Table 7.1):

Interviewee	Subject matter of the interview	Reason for not transcribing
Founding Head of Battle back	Adaptive Sport and Adventure Training	Background information on the development of Battle back. A small section was manually transcribed discussing the relationship between clinical and sporting specialists.
Prosthetist (formerly DMRC contractor)	Verification of focus group 5 and 6 (clinician perspective)	No new themes, repetition of other interviews / focus groups
Consultant lead for complex trauma	Verification of IDT focus groups (managers perspective)	No new themes, repetition of other interviews / focus groups
Post-graduate research forum	Framework analysis: MDT vs IDT	Group split and background noise made it difficult to transcribe from the audio recording.

Table 7.1: Interviews not transcribed

Appendix 8: Participant paperwork retained for analysis

Participants notes

FORMAT

- Introduction to the research question. (10 min)
- Individuals silently generate ideas in writing. (15min)
- 'Round Robin' listing of ideas on a flip chart (15min)
- Group discussion of the ideas on the flip chart (30min)
- Individuals rank top ten ideas and submit them on a voting card (5 min)
- Break (10min)
- Discussion of vote (20 min)
- Second vote to re-rank top ten ideas (10 min)
- Conclusion and feedback questionnaire (5 min)

QUESTIONS:

What components of the military rehabilitation service do you feel were key to getting you back on your feet?

- Quick time prosthetics
- over night stay
- physio
- Being around similar people, realizing you're not the only one worse off
- Doctors & consultants to hand
- Full access to a safe, ~~good~~ fitness & walking environment, knowing that if anything went wrong help is at hand.

Knowing what you know now, what changes would you make to the military rehabilitation service – additional components, removal of components?

- * Move outside activities, concerts, sports events going on. done it early days in PLL, but then it stopped, evenings are very depressing & boring, especially if your day finishes early.
- * Physio's always pushing the walking to much, not enough work being done to sort the body out, sockets cause pain
- * Care when not at hospital & back home physio is needed to prosthetist

What are your top five health issues or concerns which you now face?

- * Physio
- * New legs
- * going down the food chain with prosthetist



Completed Voting Forms

NGT VOTING FORM	
Please rank in order of priority what you believe are the ten most important components of rehabilitation we have discussed today, which must be included in a rehabilitation pathway for lower limb amputees.	
The most important item receives 100 points. Please rate the remaining 9 items anywhere on a scale of 99 down to 0. (99 = very important; 0 = least important of all).	
Component of rehabilitation	Score
1 Staffing levels & individuals	100
2 Training	99
3 MDT - It working	99
4 Not be pressurised by patients	94
5 e.g. staying longer on stubbies.	"
6 w/ ch service / skills.	96
7 Pushing the boundaries.	90
8 Maintaining links to other	90
9 Prosthetic services UK / World	"
10 Rx outside the gym / dept	95
Top five issues veteran amputees now face	
1 MH	
2 Meaningful occupation of time	
3 Relationships	
4 Coping as a civilian.	
5 ? Prosthetics service /	

Round Robin Ideas Documented on White Boards / Flip Charts

WHAT HELPS DRIVE SUCCESSFUL PHYSICAL OUTCOMES?

- TEAM APPROACH - SURGEON/COMBAT/PT.
 - SELF-SUPPORTING TEAM
- = FIGURE HEAD
- = CONSISTENT (BUDGETING)
- = STRONG LINKS WITH HEALTH PROVIDERS/TRG/SUPPORT
- = SPECIALIST CLINICS - EASY ACCESS TO SPECIALISTS
- = PATIENT BUY-IN/ALTERNATION
- = PATIENT MOTIVATION/CHALLENGE
- = MILITARY ETHOS - STRIVING FOR EXCELLENCE ORGANISATIONAL
- = FLEXIBILITY/ADAPTABILITY OF STAFF - MILITARY TO ORGANISATIONAL - NO EXCUSE
- = SUPPORT OF BUDGETARY AUTHORITY
- = WILLINGNESS TO LEARN - FROM PATIENT/OTHER PT/STAFF
- = SELF-CARE OF STAFF
- = RISK/SHORT INJURIES - BIOMECH APPROACH
- = PART OF THE RESERVE
- = ESTABLISHING RATIO'S
- = CREATIVE APPROACH
- = SHARING IDEAS BETWEEN STAFF / REGR SUPPORT
- = COMPETITIVE BUDGETING
- = GAMES / OUTDOOR EQUIPMENT
- = CLOSE PROXIMITY TO STAFF / DEPT'S
- = GHT LABS
- = TIME WITH PATIENTS
- = ACCESS TO CONSULTANTS
- = HOLISTIC APPROACH
- = OPEN ENVIRONMENT
- = NEW TECH
- = WORKING WITH OTHER PROF.
- = TIME IN REHAB TO COME TO TERMS WITH INJURY
- = "HERO" STATUS - MEDIA - PUBLIC SUPPORT
- = ERI / SIGNS
- = RESIDENTIAL BLOCKS
- = RECDM LINES
- = INSPIRATION OF PATIENT TO CLINICIAN
- = TEAM AWAY DAY / SOCIAL / TEAM BUILDING

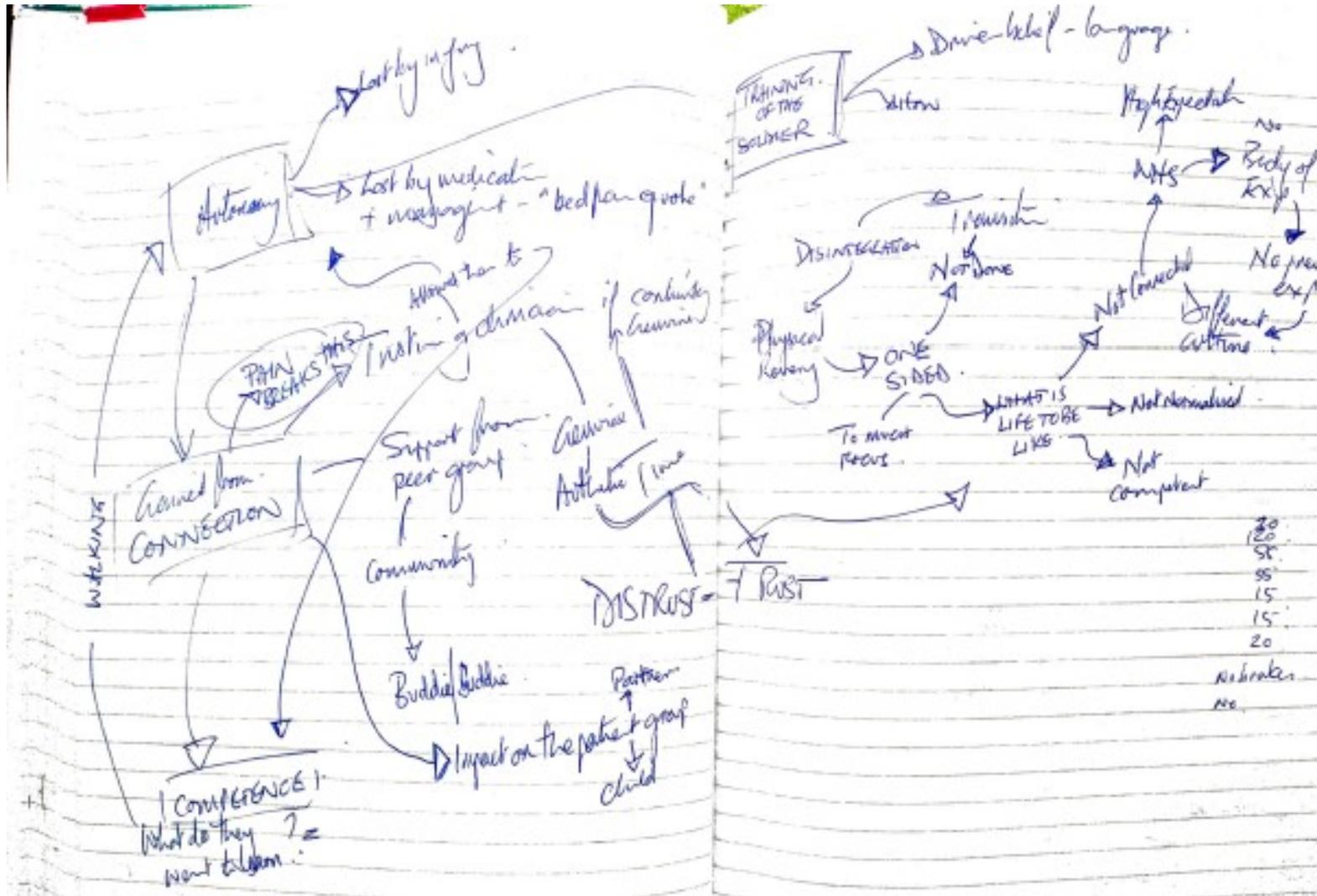
ISSUES FACED BY VETERAN LOWER LIMB AMPUTEES TODAY - DAILY

- NO CLEAR VETERAN SERVICE
- NEED FOR MENTAL HEALTH SUPPORT
- BEING TREATED AS A CIVILIAN IN NHS
- PROSTHETIC SERVICE - DISPARITY OF PROVISION
 - LACK OF RESONSIVE FITTING
 - NHS UNUSE TO COMPLEXITY OF VETERANS
 - PATIENT EXPECTATION - "HERO" STATUS
- ISOLATED
- TOP UP REHAB
- MEANINGFUL ACTIVITY / OCCUPATION
- DISCREPANCY IN PROVISION - SERVICE ATTRIBUTABLE VS NON-SERVICE
- FINANCIAL - WELL OFF - DRIFT - WITHOUT A FOCUS
- SOURCE OF DRIFTING - LACK OF IDENTITY
- END OF SPORTING ACHIEVEMENTS

WHAT WOULD WE DO DIFFERENTLY?

- = JOINED UP IT -
- = MENTAL HEALTH PROVISION - MORE / CONSISTENT
- = CLEAR HONEST REFERRALS -
- = CLEAR FIGUREHEAD FOR RECEIPT OF REFERRALS. NEED CASE MANAGER NOW.
- = NEED PSYCHOLOGIST FROM START GRIEF COUNSELLORS.
- = CLOSER ACCESS TO SURGEON'S
- = EARLY WHEELCHAIR SKILLS
- = STURDY REHAB FROM START
- = PROSTHETIC PATIENT ADMISSIONS - NO CONTROL OR DISTRIBUTION OF EFFORT
- = PRODUCTION LINE ISSUES WITH PROSTHETIC
- = BED MANAGEMENT CONSIDERING CONDITIONS ETC.
- = EARLY DIETICIAN INPUT
- = PAIN EDUCATION
- = PURPOSE BUILT
- = CASE CONFERENCE IN ADDITION TO IDT, INVOLVING TREATING CLINICIANS
- = SET GOALS AS CLINICAL TEAM WITH PT (DONE TOGETHER)
- = HOW DO WE FOCUS PATIENT? - DIC DATE OFTEN HELPED FOCUS - PATIENT DRIFT WITH TOO MUCH TIME
- = TIME LIMIT FOR CARE DID NOT ALWAYS ALIGN WITH GRIEF PROCESS
- = VETAL ORIENTATED VETERAN SERVICE
- = IDT REPORT SHOULD FOCUS ON PATIENTS IMPAIRMENT STATUS
- = BATTLEBACK ETC. OWNED BY REHAB
- = MENTAL HEALTH OWNED BY REHAB NURSING
- = OCCUPATIONAL LINK WITH REHAB
- = PHYSIO ASSISTANT FOR ADMIN ON SHOP FLOOR

Appendix 9: Example of field notes (Focus group 1)



Appendix 10: Example of a transcript summary

The following extract is taken from journal notes held on NVIVO. For purposes of authenticity, it has not been edited and so will contain spelling and grammar mistakes.

Veteran Focus Group 1 Transcript summary

Two participants discussed their rehab journey. One serving and still in the rehab system, one now a veteran, but who had recently had surgery for OI and so was back at DMRC for rehab post-surgery.

They started by discussing their experience of pain medication and the action they both had to take to escape its effects. They seemed to feel there was an early role for it, but there was little guidance which seemed to fit with their experience helping them to remove themselves from it. In the face of this dilemma, they turned to fellow patients and followed their example.

In many ways this mirrors the patient experience and support structures which has been exemplified throughout the rehab journey and into veteran life.

They express concern for the younger guys who either do not have that mutual support around them, or at home. And they note the influence of mental health upon their approach to physical rehab. They conclude this point at the end of the FG in relation to veteran care.

They cite the group approach, co-location with others as positive features which developed a camaraderie. They highlight a concern about Stanford Hall and the way in which it has been built around physical health considerations, but not considering the mental health benefits of encouraging a buddy buddy system of group support through multiple man rooms.

The role of Battle back as a means of supporting this approach and bringing people with similar patients with a shared understanding of issues together is highlighted.

The role of the clinician is also shown to go beyond the pure provision of clinical services. Instead, several references exist showing a personal trusted relationship develops which does so, because the clinician allows it, and because there is time allowed for it. A formalised system of 'key worker' is introduced but the process is already in play.

The clinician has an agenda to teach core skills, but beyond this, it is driven by the patients' goals. They speak positively about this, however relating back to their concern regarding younger soldiers who do not have life experience, what if they do not have goals or a clear reason to move forwards. The patient goals then become less of a driver.

The supportive role of the family is also highlighted throughout as both an enabler for recovery and something that also brings meaning and purpose to help them to move forwards and rediscover their new identity. So, inclusion of the family, or patient group within their rehab so the family is at least aware of what they are going through seems key to this mutual process at 'home'.

Home - throughout is referred to as a safe place - but it is a place which is compromised when things don't go well, and it affects their mental health - then home is harmed and their situation spirals. This is especially the case when their ability to be independent is affected.

Features of the military system are enjoyed. Banter and humour is mentioned, but an honest direct approach is also positive. They contrast this with civie street where this honesty is not welcomed by care providers or patients.

Use of first name terms was seen as positive to help them progress and transition. So, whilst some features of the military culture supports progress, others seem to be harmful or inhibit personal progress.

One of the participants received acute care outside of RCDM and so it took time for them to get into DMRC. They felt the isolation of being at home, and contrast this with the benefit of coming to DMRC where they met others in their position. They highlight the need for a formal system which captures outliers and tracks their progress. In this way the benefits of early rehab can be experienced by them as well.

They are proactive in their healthy living as they see their greatest future threat being their loss of independence due to disability. This overshadows them, and as with other issues they have faced they approach it by looking to others who went before them and seeing how they have managed this dilemma. And so, the sense which was picked up in clinicians FG of the 'ticking clock' takes up a similar mantra as the veteran displays a concern that their time on legs is limited, and they wish to find ways to maximise this unknown quantity.

The experience of the NHS was viewed from two different angles, that of the veteran who now sees the system he has left. And that of the soldier who was initially managed within the NHS in his early days following injury. Neither is reported positively. They voice frustration on the impact that the services they have not received has had on their lives. The veteran has consequently chosen OI as a way of escaping inadequate services. He cites the waste of resource as a result of the inadequate sockets provided and length of time these took to produce.

In support of their future, they feel they need information which is reliable. They seem to feel much of what is out there is not trustworthy and so they then fall back on the experiences and reports of others.

The point of the impact of physical health upon mental health and the impact both have upon their social role and ability to function within this is the concluding message.

1. Pain management
2. Social - physical - Mental health and how these are interwoven
3. The peer support from fellow patients and clinicians and esp. family.
4. The need for a macro pathway and tracking system.
5. The desire for information so they can make health decisions.
6. The desire to maximise their time on legs
7. The feeling that the NHS is not set up to cater for their needs and aspirations.

Appendix 11: NVIVO Admin journal and analytic journal

Within NVIVO 12 is the capability to keep a journal to aid analysis, especially when the project is large. In this appendix an example of the admin journal and analytic journal is provided. For authenticity, these extracts have not been edited and so spelling grammatical errors will be present.

Admin Journal extract

27/05/2019 07:15: Review of veteran voting was conducted. A number of stated terms could not be scored. There were also a couple of voting slips which were not returned. The statements which are unclear will be considered as the specific FG is reviewed in order to look for any discussion around it and to ascertain the meaning of the statement:

Veteran 1: Understand the meaning of 'Control' cited by participant 2.

Veteran 3: Understand the meaning of 'Normalisation of injury' cited by male participant.

Veteran 4: Look for a discussion around 'Military day to day'

Veteran 5: Look for a discussion around 'Staff' cited by 3 participants. Determine if this represents voting for motivation of staff, continuity of staff, expertise etc. A new node may be needed to encompass this meaning.

Look for discussion around 'Support' in regards to Veteran Issues

Look for a discussion around 'Sport' and its role.

Veteran 6: Look for the following discussions or phrases to gather a greater understanding:

'Staying in or leaving'

'Substance Abuse': If required interview the individual more about this.

'Transport to medical appointment'

'Not having it clinically run'

There were some new consistent themes which arose and have been added to the node structure (specifically around the 'Patient Experience'). Voting was much more specific about beneficial or negative interventions and so sub-nodes for physio, OT, prosthetics, social work, welfare, education centre, have also been added. To simplify the structure of this theme, physical therapy has been created to encompass Physio, OT, ERI. Wheelchair training has been moved into this as a sub-theme. Prosthetics has been kept as a whole theme because it encompasses funding, rehab, equipment and a number of features which need to be distinct.

Mental Health has been expanded to encompass 'Loss-Grief' and 'Resilience Training has been moved into it. Veteran statements around mental health as a service will be kept within the general theme, however this development will be monitored.

This structure of 'Interventions' may be further developed into Social, Psychological, Physical, Medical/Surgical. This will be reviewed.

A number of comments within voting were noted around the topic of managing medication / pain medication. This has been created as a sub-theme within pain management.

Statements noted on participants sheets and also in veteran issues would suggest a sense of abandonment was also prominent across the cohort. This has been added as a sub-node to 'Attitude'.

Obligation - Ready for rehab are all test nodes which have been created in anticipation - but will be reviewed in time to see if they are required.

Analytic Journal: Extract of notes on *proximity*.

09/05/2019 18:49

Geographical proximity brought people together, but there is a 'like mindedness' which is referred to. Some contractor staff were never doing to make it and were let go of because they didn't have this. It wasn't about financial, there was a shared vision.

This proximity either includes or enabled critique and testing of others ideas - and also the adoption and mutual celebration of those which worked.

The military meritocracy stands in opposition to this. They would never have allowed this. The nursing staff refer to a distance between their military leadership and the CT leadership / consultants. Look for this in references to military leadership outside of the IDT.

16/10/2019 08:04

Note that Mental Health describe a process of moving away from the team and defining boundaries around access to their service. They feel that this reduced the anxiety felt within the wider team about mental health aspects. However transcript from other professions does not support this. The nursing staff in particular appear anxious about support they felt was lacking from ?a team? closely related to them.

Appendix 12: Letter of invitation

Letter of invitation

Imperial College
London

Date: xxxxxxxxxxxx

Tel xxxxxxxxxxxxxx

Name,
Address,
XXXXXXX
XXXXXXX

Invitation to participate in the research study, 'defining a future rehabilitation pathway for lower limb military amputees'?

Dear xxxxx

We would like to invite you to join a research study which is looking to learn from the patient experience, clinician experience and patient outcomes in order to formalise a rehabilitation pathway for military lower limb amputees. The goal is to capture what we have learned following Op TELIC and Op HERRICK and ensure these lessons help direct the training of clinical staff and the provision of rehabilitation for similarly injured personnel. We would also like to know what issues or health concerns you now face in your daily life as a result of your injuries.

The initial phase of this research will involve discussion groups, called focus groups, and one to one interviews. The research will survey veterans, clinicians and their managers in order to understand aspects of the current provision which worked and that which did not.

I have enclosed a Participant Information Sheet which gives full details about the study. If you are interested in participating, it is important to read this information so that you can make a free and informed decision about whether or not to take part.

I know that you may have questions regarding the study before you can make a decision to take part. The research team and I are available to answer any questions that you may have. Please feel free to phone 020 331 17326 and leave a message in my absence and I will be glad to call you back to answer any questions or simply talk about this further.

If you are agreeable the next step is to contact the researcher, Mr Peter Le Feuvre (Email: p.le-feuvre18@imperial.ac.uk, mob: 07956-446829).

We look forward to hearing from you,

Yours sincerely

Professor Alison McGregor
Chief Investigator

Appendix 13: Participant information Sheet (PIS):

1. PIS: Veteran Focus Group
2. PIS: Clinician / Clinical Manager Focus Group
3. PIS: One to one interview



Division of Surgery
Department of Surgery and Cancer
Imperial College London
Biodynamics laboratory, 7th Floor
Charing Cross Hospital
Fulham Palace Road
London W6 8RF
Tel: 020 3313 8833
Fax: 0203 313 8835
p.le-feuvre18@imperial.ac.uk
www.imperial.ac.uk

Chief Investigator: Professor Alison H McGregor

Co-Investigator: Maj Peter Le Feuvre

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees.

Participant Information Sheet (Veteran)

We would like to invite you to join a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the research?

This research will ask veteran lower limb amputees and their clinicians about the rehabilitation they were part of at Headley Court. We would like to learn what it was about the rehabilitation provision which helped drive recovery. We also want to know what, with hindsight, veterans and clinicians felt was missing and should have been included in the rehabilitation provision at Headley Court.

This research is the 'consultation phase' of a larger PhD research program. Further details can be provided at your request.

Who is doing this research?

Major Peter Le Feuvre, is conducting this study as part of a PhD based at the Centre for Blast Injury Studies, Imperial College London.

Why have I been invited to take part?

You have been asked to take part in this research because your experience undergoing rehab at Headley Court has given you a unique and personal insight into the needs of military lower limb amputees. We would like you to share these if you feel able.

Do I have to take part?

Participation in this research is entirely voluntary and you may withdraw without any reason.

Will my taking part or not taking part affect my service career or future treatment?

No. The study is entirely voluntary and choosing not to participate or withdrawing will have no effect on your career or the treatment/care you receive.

What will I be asked to do?

You will be asked to join a small discussion group of up to 8 other veterans. This is called a focus group. The researcher will encourage the group to discuss what it was about the rehabilitation they received within the military which helped recovery. The group will also discuss what they felt should have been included in the rehabilitation they received in the military.

The group you will be part of will be asked to generate ideas and to rank these in order of importance for you. An audio recording of the discussion will be made, but no video or images will be recorded. You will be free to ask questions at any time throughout the discussion. The audio recording will be transcribed. This means the audio recording is converted into written form. During this process all contributions will be anonymised and so anything you say will not be identifiable to you. Once all the information is transcribed the original audio recordings will be destroyed. At the end of the focus group you will be asked to vote for the top 5 ideas. The focus group will last for a maximum of 2 hours.

What are the possible risks of taking part?

Other participants may bring up situations or issues which could cause you to recall unpleasant experiences relating to your injury. If you have recently experienced distress of this sort, or you are currently receiving treatment for post-traumatic stress, please discuss this with the researcher. Throughout this research, you can withdraw at any point. At any point during the focus group or at the end of the discussion, the researcher will also offer information on where further support can be sought.

What if something goes wrong?

Imperial College London holds insurance policies, which apply to this study. If you experience serious and enduring harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator ([Professor Alison McGregor, a.mcgregor@imperial.ac.uk](mailto:a.mcgregor@imperial.ac.uk)). The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

Are there any expenses and payments which I will get?

You will be refunded for your travel expenses. Accommodation will be provided if required and this will include an evening meal.

What are the possible benefits of taking part?

The findings from the focus groups will inform the later stages of this PhD research. In the longer term, it is intended that this research will inform and direct the future care pathway for military lower limb amputees. It is also possible that it will influence provision of rehabilitation outside of the military.

What will happen once the focus group is complete?

The recordings taken during the discussion session will be played back and the key information transcribed. A summary will be made and the conversations analysed. All original recordings will be destroyed once transcribing is complete. Analysis of the group discussion will be used to justify and inform the later stages of this PhD research.

Will my taking part in this study be kept confidential?

All information about you, given to us during the course of the research, will be kept strictly confidential and, your opinions with regards to the questions asked, will be kept anonymous.

If the findings from the study are published in a scientific journal, no individual will be identified in any way at any stage. The data will be held in accordance with the GDPR. Details of how we will manage your data is contained in the Transparency wording at the end of this information leaflet. Your personal details will be stored on a secure server in a password protected electronic file which belongs to Imperial College London. Only the research team will have access to the research data including the audio recordings.

What will happen to the results of the research study?

The findings from this study will be disseminated via conference presentations, journal publications and meetings with clinical and research staff. You will not be identifiable in any of those at any stage.

What happens next?

If you are happy to take part in this study, you will have an opportunity to ask any questions before being asked to sign a consent form. You will have time to decide whether to volunteer or not. We will give you a copy of the information sheet and signed consent form to keep.

Whom Do I Contact If I Have Any Questions?

If you would like to get in touch with us should you require more information, please feel free to contact us by phone at 020 3312 8833 asking for Peter Le Feuvre, by email at p.le-feuvre18@imperial.ac.uk or by post at the following address:

Peter Le Feuvre
Room 7L16, Floor 7, Laboratory Block
Charing Cross Hospital Campus
Fulham Palace Road, London W6 8RF.

Whom Do I Contact If I Have a Complaint?

Prof Alison McGregor is chief investigator for this research. If you have a complaint or a concern, this should be directed to her:

Contact details (email & phone number): a.mcgregor@imperial.ac.uk; 0203-3838831

Who Has Reviewed the Study?

This study has been reviewed by Head of Department and Joint Research Compliance Office, Imperial College London.

Compliance with the Declaration of Helsinki

This study complies, and at all times will comply, with the Declaration of Helsinki ¹ as adopted at the 64th WMA General Assembly at Fortaleza, Brazil in October 2013.

What if something goes wrong?

Imperial College London holds insurance policies, which apply to this study. If you experience serious and enduring harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator ([Professor Alison McGregor, a.mcgregor@imperial.ac.uk](mailto:a.mcgregor@imperial.ac.uk)). The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

Transparency wording for study participants

Study Title: Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees: A consensus study of clinicians, healthcare managers and patients.

ICREC Reference: 18IC4492

Imperial College London is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Imperial College London will keep identifiable information about you for 10 years after the study has finished / until 2031.

As a university we use personally-identifiable information to conduct research to improve health, care and services. As a publicly-funded organisation, we have to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw

¹ World Medical Association Declaration of Helsinki [revised October 2013]. Recommendations Guiding Medical Doctors in Biomedical Research Involving Human Subjects. 64th WMA General Assembly, Fortaleza (Brazil).

from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting Professor Alison McGregor (Email: a.mcgregor@imperial.ac.uk, Tel: 0203-3838831).

Imperial College London and the Ministry of Defence (MoD) will collect information from you for this research study in accordance with our instructions.

Imperial College London / MoD will use your name, and contact details to contact you about the research study, and make sure that relevant information about the study is recorded to oversee the quality of the study. Individuals from Imperial College London and regulatory organisations may look at your research records to check the accuracy of the research study. The MoD will pass these details to Imperial College London along with the information collected from you. The only people in Imperial College London who will have access to information that identifies you will be people who need to contact you to arrange activities related to this research, to update you on the results or audit the data collection process. The people who analyse the information will not be able to identify you and will not be able to find out your name, or contact details.

The MoD (MODREC Secretariat) will keep your Consent Form which contains identifiable information about you from this study for 50 years after the study has finished/ until 2071.

When you agree to take part in a research study, the information about your health and care may be provided to researchers running other research studies in this organisation and in other organisations. These organisations may be universities, or companies involved in health and care research in this country or abroad. Your information will only be used by organisations and researchers to conduct research in accordance with the [UK Policy Framework for Health and Social Care Research](#).

This information will not identify you and will not be combined with other information in a way that could identify you. The information will only be used for the purpose of health and care research, and cannot be used to contact you or to affect your care. It will not be used to make decisions about future services available to you, such as insurance.

Thank you

We would like to thank you for taking the time to read through this information sheet and for possibly participating in the study.

Chief Investigator: Professor Alison H McGregor

Co-Investigator: Maj Peter Le Feuvre

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees.

Participant Information Sheet (Clinician and Clinical Managers)

Version 3, 29.05.2018

We would like to invite you to join a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the research?

This research will ask veteran lower limb amputees, their clinicians and the managers of the Service about the rehabilitation they were part of at Headley Court. We would like to learn what it was about the rehabilitation provision which helped drive recovery. We also want to know what, with hindsight, veterans, clinicians and managers felt was missing and should have been included in the rehabilitation provision at Headley Court.

This research is the 'consultation phase' of a larger PhD research program. Further details can be provided at your request.

Who is doing this research?

Major Peter Le Feuvre, is conducting this study as part of a PhD based at the Centre for Blast Injury Studies, Imperial College London.

Why have I been invited to take part?

You have been asked to take part in this research because your experience delivering rehab at Headley Court has given you a unique and personal insight into the needs of military lower limb amputees. We would like you to share these if you feel able.

Do I have to take part?

Participation in this research is entirely voluntary and you may withdraw without any reason.

Will my taking part or not taking part affect my service career or future treatment?

No. The study is entirely voluntary and choosing not to participate or withdrawing will have no effect on your career or the treatment/care you receive.

What will I be asked to do?

You will be asked to join a small discussion group of up to 8 other clinicians or managers who also worked at DMRC between 2007-2014. The researcher will encourage the group to discuss what it was about the rehabilitation which was provided from within the military which helped recovery. The group will also discuss what they felt should have been included within this rehabilitation pathway.

The group you will be part of will be asked to generate ideas and to rank these in order of importance for you.

An audio recording of the discussion will be made, but no video or images will be recorded. You will be free to ask questions at any time throughout the discussion.

The audio recording will be transcribed. This means the audio recording is converted into written form. During this process all contributions will be anonymised and so anything you say will not be identifiable to you. Once all the information is transcribed the original audio recordings will be destroyed. The focus group will last for a maximum of 2 hours.

What are the possible risks of taking part?

Other participants may bring up situations or issues which could cause you to recall unpleasant experiences. If you have recently experienced distress of this sort, or you are currently receiving treatment for post-traumatic stress, please discuss this with the researcher.

Throughout this research, you can withdraw at any point. At any point during the focus group or at the end of the discussion, the researcher will also offer information on where further support can be sought.

What if something goes wrong?

Imperial College London holds insurance policies, which apply to this study. If you experience serious and enduring harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator ([Professor Alison McGregor, a.mcgregor@imperial.ac.uk](mailto:a.mcgregor@imperial.ac.uk)). The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

Are there any expenses and payments which I will get?

You will be refunded for your travel expenses. Accommodation will be provided if required.

What are the possible benefits of taking part?

The findings from the focus groups will inform the later stages of this PhD research. In the longer term, it is intended that this research will inform and direct the future care pathway for military lower limb amputees. It is also possible that it will influence provision of rehabilitation outside of the military.

What will happen once the focus group is complete?

The recordings taken during the discussion session will be played back and the key information transcribed. A summary will be made and the conversations analysed. All original recordings will be destroyed once transcribing is complete. Analysis of the group discussion will be used to justify and inform the later stages of this PhD research.

Will my taking part in this study be kept confidential?

All information about you, given to us during the course of the research, will be kept strictly confidential and, your opinions with regards to the questions asked, will be kept anonymous.

If the findings from the study are published in a scientific journal, no individual will be identified in any way at any stage. The data will be held in accordance with the GDPR. Details of how we will manage your data is contained in the Transparency wording at the end of this information leaflet. Your personal details will be stored on a secure server in a password protected electronic file which belongs to Imperial College London. Only the research team will have access to the research data including the audio recordings.

What will happen to the results of the research study?

The findings from this study will be disseminated via conference presentations, journal publications and meetings with clinical and research staff. You will not be identifiable in any of those at any stage.

What happens next?

If you are happy to take part in this study, you will have an opportunity to ask any questions before being asked to sign a consent form. You will have time to decide whether to volunteer or not. We will give you a copy of the information sheet and signed consent form to keep.

Whom Do I Contact If I Have Any Questions?

If you would like to get in touch with us should you require more information, please feel free to contact us by phone at 020 3312 8833 asking for Peter Le Feuvre, by email at p.le-feuvre18@imperial.ac.uk or by post at the following address:

Peter Le Feuvre
Room 7L16, Floor 7, Laboratory Block
Charing Cross Hospital Campus
Fulham Palace Road, London W6 8RF.

Whom Do I Contact If I Have a Complaint?

Prof Alison McGregor is lead supervisor for this research. If you have a complaint or a concern, this should be directed to her:

Contact details (email & phone number): a.mcgregor@imperial.ac.uk; 0203-3838831

Who Has Reviewed the Study?

This study has been reviewed by Head of Department and Joint Research Compliance Office, Imperial College London.

Compliance with the Declaration of Helsinki

This study complies, and at all times will comply, with the Declaration of Helsinki ² as adopted at the 64th WMA General Assembly at Fortaleza, Brazil in October 2013.

What if something goes wrong?

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Transparency wording for study participants

Study Title: Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees: A consensus study of clinicians, healthcare managers and patients.

ICREC Reference: 18IC4492

Imperial College London is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Imperial College London will keep identifiable information about you for 10 years after the study has finished / until 2031.

As a university we use personally-identifiable information to conduct research to improve health, care and services. As a publicly-funded organisation, we have to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

² World Medical Association Declaration of Helsinki [revised October 2013]. Recommendations Guiding Medical Doctors in Biomedical Research Involving Human Subjects. 64th WMA General Assembly, Fortaleza (Brazil).

You can find out more about how we use your information by contacting Professor Alison McGregor (Email: a.mcgregor@imperial.ac.uk, Tel: 0203-3838831).

Imperial College London and the Ministry of Defence (MoD) will collect information from you for this research study in accordance with our instructions.

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The MoD (MODREC Secretariat) will keep your Consent Form which contains identifiable information about you from this study for 50 years after the study has finished/ until 2071.

When you agree to take part in a research study, the information about your health and care may be provided to researchers running other research studies in this organisation and in other organisations. These organisations may be universities, or companies involved in health and care research in this country or abroad. Your information will only be used by organisations and researchers to conduct research in accordance with the [UK Policy Framework for Health and Social Care Research](#).

This information will not identify you and will not be combined with other information in a way that could identify you. The information will only be used for the purpose of health and care research, and cannot be used to contact you or to affect your care. It will not be used to make decisions about future services available to you, such as insurance.

Thank you

We would like to thank you for taking the time to read through this information sheet and for possibly participating in the study.



Division of Surgery
Department of Surgery and Cancer
Imperial College London
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Tel: 020 3313 8833
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p.le-feuvre18@imperial.ac.uk
www.imperial.ac.uk

Chief Investigator: Professor Alison H McGregor

Co-Investigator: Maj Peter Le Feuvre

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees.

Participant Information Sheet (One to One Interviews)

We would like to invite you to join a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the research?

Previous to this study, we conducted focus groups with veteran lower limb amputees, their clinicians and the managers of the military rehabilitation service. We sought to learn what it was about the rehabilitation provision at Headley Court which helped drive recovery. We also wanted to know what, with hindsight, participants felt was missing and should have been included in the rehabilitation provision at Headley Court. This study will build on this consultation by interviewing

participants from the groups outlined above. Both the interviews and focus groups are part of the 'consultation phase' of a larger PhD research program. Further details can be provided on request.

Who is doing this research?

Major Peter Le Feuvre, is conducting this study as part of a PhD based at the Centre for Blast Injury Studies, Imperial College London.

Why have I been invited to take part?

You have been asked to take part in this research because your experience undergoing or delivering rehab at Headley Court has given you a unique and personal insight into the needs of military lower limb amputees. We would like you to share these if you feel able.

Do I have to take part?

Participation in this research is entirely voluntary and you may withdraw without any reason.

Will my taking part or not taking part affect my career or future treatment?

No. The study is entirely voluntary and choosing not to participate or withdrawing will have no effect on your career or the treatment/care you receive.

What will I be asked to do?

The researcher will travel to a chosen location agreed with by you. The time of the session will be approximately an hour and it will be audio recorded. The researcher will first introduce the research and will cover the key issues raised in the focus groups. The researcher will then engage a discussion with you on issues relating to lower limb amputee rehabilitation. You will be asked for your thoughts on the outcome from the focus groups. You will be free to ask questions at any time. Your responses to the questions will be recorded initially on audio and then later transcribed. You will not be identified in anyway. Once all the information is transcribed the original tapes will be destroyed.

What are the possible risks of taking part?

Recalling incidents, situations or issues can be distressing. You are under no obligation to answer any of the questions asked. If you are uncomfortable, distressed or anxious about any of the questions, please speak to the researcher.

What if something goes wrong?

Imperial College London holds insurance policies, which apply to this study. If you experience serious and enduring harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator ([Professor Alison McGregor, a.mcgregor@imperial.ac.uk](mailto:a.mcgregor@imperial.ac.uk)). The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

Are there any expenses and payments which I will get?

You will be refunded for your travel expenses you may incur. As a thank you for your time, a small gift of £30 will be sent to you following the interview.

What are the possible benefits of taking part?

The findings from the focus groups will inform the later stages of this PhD research. In the longer term, it is intended that this research will inform and direct the future care pathway for military lower limb amputees. It is also possible that it will influence provision of rehabilitation outside of the military.

What will happen once the interview is complete?

The recordings taken during the discussion session will be played back and the key information transcribed. A summary will be made and the conversations analysed. All original recordings will be destroyed once transcribing is complete. Analysis of the discussion will be used to justify and inform the later stages of this PhD research.

Will my taking part in this study be kept confidential?

All information about you, given to us during the course of the research, will be kept strictly confidential and, your opinions with regards to the questions asked, will be kept anonymous.

If the findings from the study are published in a scientific journal, no individual will be identified in any way at any stage. The data will be held in accordance with the Data Protection Act, which means that we keep it safely and cannot reveal it to other people, without your permission. Your personal details will be stored on a password protected computer which belongs to Imperial

College London. Only the research team will have access to the research data including the audio recordings.

What will happen to the results of the research study?

The findings from this study will be disseminated via conference presentations, journal publications and meetings with clinical and research staff. You will not be identifiable in any of those at any stage.

What happens next?

If you are happy to take part in this interview, you will have an opportunity to ask any questions before being asked to sign a consent form. You will have time to decide whether to volunteer or not. We will give you a copy of the information sheet and signed consent form to keep.

Whom Do I Contact If I Have Any Questions?

If you would like to get in touch with us should you require more information, please feel free to contact us by phone at 020 3312 8833 asking for Peter Le Feuvre, by email at p.le-feuvre18@imperial.ac.uk or by post at the following address:

Peter Le Feuvre
Room 7L16, Floor 7, Laboratory Block
Charing Cross Hospital Campus
Fulham Palace Road, London W6 8RF.

Whom Do I Contact If I Have a Complaint?

Prof Alison McGregor is lead supervisor for this research. If you have a complaint or a concern, this should be directed to her:

Contact details (email & phone number): a.mcgregor@imperial.ac.uk; 0203-3838831

Who Has Reviewed the Study?

This study has been reviewed by Head of Department and Joint Research Compliance Office, Imperial College London.

Compliance with the Declaration of Helsinki

This study complies, and at all times will comply, with the Declaration of Helsinki³ as adopted at the 64th WMA General Assembly at Fortaleza, Brazil in October 2013.

What if something goes wrong?

Imperial College London holds insurance policies, which apply to this study. If you experience serious and enduring harm or injury as a result of taking part in this study, you may be eligible to claim compensation without having to prove that Imperial College is at fault. This does not affect your legal rights to seek compensation.

If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator ([Professor Alison McGregor, a.mcgregor@imperial.ac.uk](mailto:a.mcgregor@imperial.ac.uk)). The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

Transparency wording for study participants

Study Title: Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees: A consensus study of clinicians, healthcare managers and patients..

ICREC Reference: 18IC4492

Imperial College London is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Imperial College London will keep identifiable information about you for 10 years after the study has finished / until 2031.

As a university we use personally-identifiable information to conduct research to improve health, care and services. As a publicly-funded organisation, we have to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information by contacting Professor Alison McGregor (Email: a.mcgregor@imperial.ac.uk, Tel: 0203-3838831).

³ World Medical Association Declaration of Helsinki [revised October 2013]. Recommendations Guiding Medical Doctors in Biomedical Research Involving Human Subjects. 64th WMA General Assembly, Fortaleza (Brazil).

Imperial College London and the Ministry of Defence (MoD) will collect information from you for this research study in accordance with our instructions.

Imperial College London / MoD will use your name, and contact details to contact you about the research study, and make sure that relevant information about the study is recorded to oversee the quality of the study. Individuals from Imperial College London and regulatory organisations may look at your research records to check the accuracy of the research study. The MoD will pass these details to Imperial College London along with the information collected from you. The only people in Imperial College London who will have access to information that identifies you will be people who need to contact you to arrange activities related to this research, to update you on the results or audit the data collection process. The people who analyse the information will not be able to identify you and will not be able to find out your name, or contact details.

The MoD (MODREC Secretariat) will keep your Consent Form which contains identifiable information about you from this study for 50 years after the study has finished/ until 2071.

When you agree to take part in a research study, the information about your health and care may be provided to researchers running other research studies in this organisation and in other organisations. These organisations may be universities, or companies involved in health and care research in this country or abroad. Your information will only be used by organisations and researchers to conduct research in accordance with the [UK Policy Framework for Health and Social Care Research](#).

This information will not identify you and will not be combined with other information in a way that could identify you. The information will only be used for the purpose of health and care research, and cannot be used to contact you or to affect your care. It will not be used to make decisions about future services available to you, such as insurance.

Thank you

We would like to thank you for taking the time to read through this information sheet and for possibly participating in the study.

Appendix 14: Consent Forms:

1. NGT Focus Group Consent
2. One to one interview Consent

Division of Surgery
Department of Surgery and Cancer
Imperial College London
Biodynamics laboratory, 7th Floor
Charing Cross Hospital
Fulham Palace Road
London W6 8RF
Tel: 020 3313 8833
Fax: 0203 313 8835
a.mcgregor@imperial.ac.uk
www.imperial.ac.uk

Name of Researchers: Prof A McGregor, Maj PA Le Feuvre

MoDREC Reference: 866/MODREC/18

Imperial College Reference: 18IC4492

Participant Identification Number for this trial:

CONSENT FORM (NGT Study) V3: 29-05-2018

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees:

Please Initial Box

1. I confirm that I have read and understood the Patient Information Sheet (PIS), dated 29/05/2018 (version 3) for the above study. The nature, aims and risks of the research have been explained to me. All my questions have been answered fully to my satisfaction
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, and without my medical care, education, employment or legal rights being affected.
3. I consent to the processing of my personal information (name, date of birth, address and telephone number, service number) for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the GDPR as outlined in the PIS (29/05/2018 v3).
4. I understand that sections of my research notes and data may be accessed by responsible persons from the research team, from Imperial College London and/or from regulatory authorities where it is relevant to the research and in order to check that it is being conducted correctly.
5. I agree for my research data collected as part of this study to be securely stored at Imperial College London for 10 years following completion of the study.
6. If I decide to withdraw from the study, I consent for my contribution in any focus group or interview to remain as part of this research up to the point of my withdrawal.
7. I agree for an audio recording to be taken during my participation within the focus group. I understand that these will be transcribed and anonymised and that direct quotes may be used but no participants will be identifiable. I understand that the recording will be destroyed immediately after transcription.
8. This study is a collaboration between the Ministry of Defence and Imperial College London. I agree for my anonymised data to be shared between the MoD and Imperial College London.

9. I understand that in the event of my sustaining injury, illness or death as a direct result of participating as a volunteer in Ministry of Defence research, I or my dependants may enter a claim with the Ministry of Defence for compensation under the provisions of the no-fault compensation scheme, details of which are attached

10. I understand that anonymised data produced during this research may be used in related future research, or to support publication or presentation of the findings.

11. Following the focus groups, the researcher may conduct a small number of one to one interviews. Please tick this box if you would you be happy to be approached?

12. I agree to take part in the above study.

Participant's Statement:

I

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information for Participants about the project, and understand what the research study involves.

Signed :

Date :

Witness Name :

Signature :

Date :

Investigator's Statement :

I

confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the Participant.

Signed :

Date :

Authorising Signatures

The information supplied above is to the best of my knowledge and belief accurate. I clearly understand my obligations and the rights of research participants, particularly concerning recruitment of participants and obtaining valid consent.

Signature of Chief Investigator

Date :

Name and Contact Details of Independent Medical Officer (if appropriate):

Name and Contact Details of Chief Investigator:

Name of Researchers: Prof A McGregor, Maj PA Le Feuvre

MoDREC Reference: 866/MODREC/18

Imperial College Reference: 18IC4492

Participant Identification Number for this trial:

CONSENT FORM (Interview) V3: 29-05-2018

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees:

Please Initial Box

13. I confirm that I have read and understood the Patient Information Sheet (PIS), dated 29/05/2018 (version 3) for the above study. The nature, aims and risks of the research have been explained to me. All my questions have been answered fully to my satisfaction
14. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, and without my medical care, education, employment or legal rights being affected.
15. I consent to the processing of my personal information (name, date of birth, address and telephone number, service number) for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the GDPR as outlined in the PIS (29/05/2018 v3).
16. I understand that sections of my research notes and data may be accessed by responsible persons from the research team, from Imperial College London and/or from regulatory authorities where it is relevant to the research and in order to check that it is being conducted correctly.
17. I agree for my research data collected as part of this study to be securely stored at Imperial College London for 10 years following completion of the study.
18. If I decide to withdraw from the study, I consent for my contribution in any focus group or interview to remain as part of this research up to the point of my withdrawal.
19. I agree for an audio recording to be taken during my participation within the focus group or interview. I understand that these will be transcribed and anonymised and that direct quotes may be used but no participants will be identifiable. I understand that the recording will be destroyed immediately after transcription.
20. This study is a collaboration between the Ministry of Defence and Imperial College London. I agree for my anonymised data to be shared between the MoD and Imperial College London.

21. I understand that in the event of my sustaining injury, illness or death as a direct result of participating as a volunteer in Ministry of Defence research, I or my dependants may enter a claim with the Ministry of Defence for compensation under the provisions of the no-fault compensation scheme, details of which are attached

22. I understand that anonymised data produced during this research may be used in related future research, or to support publication or presentation of the findings.

23. Following the focus groups, the researcher may conduct a small number of one to one interviews. Please tick this box if you would you be happy to be approached?

24. I agree to take part in the above study.

Participant's Statement:

I

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information for Participants about the project, and understand what the research study involves.

Signed :

Date :

Witness Name :

Signature :

Date :

Investigator's Statement :

I

confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the Participant.

Signed :

Date :

Authorising Signatures

The information supplied above is to the best of my knowledge and belief accurate. I clearly understand my obligations and the rights of research participants, particularly concerning recruitment of participants and obtaining valid consent.

Signature of Chief Investigator

.....

Date :

Name and Contact Details of Independent Medical Officer (if appropriate):

Name and Contact Details of Chief Investigator:

Appendix 15: Focus group Handout

1. Focus group question and note paper
2. Introductory presentation handout
3. Voting form

Focus group question and note paper

FORMAT

- Introduction to the research question. (10 min)
- Individuals silently generate ideas in writing. (15min)
- 'Round Robin' listing of ideas on a flip chart (15min)
- Group discussion of the ideas on the flip chart (30min)
- Individuals rank top ten ideas and submit them on a voting card (5 min)
- Break (10min)
- Discussion of vote (20 min)
- Second vote to re-rank top ten ideas (10 min)
- Conclusion and feedback questionnaire (5 min)

QUESTIONS:

What components of the military rehabilitation service do you feel were key to getting you back on your feet?

Knowing what you know now, what changes would you make to the military rehabilitation service – additional components, removal of components?

What are your top five health issues or concerns which you now face?

Introductory Presentation Handout

Defining a Future Rehabilitation Pathway for Lower Limb Military Amputees

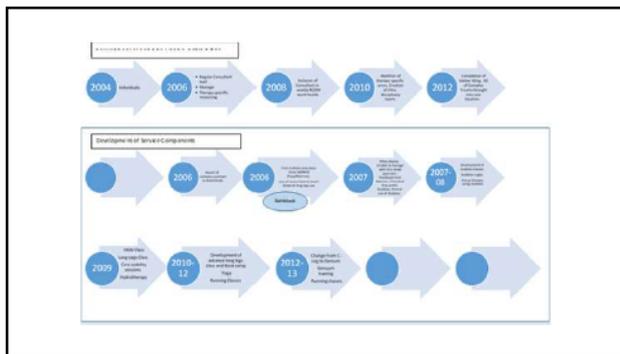
A consensus study of clinicians, healthcare managers and patients.

1

History

- Robert Jones (1857 – 1933)
- Understood the body as a continuous locomotor system.
- Understood the need to provide healthcare as a coordinated pathway to support this locomotor system creating rehabilitation centres ‘with operative, technical, and re-educational departments.
- ‘...to the highest possible grade of health and earning power.’

2



3

Functional and Mental Health Status of United Kingdom Military Amputees Post-rehabilitation

Ladlow P, Phillip R, Etherington J, et al. (Arch Phys Med Rehabil 2015;96:2048-54.)

Physical Outcomes at Discharge

- **75% of all amputees attained AMP-Pro functional mobility score typical of an active adult or athlete.**
- **91% of amputees that were reported to be able to “walk independently anywhere in any weather”.**
- 95% have the ability to perform activities of daily living independently or independently with the use of an aid/adaptation.

4

Temporal Spatial and Metabolic Measures of Walking in Highly Functional Individuals With Lower Limb Amputations

Jarvis H, Bennett A, Twiste M et al. Arch Phys Med Rehabil. (2017) Jul; 98(7): 1389-1399.

- Walking speed, stride length, step length, and cadence of individuals with a unilateral transtibial or transfemoral amputation were comparable with able-bodied persons.
- Gait pattern was highly functional and efficient in all groups.
- **Enhanced spatial and metabolic parameters were noted when compared with populations wearing similar prosthetic componentry.**

What do you feel are the top five issues veteran amputees now face in their daily lives.

11

Focus Group Question: Clinicians

- What components of the service do you feel were key to the successful outcomes we saw? And what are you most proud of?
- Knowing what we know now, what changes would you make to the service – additional components, removal of components?
- What do you feel are the top five issues veteran amputees now face in their daily lives.

What do you feel are the top five issues veteran amputees now face in their daily lives.

12

Focus Group Question: Results of the vote / Discussion (20 min)

- What components of the service do you feel were key to the successful outcomes we saw? And what are you most proud of?
- Knowing what we know now, what changes would you make to the service – additional components, removal of components?
- What do you feel are the top five issues veteran amputees now face in their daily lives.

13

Focus Group Question: Voting (15 min)

- What components of the service do you feel were key to the successful outcomes we saw? And what are you most proud of?
- Knowing what we know now, what changes would you make to the service – additional components, removal of components?
- What do you feel are the top five issues veteran amputees now face in their daily lives.

14

Focus Group Question: Second Vote (10 min)

- What components of the service do you feel were key to the successful outcomes we saw? And what are you most proud of?
- Knowing what we know now, what changes would you make to the service – additional components, removal of components?
- What do you feel are the top five issues veteran amputees now face in their daily lives.

15

Conclusion / Feedback

16

NGT Voting Form

NGT VOTING FORM

Please rank in order of priority what you believe are the ten most important components of rehabilitation we have discussed today, which must be included in a rehabilitation pathway for lower limb amputees.

The most important item receives 100 points. Please rate the remaining 9 items anywhere on a scale of 99 down to 0. (99 = very important; 0 = least important of all).

Component of rehabilitation	Score
1	100
2	
3	
4	
5	
6	
7	
8	
9	
10	
Top five issues veteran amputees now face	
1	
2	
3	
4	
5	

Appendix 16: InterPACT Outcome Assessment and Confirmatory Email to Postgraduate Research Group

Le Feuvre, Peter

From: Le Feuvre, Peter
Sent: 22 January 2020 23:18
To: RUSSELL, Anne-Marie (IMPERIAL COLLEGE HEALTHCARE NHS TRUST); DOLMAN, Leanne (IMPERIAL COLLEGE HEALTHCARE NHS TRUST); SPRING, Carolyn (IMPERIAL COLLEGE HEALTHCARE NHS TRUST); MCKIBBEN, Shauna (IMPERIAL COLLEGE HEALTHCARE NHS TRUST)
Cc: mary.wells5; McGregor, Alison H
Subject: Research collaboration: Message of thanks
Attachments: Conceptual framework of collaboration.docx

Dear Anne-Marie, Leanne, Carolyn and Shauna

Thank you so much for your input last week. The discussion we had around the two frameworks both confirmed aspects of my analysis and also provided me with new insight, particularly your focus upon the clients role within the MDT and IDT. Interestingly, none of the papers I have read which seek to perform a concept analysis upon collaboration actually consider the clients role. This is a point made by Xyrichis.

The main purpose of this email is to thank you for the time you gave to me, and to assure you that I will acknowledge the groups input in my thesis. A secondary purpose is to feedback what I have done with your input. If you are interested - do read on, and feel free to comment back to me directly if you agree, disagree or think I could improve this further.

When I summarised our discussion, it did seem to fit around the conceptual analysis of collaboration proposed by two authors, bar the focus on the patient.

In order to present this work I have therefore created a summary framework (attached) comparing collaboration in the IDT and MDT. On the left hand side of the framework are the concepts I have grouped relating to collaboration highlighted by these authors. Within the column for MDT and IDT, I have then provided a rating which represents the degree to which you saw these concepts evidenced in the data you read. Clearly, the ratings are my interpretation of your discussion. But I have included a statement from the data below each rating as evidence for it.

As noted above, the 'Clients Role' was discussed in our session, but does not appear so overtly as a consideration in the literature. You have therefore revealed a gap for me to dig into further (and I have plenty of patient statements from my data which I can use).

Feel free to have a look at the framework (I tried my best to keep it concise) and to critique it. If you think it could be presented better, or if you disagree with my interpretation of your discussion, please do say.

Thank you again for your help and time.

I look forward to seeing you in March.

Best wishes

Peter Le Feuvre

Concepts relating to Collaboration[134]	Interprofessional Activity Classification Tool [2]	Imperial College Interdisciplinary Research Group review of coding and concepts relating to collaboration	
		IDT	MDT
Sharing	Shared Commitment	High <i>...so, the communication within the team and through the team and the support from each other as this was all happening and the fact that most of the staff at that point in time and all the way through, gave more than the hours that they were paid for</i>	Low <i>That resilience piece, by sharing, didn't then translate, it didn't happen to the Nursing Team.</i>
	Shared Identity	High <i>I think that was really good, the joint sessions, it started to be accepted that that was beneficial to the patient and to the staff...</i>	Low <i>So, on two fronts, one is the therapists didn't get what we do and then you had part of nursing who didn't get what we had to do.</i>
Partnership	Clear Team Goals	High <i>I feel like it was shared well amongst all of the IDT who would identify who would be best to sort of lead on a specific goal</i>	Low <i>The bit that was demoralising was that we were viewed as a babysitting service...in fact a whole raft of work was done during the nights</i>
	Clear roles & responsibilities	High <i>...there wasn't this 'physio's do this, OTs only do that'...so physios would help OTs and OTs would help physio's...</i>	Low <i>...I think my own perspective would be for the nurses to know what the nursing role is and for the nurses to be able to project that into the IDT.</i>
Interdependence	Interdependence between members	High <i>I think we were very good at...having a culture where nobody expected you to know everything, and you could ask anyone to actually help you.</i>	Low <i>But that patient...is dumped on the ward and now it's our job to get them to...OT...physio.</i>
Power symmetry	Integration between work practices	High power symmetry / High group autonomy	Low power symmetry / High professional autonomy
High group autonomy (low professional autonomy)		<i>I think it was really challenging, and it was a shared experience for everyone. I think that's why morale was so great, because when you're in an experience with somebody and you're all learning at the same time it's just such a leveller.</i>	<i>...there was this real medical model is basically what I'm trying to describe, this real entrenched model of how they deliver their rehab and I had to fit in. When I didn't, it caused a degree of shock.</i>
Clients Role		Active participant within evolving care:	Receiver of a care process:
		<i>...there was a willingness for staff to learn, but not just for the patients but with the patients and from the patients...</i>	<i>You are taking that responsibility of moving that patient forward</i>

Figure 16.1 Interdisciplinary Research Group summary framework of their evaluation of collaboration as evidenced in MDT and IDT coded data.

APPENDIX 17: Justification for each ADVANCE Baseline Outcomes Requested.

The outcome data requested from ADVANCE is listed in the following table. Outcomes were requested to help answer questions or provide clarity from points arising from the consultation process.

Measure		Assessment	Comment
Background	Age at injury	Defence Statistics	Participants hypothesise that junior soldiers are less likely to find employment and have a poorer QoL.
	Rank	Defence Statistics	
	Primary Military Role	Self-Report	
	Length of military service	Clinician Assessment	
	Time between injury & assessment	Clinician Assessment	How long after injury was ADVANCE baseline data captured?
Outcome Scores			
Physical Presentation	Exposed (Unilateral, Bilateral, Triple Amputees v uninjured control (unexposed)	Self-Report (confirmed with DEXA scan)	To compare outcome between these groups.
	Injury severity score (New Injury Severity Score)	Clinician Assessment	Is NISS related to the number of amputations / mobility / psychological measure?
	Abdominal Circumference	Clinician Assessment	Is there a relationship between physical indicators of obesity and outcome scores?
	Hip Circumference	Clinician Assessment	
	BMI (Adjusted for amputation)	Clinician Assessment	
	Waist Hip Ratio	Clinician Assessment	
Pain	Phantom Limb Pain (PLP)	Self-Report	Is there a relationship between pain in this population and injury severity? Are social /psychological /physical outcomes associated with pain?
	Residual Limb Pain (RLP)	Self-Report	
	Back Pain Score) LBP)	Self-Report	
Mobility	6-Min Walk Distance	Clinician Assessment	Is there a relationship between prosthetic mobility and social / psychological or physical outcomes?
	Amputee Mobility questionnaire	Clinician Assessment	
	SIGAM	Self-Report	Is there a relationship between mobility endurance (6MWD), self-reported ability (SIGAM) and SCS?
	Socket Comfort Score (SCS)	Self-Report	Participants report that prosthetic fit affects their mobility and QoL.
	Prosthetic Satisfaction (PSS)	Self-Report	
	International Physical Activity Questionnaire (IPAQ)	Self-Report	Is there a relationship between self-reports of physical activity and physical outcome scores?
	Oswestry Disability Score	Self-Report	
Psychological	PHQ-9	Self-Report	What is the psychological health of this population?
	GAD-7	Self-Report	Is there a relationship between GAD-7/PHQ-9 and physical outcome?
Social	Scale of perceived social support	Self-Report	Is there a relationship between perceived social support and physical or psychological outcome?
	Marital Status	Self-Report	Do those with a partner have better biopsychosocial outcomes?

	Resides alone	Self-Report	Do those who live alone have lower biopsychosocial outcomes?
	Employment	Self-Report	Is employment and psychosocial outcome associated?
Quality of Life	EQ5D-5L	Self-Report	Is there a relationship between QoL / mobility performance / IPAQ / pain / anxiety / depression?

Table 17.1 Questions / comments arising from the consultation (right) used to justify the request for outcome measures from ADVANCE data (left).

APPENDIX 18: Re-coded Variables

Low sample size, or high variance resulted in the decision to re-code Likert scales into an ordinal scale with two or three levels. This has been described in Section 3, the list of variables and details of their recoding is detailed in Figure 18.1.

Variable	Variable description	Re-coded name	Variable description	Justification / Reference
Control / Exposed	Non-injured control and participants with limb loss.	Amputation Count	0: Uninjured control; 1: Unilateral; 2: Bilateral; 3: Triple amputee groups	To enable comparison with earlier military research [4]
6-Minute walk test	Measuring 6-minute walk distance (6MWD) (metres)	Walking Category	0: Community Walker: 6MWD > 410m 1: Non-community walker: 6MWD < 410m	Published community 6MWD [420].
SIGAM	Six-point categorical scale: Grade A (Cosmetic limb wearing), B, C, D, E to Grade F (Normal or near normal gait).	SIGAM (Condensed)	0: A-C (Minimal prosthetic mobility) 1: D-E (Community prosthetic user) 2: F (Unlimited prosthetic user)	Low sample numbers below grade E and F.
BMI	Scale from 18.5-48.0	BMI Scale	0: 18.5-24.9 (Uninjured) 1: 25.0-29.9 (Overweight) 2: 30.0+ (Obese)	https://www.nhs.uk/common-health-questions/lifestyle/what-is-the-body-mass-index-bmi/
Oswestry Index	Index 0-100% interpreted into 5 scales: minimal disability (0-20); moderate disability (21-40); severe disability (41-60); crippled (61-80); bed bound (81+).	Oswestry Category	0: Minimal Disability 1: Moderate – crippling disability	Low sample size for all scales below <i>minimal disability</i> .
Socket Comfort Score (SCS)	0-10 Likert scale: 0= No comfort; 10 = perfect comfort	SCS Cond	0-6 / 10: uncomfortable socket 7-10 / 10: comfortable socket	SCS used as a Key Performance Indicator in MoD: sockets must achieve a SCS of 7/10 or more.
Prosthetic Satisfaction Score (PSS)	0-10 Likert scale: 0= No satisfaction; 10 = perfect satisfaction*	PSS Cond	0-6 / 10: unsatisfied 7-10 / 10: satisfied	Justification as for SCS.
Low Back Pain (LBP)	Severity; Frequency; Impact: 0-10 Likert scale*	LBP Sev; LBP Freq; LBP Imp	0-3: Minimal pain 4-10: Moderate – High Pain	Low sample reporting scores >4/10
Phantom Limb Pain (PLP)	Severity; Frequency; Impact: 0-10 Likert scale*	LBP Sev; LBP Freq; LBP Imp	0-3: Minimal pain 4-10: Moderate – High Pain	Low sample reporting scores >4/10
Residual Limb Pain (RLP)	Severity; Frequency; Impact: 0-10 Likert scale*	LBP Sev; LBP Freq; LBP Imp	0-3: Minimal pain 4-10: Moderate – High Pain	Low sample reporting scores >4/10
GAD-7	Ordinal Scale 0 (no anxiety) -21 (severe)	GAD-7 Category	Score 0-9: Not clinically significant	A score >9 is deemed clinically significant [186].

			Score 10-21: Clinically significant	
PHQ-9	Ordinal Scale 0 (no depression) -21 (severe)	PHQ-9 Category	0-9: Not clinically significant 10-27: Clinically significant	A score >9 is deemed clinically significant [187].

Table App-18.1: Re-coded variable list with justifications (*0= no pain, 10= maximum pain)

APPENDIX 19: Statistical tests

Rational for the choice of statistical tests for each outcome is detailed in the following table.

Injury Severity			
Null hypothesis: There is no association between NISS and the independent variable.			
Dependent Variable	Independent Variable	Assumptions*	Statistical test
New injury severity score (NISS)	Amputation count 6MWD (metres) AMPPRO score SIGAM grade EQ-5D-5L Dimensions: mobility, self-care, usual activity, pain /discomfort, depression / anxiety	NISS: ratio scale Amputation Count: Ordinal scale 6MWD: Continuous ratio scale AMPPRO: Interval scale SIGAM: Ordinal scale EQ-5D-5L Dimension: Ordinal scale	Spearman rank-order correlation
	Walking category (community walker/non-community walker)	NISS: ratio scale Walking Category: Ordinal categories	Mann Whitney U Test
Quality of Life (EQ-5D-5L)			
Null Hypothesis: There is no difference between EQ-5D-5L index or its dimensions between groups.			
EQ-5D-5L Index	Control vs Amputation Group Amputation count. Walking category	EQ-5D-5L: ratio scale Control / Amputation Group: Nominal categories Amputation Count: Ordinal scale	Kruskal Wallace H Test with post hoc Mann Whitney U Test (KW with MW post hoc)
EQ-5D-5L Dimensions: mobility, self-care, usual activity, pain /discomfort, depression / anxiety	Amputation count	EQ-5D-5L Dimension: Ordinal scale Amputation Count: Ordinal scale	KW with MW post hoc
Prosthetic mobility: Difference in mobility outcomes between groups.			
<i>Null Hypothesis: There is no difference in scores of the dependent variable between control and amputee groups.</i>			
6MWD (metres) Total Met-Minutes: • All Activities • Walking • Moderate activities • Vigorous activities	Amputation count Walking category (community vs non-community walker)	6MWD: Ratio scale Total Met Minutes: Ratio scale Amputation Count: Ordinal scale	KW with MW post hoc
Prosthetic mobility: Association / relationship between dependent and independent variables.			
<i>Null Hypothesis: There is no association between dependent and independent variable categories.</i>			
Dependent Variable	Independent Variable	Assumptions*	Statistical test

Walking Category	Oswestry category BMI category SIGAM categories	Walking category: Ordinal categorical data Oswestry category, BMI category, SIGAM category: Ordinal categorical data	Pearson Chi Square (or Fisher's exact test when conditions are violated)
AMPPRO	6MWD	AMPPRO: interval scale 6MWD: ratio scale ¹	Spearman rho
	Walking Category	Walking category: Ordinal categorical data	

Pain / Discomfort / Anxiety / Depression			
<i>Null Hypothesis: There is no association between dependent and independent variables.</i>			
Socket Comfort Score (SCS Cond)	Amputation Count Walking Category Oswestry Category Residual Limb Pain (RLP Cond)	Variables are ordinal categories	Pearson Chi Square (or Fisher's exact test when conditions are violated)
	SIGAM Category	Interval scale	
Prosthetic Satisfaction Score (PSS) Cond	Amputation count Walking category	Variables are ordinal categories	Pearson Chi Square (or Fisher's exact test when conditions are violated)
GAD-7 (Cond)	Amputation Count SIGAM Cond, LBP, PLP, RLP, SCS	Variables are ordinal categories	
PHQ-9 (Cond)	Walking Category		

Multidimensional scale of perceived social support (MSPSS) / Employment / Living alone			
<i>Null Hypothesis: There is no difference or association in MSPSS across the study population</i>			
MSPSS	Amputation Count	MSPSS: Ratio scale Amputation count: ordinal scale	KW with MW post hoc
MSPSS	Living alone Working category	MSPSS: Ratio scale Living alone / working: ordinal categories	Mann Whitney U Test
Working Category	Walking category Amputation count	Variables are ordinal categories	Fisher's Exact Test (2x2) Pearson Chi Square (4x2)

Table App-19.1: Justification table outlining choice of statistical tests. [419]

Appendix 20: Framework example MDT / IDT Team Dynamic

MDT Team Dynamics	
Positive	<p>I think we supported each other but I don't know that the wider MDT supported us.</p> <p>so I introduced (Name) to the concept of behaviour activation, he introduced me to the concept of adaptive sport and then together we just thought, "Well why don't we try and do some of this? Why don't we try and actually target this to a group of people who we think would benefit? Let's try PTSD".</p>
Negative	<p>I think probably the military nurses coming and going were not a benefit... you get a varying amount of motivation from them. For some of them, being posted here is about the last thing they ever want to do...that was not helpful.</p> <p>So, there was this real medical model is basically what I'm trying to describe, this real entrenched model of how they deliver their rehab and I had to fit in and when I didn't, it caused a degree of shock.</p> <p>it didn't look right to them (consultant) and because it didn't look right, they got upset about it. Because they got upset about it, conflict happened and then because conflict happened the military bits kicked in and all sorts of things went wrong.</p> <p>Yeah, no time for training, you were literally just in there running...I'd come from a standard NHS environment ... to seeing these really traumatic injuries with no sort of training prior to that. It's training on the job, you know, I remember tripping over my first patient ... double amputee, and just going, "Oh my God," ...it was full-on.</p> <p>...the bit that was demoralising is that we were viewed as a babysitting service, whereas in fact a whole raft of work was done during the nights here when a patient was up at 2am or 3am in the morning and they were in pain and they were coming to terms with what they'd lost.</p> <p>So, on two fronts; one is the therapists didn't get what we do and then you had part of nursing who didn't get what we had to do. So, we were finding it a bit tricky (laughs).</p>
Trust	
Distrust	<p>So, I would return the next day ...to...said patient and ...it's almost like a suicide watch going on within the Complex Trauma. So, there was never any tolerance (to allow them to grieve). This is a unique group and we don't know how they're going to respond... we have to have quite distinct red lines and everything before then we need to tolerate. Violence obviously and attempts to harm outside of that; everything else needs to be understood ...think about their headspace and think about the loss of control that they've just gone through in their life...it was hugely apparent that there was a lot of work to be done, not with the patients but with the treating Team.</p>

(IDT) Team Dynamics	
Positive	<p>...when social work was not embedded in the team, that's when we had more problems. When they embedded in the team, that's when it became easier.</p> <p>It wasn't a specialist area for anybody at Headley when the conflict started, so they (hierarchy) gave us a lot of support to get that training and to get the staff in that would have some of that support for us....so the communication within the team and through the team and the support from each other as this was all happening and the fact that most of the staff at that point in time and all the way through, gave more than the hours that they were paid for to get the job done and put a lot in to it.</p> <p>...actually spending that time as a team to work out what's important for that patient.</p> <p>Although we were a large team, there was barely anything of that, and so people did all stay late. Almost, work became the social life</p> <p>You have to have a staff member who's open, who doesn't think someone questioning them, is criticism....And I certainly found that when I was doing something I would, you know... "Right, XXX, what do you think of this?" ...it was the same in IDT meetings. It wasn't, "Why is this person not doing this yet?"</p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day...whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice.</p> <p>... the social aspect...there are times to me that was like, "The military's burning all this money on stuff...actually the social aspect, the fact that we had ...parties, things where we just all interact....It was so important.</p> <p>whilst it was work, it was hard work, it also didn't feel like work...and you think, 'Well, this is fun,'</p>
Negative	<p>Mental health never embedded in the team, and I think we could've addressed a lot of these issues if it had been embedded in the team. And I think, again, although it got so big, nursing and rehab did have to split, and they did, but because you don't, it's separate that causes difficulties.</p> <p>Certainly, the good staff-patient ratio but also, as I say, for us, we've been through a lot of staff in prosthetics and for some of them it just wasn't the right place to work, you do need the right like-minded staff who are willing to put in the hours</p>
Trust	<p>I think it was really challenging, and it was a shared experience for everyone. I think that's why morale was so great, because when you're in an experience with somebody and you're all learning at the same time it's just such a leveller.</p> <p>Probably really as a team together because everyone was just, knew everyone was just working flat out.</p> <p>a holistic approach, flexible content and creative ideas. I think the fact that we're all, like [name] and [name] were saying, able to try stuff and give it a go but also be quite creative and motivate each other or inspire each other.</p> <p>You have to have a staff member who's open, who doesn't think someone questioning them, is criticism....And I certainly found that when I was doing something I would, you know... "Right, XXX, what do you think of this?" ...it was the same in IDT meetings. It wasn't, "Why is this person not doing this yet?"</p> <p>Everyone was working was really hard, it wasn't like you're like, "Oh, those physios, they're sitting doing nothing"....Because we were like all working flat out.</p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day, the lead of that, whether it be the clinical lead or the management lead or the physio versus prosthetist, whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice. You don't go, 'Well, they said this but I don't agree with it, and I think, you say, they said this and that's what we're aiming for now.'</p>
Distrust	

Appendix 21: Clinician and clinical manager full voting results

THEMES SELECTED BY PATICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	TOTAL SCORE	RANK
THE IDT		Clinicians (MoD Civ/Mil) (n=8)	Managers & Clinicians (n=8)	Nurses V Rehab (n=5 v 2)	AHP previous employees (n=7 + 7)	AHP previous employees (n=7 + 7)		
IDT: Joint Approach	Joint meetings, planning, sharing of goals (not relating to joint clinical treatment)	591	798	447	399	374	2609	1
IDT: Communication: Patient - clinician	IDT meeting format and schedule of communication which included patient.				179	190	369	2nd
IDT: Proximity	Geographical proximity brought about a shared consciousness and team identity which led to a cultural proximity in approach.	93			82	200	375	3rd
IDT: Team Dynamics	Relationships and collaboration was enhanced by complex trauma social events, lunches and away days.				166	444	610	4th
IDT: Military and civilian mix of clinical staff	Mix of military and civilian clinicians was seen as a positive feature					130	130	5th
LEADERSHIP: Consultant - Civilian Manager Leadership	IDT Led by military consultant and a civilian facilities or administrative manager. Both pillars mutually accountable for patient care, visible, accessible and equivalent.	300	286				586	
LEADERSHIP: Consistant Leadership	Individuals in team leadership position remained consistant throughout this period.	193	461		90		744	8
RIPPLES FROM THE IDT APPROACH								
Risk tolerance	Leadership were prepared to give things a go which were untried. Consultants backed clinicians and provided cover for these initiatives. Patients were also prepared to 'give it a go'. Acknowledgement that we didn't have the answers.							
				279		97	376	20
Black box thinking	Reflective approach learning from lessons which did not succeed, not being afraid of failure, adapting and evolving care		225	85	155	90	555	13
Clinical co-ordination roles	Rehab coordination officer, Registrar on S4/412 were key posts at RCDM. Key worker role developed at DMRC	185	178	219			582	12

Joint therapy sessions	Multi-disciplinary treatment sessions between two professions, or joint assessments which commenced each admission.	158						587	15	
Peer support: clinician - pt - manager	Patient, clinician and manager may offer peer support to one another or to those with whom they share a role. This theme is specific to Complex Trauma	94	429	91	272	290	286	1190	4	
Defining the clinical roles	Nurse specific theme highlighted in 1 to 1 interviews. Recognition that there was not a shared sense of role within Nursing Div, or members of the team felt intimidated by the			100				100		
Networking beyond the IDT to access expertise	Access to specialists in the fields of surgery and medicine. Proximity and peer support from specialists through inclusion of DMRC therapy staff in these clinics, and clinics largely located at DMRC.	195	95					290		
RESOURCING THE IDT										
Optimal Staff Allocation (acute and sub-acute)	Staff Ratios: Staff number allowed sufficient time with patients and to manage the breadth and creativity of the program	388	85					99	572	19
Continuity of staff	Nursing make particular reference to posting disruption and use of bank staff upon the service. Therapy staff view the consistency of staffing achieved despite temporary contracts and military postings, as a positive			95			60	155		
Required resources (required resource: equipment)	Ease of justifying equipment and resources when these were needed. Provision enabled created 'whatever it takes' attitude and provision was based on need and not financial budgets	481	447	80	80			160	1248	
Time	The program allowed flexibility of time to be scheduled for patients as needed. Enabled the building of trust and friendship.	188	90	159	169			99	705	
outcome measures: relevant - meaningful	Outcome measures needed to reflect and measure change and be appropriate for the client group.		55						55	
The need for simple joined up communication /	Recognition that there was a need for joined up IT, use of online medical notes to enable communication beyond DMRC. And a need for rationalisation of IT systems / means of recording outcomes.	188	182	180					550	14

Infrastructure / outdoor environment	The environment at DMRC allowed a broad program and use of the outdoors enabling real life functional rehab	96				189	285		
PHILOSOPHY OF CARE									
Whatever it takes	Encompasses motivation of individuals and the organisation to do whatever it took to help patients recovery.	674	290	140	290	237	1631	3	
Patient centred (goals & intervention)	Goals centred around patients objectives they sought to achieve - dance at their wedding etc		185	698	271 ?		1154	5	
Broad and holistic approach to therapy / intervention	Therapy encompassed community visits, sport, AT, horticulture, yoga. Rehab was seen as a restoration back to a life the patient sought and so this theme ties with 'whatever it takes', patient centred goals, and functional voc approach.	285	452	80	340	94	1251	6	
Functional / vocational / activity / skill focus	Functional vocational focus to rehab gave activity meaning and purpose for patients. Also helped therapy staff to learn what made patients tick	91	434	97		80	702	9	
Ethos and banter	Military ethos was seen to encompass a high expectation for success and high standards, whilst the banter brought comedy and fun to the rehab work.	187	95	95	183	80	640		
Application of accrued learning (was SOPs)	SOPs developed as the team developed helped to provide structure to provision	97	91	60	90		338		
NECESSITY THE MOTHER OF INVENTION / INNOVATION									
Periodic Intensive Rehab (PIR)	Rythmn of rehab - flexible blocks of care in DMRC with flexible blocks at home.	182	191	258	179	70	880	7	
Group therapy - one to one	Variety in the program allowing one to one focused care, and also group therapy where patients learn from one another.	94	170	93	80	263	700	10	
Structured timetable centred on patient need	timetable meant there was less drift and specific need could be targetted			100	69	70	239		
MSK S&C Underpinning to treatment	Foundation of DMRC MSK approach to rehab was adopted and adapted for CT cohort	89	98				187		
Shared conciousness between organisations	Sharing of goals and aspirations for patients between organisations external to DMRC. In particular links built with RCDM and specialist units across the UK.	182	252				434	17	
TIME: The clock is ticking, proactive care decisions hastening recovery before MD	The need for clear deadlines and targets to prevent drift, maintain focus and plan towards transition					199	199		

Early intervention	ITU Rehab, reach of prosthetics into acute care, recognition that we start rehab and use definitive sockets as early as healing will allow		179	98	70	347	
INTERVENTIONS							
Pain Management	Consistent and attentive focus on pain management early on at RCDM		154	98		252	
Mental health support (patient and staff)	Negative theme representing clinicians belief that patients and staff needed mental health support and treatment provision. Provision was seen as inadequate	382	80	486	233	471	1652
Wheel chair training	Formalised training on wheelchairs to support safe use.	96					96
Early nutritional support	Intensive nature of rehab and healing following trauma required a greater focus on nutrition. This theme links with transitional support.		75				75
Resilience Training	Resilience training was a focus for ERI and nursing staff as part of their feeling they needed mental health support.			139	155		294
Dedicated IST Support	Training opportunities, dedicated time in the clinical program, and peer to peer training (therapists). Nursing staff see this as something they were deprived of.	289.5		364			653.5
Health promotion / health education	Need for patients to understand how to adapt their lifestyles now they are without limbs so to avoid weight gain and comorbidities.		80		86		166
THE MILITARY FAIRYTALE							
Patient motivation and camaraderie	Patient drive to achieve	290	192				482
Transition: Continuity of healthcare	The lack of continuity from military to civilian meant that clinicians felt they were dropping their patients into the system, you clear it, you plan it, you do it in facility. Seen that we could have transitioned them better in how we structured accommodation and	187		99	65		351
Transition: Support for future social, community role (inc employment)				194	86	88	368

Appendix 22: Veteran full voting results

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6	TOTAL SCORE
IDT Culture		Veteran 1 (DMRC)	Veteran 2 (Winchester)	Veteran 3 (Nottingham)	Veteran 4 (Preston)	Veteran 5 (Tedworth Ho)	Veteran 6 (London)	
IDT: Joint Approach	Joint meetings, planning, sharing of goals (not relating to joint clinical treatment)		90		300	100	100	590
IDT Communication: Patient	IDT meeting format and schedule of communication which included patient.	199						199
IDT: Proximity	Geographical proximity brought about a shared consciousness and team identity which led to a cultural proximity in approach.		85	100	90	200		475
IDT: Team Dynamics	Relationships and collaboration was enhanced by complex trauma social events, lunches and away days. Encompasses patients group			75				75
Broad Specialist based team	Should this be Whatever it takes - listen to the transcript to decide		86			181		267
IDT: Military and civilian mix	Mix of military and civilian clinicians was seen as a positive feature							0
LEADERSHIP: The defined role	IDT Led by military consultant and a civilian facilities or administrative manager. Both pillars mutually accountable for patient care, visible, accessible and equivalent.							
LEADERSHIP: Consistant Lead	Individuals in team leadership position remained consistant throughout this period.				60			60
RIPPLES FROM THE IDT APPROACH								
Risk tolerance	Leadership were prepared to give things a go which were untried. Consultants backed clinicians and provided cover for these initiatives. Patients were also prepared to 'give it a go'. Acknowledgement that we didn't have the answers.	88						88
Black box thinking	Reflective approach learning from lessons which did not succeed, not being afraid of failure, adapting and evolving care							0

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6
Clinical co-ordination roles	Rehab coordination officer, Registrar on S4/412 were key posts at RCDM. Key worker role developed at DMRC	175					175
Joint therapy sessions	Multi-disciplinary treatment sessions between two professions, or joint assessments which commenced each admission.						0
Peer support: clinician - pt - n	Patient, clinician and manager may offer peer support to one another or to those with whom they share a role. Peer support requires the building of honest trusting relationships of support.	95		100			80
Defining the clinical roles	Nurse specific theme highlighted in 1 to 1 interviews. Recognition that there was not a shared sense of role within Nursing Div, or members of the team felt intimidated by the						0
Networking beyond the IDT to	Access to specialists in the fields of surgery and medicine. Proximity and peer support from specialists through inclusion of DMRC therapy staff in these clinics, and clinics largely located at DMRC.	96	50				146
PATIENT CENTRED RESOURCING							
Optimal Staff Allocation (acute)	Staff Ratios: Staff number allowed sufficient time with patients and to manage the breadth and creativity of the program						0
Continuity of staff	Nursing make particular reference to posting disruption and use of bank staff upon the service. Therapy staff view the consistency of staffing achieved despite temporary contracts and military postings, as a positive	92		69			161
Required resources (required)	Ease of justifying equipment and resources when these were needed. Provision enabled created 'whatever it takes' attitude and provision was based on need and not financial budgets		90			185	275
Time	The program allowed flexibility of time to be scheduled for patients as needed. Enabled the building of trust and friendship. Also time to recover and adjust.	90					90
outcome measures: relevant	Outcome measures needed to reflect and measure change and be appropriate for the client group.						0

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6
The need for simple joined up	Recognition that there was a need for joined up IT, use of online medical notes to enable communication beyond DMRC. And a need for rationalisation of IT systems / means of recording outcomes.						0
Infrastructure / outdoor enviro	The environment at DMRC allowed a broad program and use of the outdoors enabling real life functional rehab			163		160	
Duty status attributed to reha	Rehab was seen as military duty which supported personnel financially as they underwent rehab.						0
Training Support	Training opportunities, dedicated time in the clinical program, and peer to peer training (therapists). Nursing staff see this as something they were deprived of.						0
PHILOSOPHY OF CARE							
Whatever it takes - Art of the p	Encompasses motivation of individuals and the organisation to do whatever it took to help patients recovery.			171		181	352
Patient centred (goals & inter	Goals centred around patients objectives they sought to achieve - dance at their wedding etc			70	80		150
Broad and holistic approach t	Therapy encompassed community visits, sport, AT, horticulture, yoga. Rehab was seen as a restoration back to a life the patient sought and so this theme ties with 'whatever it takes', patient centred goals, and functional voc approach.	91	186	80	135		492
Functional / vocational / activ	Functional vocational focus to rehab gave activity meaning and purpose for patients. Also helped therapy staff to learn what made patients tick						0
Ethos and banter	Military ethos was seen to encompass a high expectation for success and high standards, whilst the banter brought comedy and fun to the rehab work. Empathy not sympathy				100		100
Application of accrued learnin	SOPs developed as the team developed helped to provide structure to provision. Collective experience of patients fed into group sessions and collaborative support between patient and clinician			90			90

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6	
Early intervention	ITU Rehab, reach of prosthetics into acute care, recognition that we start rehab and use definitive sockets as early as healing will allow							0
MSK S&C Underpinning to tre	Foundation of DMRC MSK approach to rehab was adopted and adapted for CT cohort		186					186
Continuity of care								0
NECESSITY THE MOTHER OF INVENTION / INNOVATION								
Periodic Intensive Rehab (PIR)	Rythmn of rehab - flexible blocks of care in DMRC with flexible blocks at home. Provision of residential care		85	79	434	165		763
Group therapy - one to one	Variety in the program allowing one to one focused care, and also group therapy where patients learn from one another.		100		200	192		492
Structured timetable centred	timetable meant there was less drift and specific need could be targetted				80			80
Shared conciousness between	Sharing of goals and aspirations for patients between organisations external to DMRC. In particular links built with RCDM and specialist units across the UK.							0
TIME: The clock is ticking, proactive care decisions hastening recovery before MD	The need for clear deadlines and targets to prevent drift, maintain focus and plan towards transition					90		90
INTERVENTIONS								
Pain Management	Consistent and attentive focus on pain management early on at RCDM	85					98	183
Mental health support (patier	Negative theme representing clinicians belief that patients and staff needed mental health support and treatment provision. Provision was seen as inadequate		110			99	180	389
Wheel chair training	Formalised training on wheelchairs to support safe use.							0

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6	
Prosthetic Provision			298	165	100	198	174	935
Early nutritional support	Intensive nature of rehab and healing following trauma required a greater focus on nutrition. This theme links with transitional support.							0
Resilience Training	Resilience training was a focus for ERI and nursing staff as part of their feeling they needed mental health support.							0
Use of Sport and Adventure Trg	Inc Battleback, water sports - rec therapy etc		70		70	338	50	528
OT			75					75
Social Work			70		240			310
Physio					100	99	280	479
Welfare						80	95	175
Health promotion / health ed	Need for patients to understand how to adapt their lifestyles now they are without limbs so to avoid weight gain and comorbidies.	100	98					198
Education (AEC - Further Ed)							178	178

THEMES SELECTED BY PARTICIPANTS	DEFINITION	FG 1	FG 2	FG 3	FG 4	FG 5	FG 6	
THE MILITARY FAIRYTALE								
Veteral Health Service								
Managing their own health - healthcare	does this relate to pain management	98					150	248
The Hero effect								
Patient motivation and camaraderie	Patient drive to achieve						100	100
Transition: Employment	Seen as poor - negative attitude	93	96				95	284
Transition: Continuity of health	The lack of continuity from military to civilian meant that clinicians felt they were dropping their patients into the unknown. Clear D/C planning would be enabled if care progressed into a veteran designated provision which shared awareness of military provision.						100	100
Transition: Support for future social, community role (inc employment)	Clinical, social, educational, financial, step down facility. Seen that we could have transitioned them better in how we structured accommodation and service support for patients.						282	282
THE PATIENT EXPERIENCE								
Support for and from peers and family	Being around others with the same injury. Also the support offered from family and significant others	195	190		95		343	823
Substance abuse							93	93
Juggling commitments at home when away	Life other than rehab (family, ed etc)	80						80

Appendix 23: Mental health coding framework

Mental Health		
	Positive	Negative
Service Delivery	<p>Having said that, what helped... this is where kind of you exploited that gap which was needed of the horticultural stuff, the yoga, all of that fits into this thing, back to my point of, you know, not everyone's a physical being, this was not lighting everyone's fire this very physical programme and actually we did quite well at offering those other things but Carol would have told you wouldn't she that she'd got loads of the mental health stuff down in the greenhouse for the staff and patients, people went to the greenhouse.</p> <p>They didn't go to the mental health team... the patients like to drop down and have a chat there knowing that it wasn't all going to naturally escalate. And that's what happened a bit, touching on what you were talking about earlier, because everyone was quite anxious about the mental health stuff I think stuff was escalated too quickly whereas Carol would give them tea and sympathy and not escalate it.</p> <p>I'm quite proud of introducing yoga and getting the yoga started, I think that's a really good addition to the programme, just because it was quite different to some of the other things that they did. And, as far as mental health, I think it was very helpful for a lot of guys, so, that was one of the things down.</p> <p>Post-traumatic Recovery Course... The improvements I saw from people in a week there were huge, because they were doing things that, I guess it was like a try all these sports and see what happens and see what you can do. And there was one guy who was a double amputee, always wore his trousers, couldn't swim. We got them going between boats on a rope, he went to a waterpark, took his</p>	<p>mental health...The fact that they were in a building away from everybody for the whole time.</p> <p>Up a hill. In an uneven terrain that was impossible to get to and I think, unfortunately, I think that's going to last as a legacy because we didn't instil the right story right from Day One that this is just as much a part of rehab as prosthetics, physio, OT, you know, and we went and isolated it from the whole picture and the staff</p> <p>Mental health never embedded in the team, and I think we could've addressed a lot of these issues if it had been embedded in the team. And I think, again, although it got so big, nursing and rehab did have to split, and they did, but because you don't, it's separate that causes difficulties.</p>

	<p>shorts off, he didn't have other shorts on (laughter), but took his trousers off, and he had so much confidence he actually just then wheeled his wheelchair into the swimming pool because he just thought, 'I don't care'. And I think more things like that that were residential activities, it doesn't have to be sport, but something like that, where you're given almost a suite of activities to show, 'Okay, this has happened, but look at all the other things that are possible'.</p>	
<p>Patient dealing with Loss</p>	<p>...challenges, like the Ironman...was such an asset. It just gave some of these guys something to work towards...I mean, (name)... it completely changed his life, and I mean completely, and that was just an Ironman. He's now got a profession and a living and a career and something that he loves doing.</p> <p>Yeah, having achieved high levels of physical activity, it was (?) before, to go into being absolutely injured. Giving them something that they can achieve that is so immense, like an Ironman, a lot of able-bodied can't achieve that. I think it's just so empowering.</p> <p>I've put mental health support alongside physical rehab and that's also put in my "things that I'd change" but (laughter) I do think that the environment, even if it wasn't specifically mental health team input, even from OTs, from all the team really, I think – and the patients from each other, they were generally supported, even though it was an organic mental health support, rather than it being a structured – I think that was quite an important part of it and allowing people time to process their injury and the change in their physical and then therefore whole life situation, they had the time to do that so they had the time for their mental health to catch up with their physical rehab, if that makes sense?</p> <p>shared experience because there's already some stuff coming out of Manchester, isn't there, about being in the same environment, they found it very mutually supporting to help people through the same experience.</p>	<p>I think the loss of their job, the loss of their family role, loss of their person as to who they are, loss of their bodily functions.</p> <p>Loss of their colleagues. So, the loss piece is a big piece and I think what they had lost, as you say, limbs, colleagues, status, career, even their status within their family, they're not the breadwinner anymore, they're not the guy that comes in, does the family thing and then gets posted somewhere else and then comes back in. So, they lose everything they went for and I don't think we – I don't believe we saw the effect of that fully at that time and that may be where they are now, is that they're coming to terms with everything that they've lost.</p> <p>... talking to some of them now about that, there's lots of crashing.</p> <p>It's – what they (veterans) were saying is they might not have got their heads around it enough to really focus on their rehab properly before they were discharged...they were just, "I wasn't ready to do it, I just wanted to leave". Three years down the line, "Actually this is where I want to pick up and do my rehab and I'm trying really hard now and I haven't necessarily got access to the same facilities but I realise now how much of a benefit it was but I can't access it anymore" ...whether it was a mental health reasons or whatever, didn't get in to the right head space in the time frame they had –</p>

<p>Staff Resilience</p>	<p>...an agency psychologist...massively good at that staff support and it really illustrated what was needed because she was very didactic. ...there's a patient who's red alert personality disorder playing all the team off against the other, causing the team to start splitting, she would get all the team in a room straight away, 'Right, this...patient...(is) splitting the team, ...you, (name) you're colluding with the patient, you need to stop that immediately'...'you're all criticising the nurses but the nurses are doing a fantastic job ...you think you're doing the right thing, sorry you're not, you're doing it with the best of intentions but you're actually doing it wrong, this is what you need to do...and we'll meet again in a week.' That was awesome and people struggled personally with that in the moment but they went away and they were all totally reassured because they all had absolute direction.</p> <p>And we'll get much more out of it...we were given that autonomy, I mean, I see other clinicians not feeling that they can say, "You're not ready".</p> <p>So, it's done as a multidisciplinary team approach rather than... because we used to be in lots of different departments and so things like we had when social work... the areas we had trouble with, for example, when social work was not embedded in the team, that's when we had more problems. When they embedded in the team, that's when it became easier.</p>	<p>we were full to bursting...daytimes were busy doing personal care and wound dressings and getting them to and from various sessions and the night times, when everything stopped...they would then reflect on their day and reflect on their future...what's gone horribly wrong...that would come out then to the night staff...and you would listen ...but what do you then do with that? There was no supervision, there was no staff supervision...you then were just left with it.</p> <p>...they're recalling stories of watching their friends being blown up in front of them and they can visually tell you word for word and taste it and smell it and see it and you're having to sit there and listen to that and just almost contain them and hold them, you're then left with how that made them feel, but no one is there to then support you. And, I think we did really well to not crumble and just say, "Do you know what? I can't do this, this is too much, I've had enough".</p> <p>when we sat down in IDT, psych would say, 'Yeah, no issues this week,' and you'd be sat there thinking, 'What? Are we talking about the same person?' Because I think, again, it comes down to those relationships and rapport, and you would be the person that they - would suddenly want to download, whether it was the incident they were in, or something that was going on at home, or something else. And I get at me, a few of the things I thought, 'Oh you,' you know, I didn't have supervision, and when I left I did say I felt really strongly about that. Because suddenly you were, someone was downloading about wanting to take their life, had enough, wanted out, you know, and you just think-</p>
<p>Expectations of patients</p>		<p>I think they (patients) thought at last I've found somebody who can sort out my problems, he didn't see that as his role at all because that's not a CPNs role to provide daily counselling and blah, blah, blah which is kind of what you're saying, why it was at odds with the physical rehab programme where we expected physios, OTs et all to see the patients every day and get engaged.</p>

<p>Expectations of peers</p>		<p>'Oh they seem alright to me', he had no interventions to offer which frustrated the hell out of all the staff but from (name) point of view that isn't what his job was so there was a total mismatch between what we expected them to be doing and what they could actually deliver a lot of the time.</p> <p>...physios... mental health stuff ...makes them quite anxious OTs should be able to deal with more mental health issues...but we had some very, very physical OTs ...who were also very uncomfortable with picking up the mental health.</p> <p>The consultants were very anxious about the mental health issues and didn't really have any experience of managing it so actually</p> <p>if we'd had a slightly different team of people who were more mentally health aware we probably wouldn't have pushed it all to the mental health team.</p> <p>...we kept saying to them (mental health team), "Come down and spend time with us, come and mingle with the guys, come ..." They (patients) can't get to you.</p> <p>Headley Court to be a fantastic place. The one down part I found was the mental health services.</p> <p>But – I have a big thing that they don't have PTSD, so we don't need to treat them. Oh no, no, no. Come and see what's happening in our session and realise ... this is not working. They have a problem.</p> <p>I think from sitting where I sit and listening and watching the – although it's good that it's here, the mental health provision is shonky at best.</p> <p>I think it's shocking that we go through hours a week of MDTs and very rarely even have anyone from Mental Health turn up when you see the state of our patients –</p>
<p>Service Requirement</p>	<p>you talk about mixing patients up, I think Headley, the actual building, worked for patients. So, you've got a mixture of single rooms, double rooms, four-man rooms,</p>	<p>...mental health nurses offered no interventions at all so actually then it wasn't really CPNs that we needed... they just happened to exist in the military but unless they were a CPN that could do any</p>

	<p>yeah, and for (name), being in with three other guys, that would have helped him, especially in down time when they're laying on their bed and they're all chatting away or whatever and talking about their problems. Didn't want us there, they would talk to their... Not so sure how that's going to work with single-man rooms.</p>	<p>intervention they just do watchful waiting and an assessment and say whether they're mentally ill or not and we refer them to a psychiatrist</p> <p>...a CPN is quite a limited remit, CPN is a) a community psychiatric nurse; we're not in the community so they go and drop round people's houses and do a little bit of intervention. Secondly, you know, they really only work under the direction of a psychiatrist who diagnoses a mental health condition, and they generally only work with people who have diagnosed mental health conditions, well, we didn't have a lot of that</p> <p>...we had people who were undergoing a normal adjustment disorder with no aberrant mental health diagnosis and so the mental health nurses were like 'no need for us'...but the team are going, 'Well, who the hell is going to do this then?'</p> <p>I think they were the wrong people but that almost grew because they set themselves up as a little mental health team, you know, a bit like we've got a pain team so therefore anything to do with pain goes to that team but they...actually needed a mental health OT, they needed psychology, they needed other people like that not just nurses I think.</p>
<p>Mental Health Service Personnel</p>		<p>there were definitely points in that posting, that career if you like juncture, where I would go home and just blubber...through almost mental exhaustion of just fighting everyone, literally fighting everyone and at that point in my career</p> <p>the reason I was kicking and screaming is because ...I am a mental health – and I am not a general nurse for a good reason...the whole thing filled me with horror and dread. I had no terms of reference, I had no job spec, I had no direction, and I had no idea what the hell was expected of me.</p> <p>I never ever agreed with the way that I was being used...my phone rang – and it was the duty officer...said right you have got to come in, because we have had a triple amputee...have got to go and see him and his family. And, I said Well what do you want me to do? ...I did go in...that first image will always stay with me, because I just looked at him and thought what the fuck am I going to say to him...as it was,</p>

		<p>he was from Plymouth, we started to talk about pasties, and we sort of created this rapport. But the therapeutic benefit of what I was delivering was no more than what a sensible level-headed, compassionate, straight-talking nurse could have done. So, again there was no benefit in having a mental health expert going in.</p> <p>... there is negligible evidence that having a mental health presence here – you had [name] trying to build this huge empire of mental health capability at XXXX, and I was saying no, we have got to pull away (here), have a presence but the main effort needs to be at XXXX XXX.</p> <p>the reality is that when I left XXXX, completely broken, they then assigned four individuals, because again it is that classic well, we need more so we will throw more resources at something that is broken,</p>
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Appendix 24: Information Gathering 3-5: Interview summary exploring the mental health service with CPN service leads.

As part of the analytical process, coded data was categorised. Patterns were sought in these categories which resulted in attributing concepts to each.

<p>Setting up the Service Mental Health Services were introduced into DMRC and RCDM due to growing political concern</p>	<p>Mental Health Quotes ...It was a sense of isolation...you're on your own. Complex Trauma is a consultant led programme. It was clearly apparent even the Consultants did not have a great grasp of psychological trauma. (CPN1)</p> <p>As an experienced mental health practitioner having recognised that what I was doing was...not therapeutically beneficial, it could have been counter therapeutic...they wanted me to go and say 'there there'...I refused, it was far from OK.</p> <p>Everything was wrong with the way we were delivering mental health, but as a junior officer going up against senior consultants.</p> <p>'...he's just told me I need to do this...otherwise the patient is at risk and you're thinking ...(I) need leadership but the rank slides and what we were there to do all went in the wrong direction.'</p> <p>The in-reach (psychiatrist) was not known for his stoic manner...there was no Defence Consultant Advisor link in (for mental health).</p>	<p>Concepts being presented:</p> <p>Isolation Lacking peer support Hierarchy</p> <p>Hierarchy Ignored Professionally compromised</p> <p>Hierarchy / lacking support Disempowered</p> <p>Hierarchy Threat</p> <p>Lacking senior oversight and support Isolated / disconnected</p>
<p>Mental Health Division (DMRC) As Mental Health services were established, the integrated model was rejected and a separate departmental structure was set up.</p>	<p>We needed our own (mental health) division...we turned things around so we eventually got our own space...away from these treating teams.</p> <p>I'll start treating people from a mental health perspective when they can walk to the appointment, before then...everything else needs to be managed with good old sympathy and understanding.</p> <p>We started operating in a way not dissimilar to how mental health operates in the military...you book an appointment, someone makes a</p>	<p>Establishing distance – developing an independent identity.</p> <p>Taking control, establishing independent roles and goals for the mental health service.</p> <p>Access was limited. A formalised Newtonian model of provision with administrative</p>

	<p>referral, you do an assessment, commence treatment within physical time-lined boundaries, as opposed to just dropping in and out and responding to people upset on the ward.</p>	<p>processes and referral criteria was introduced.</p>
<p>Realising the need for collaboration The difficulty accessing mental health expertise led clinical teams to recruit clinicians with a special interest in Mental Health (psychologist / mental health OTs). The interviewee arrived in post and recognised the importance of gaining collaboration between mental health and the professions operating in the clinical teams. Professional support and collective treatment planning was introduced. Integration between community mental health provision was also needed with physical rehab providers</p>	<p>The governance behind it is quite loose...there were nurses in the team...mental health OTs...we had psychology...the organisation allowed them to remain in different (teams)...delivery of mental health...had almost become everybody's job...and that had governance issues.</p> <p>...while trying to work with the MDT it was also making sure the right person was delivering the right intervention and that had become blurred.</p> <p>Mental health needs to be delivered across the piste...we had nominated CPNs who worked in the IDT, but then we had our own MDT, consultant, psychologist, mental health nurses, CPNs....we could go through the caseload...we would all know what the care pathway was...we would document all of that</p> <p>It's the supervision piece and it's that collaboration across the piste so people don't feel like they are working in isolation.</p> <p>Complex Trauma patients...some opted not to do mental health work at Headley because they had come to do their physical rehabilitation...If they had a diagnosis of PTSD they could do that with a DCMH. (So my role was)...looking at NICE guidance for trauma intervention (ensuring physical rehabilitation) was clinically recommended (from a mental health perspective).</p>	<p>A shared identity, shared goals and procedures compliant with best practice was needed.</p> <p>Introducing clear roles and responsibilities</p> <p>Integrating practice and building interdependence.</p> <p>Ensuring practitioners felt connected and capable.</p> <p>Networking clinical aims from community based mental health into the physical health domain so treatment was complementary.</p>

Appendix 25: Framework of statements coded to both IDT and MDT teamwork and attitude

1. Team dynamics
2. IDT Joint Approach
3. Communication
4. Hierarchy
5. Proximity

Team Dynamics

(IDT) Team Dynamics	
Positive	<p>...when social work was not embedded in the team, that's when we had more problems. When they embedded in the team, that's when it became easier.</p> <p>It wasn't a specialist area for anybody at Headley when the conflict started, so they (hierarchy) gave us a lot of support to get that training and to get the staff in that would have some of that support for us....so the communication within the team and through the team and the support from each other as this was all happening and the fact that most of the staff at that point in time and all the way through, gave more than the hours that they were paid for to get the job done and put a lot in to it.</p> <p>...actually spending that time as a team to work out what's important for that patient.</p> <p>Although we were a large team, there was barely anything of that, and so people did all stay late. Almost, work became the social life</p> <p>You have to have a staff member who's open, who doesn't think someone questioning them, is criticism....And I certainly found that when I was doing something I would, you know... "Right, XXX, what do you think of this?" ...it was the same in IDT meetings. It wasn't, "Why is this person not doing this yet?"</p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day...whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice.</p> <p>... the social aspect...there are times to me that was like, "The military's burning all this money on stuff...actually the social aspect the fact that we had parties things where we just all interact. It was so important"</p>
Negative	<p>Mental health never embedded in the team, and I think we could've addressed a lot of these issues if it had been embedded in the team. And I think, again, although it got so big, nursing and rehab did have to split, and they did, but because you don't, it's separate that causes difficulties.</p> <p>Certainly, the good staff-patient ratio but also, as I say, for us, we've been through a lot of staff in prosthetics and for some of them it just wasn't the right place to work, you do need the right like-minded staff who are willing to put in the hours</p>
Trust	<p>I think it was really challenging, and it was a shared experience for everyone. I think that's why morale was so great, because when you're in an experience with somebody and you're all learning at the same time it's just such a leveller.</p> <p>Probably really as a team together because everyone was just, knew everyone was just working flat out.</p> <p>a holistic approach, flexible content and creative ideas. I think the fact that we're all, like [name] and [name] were saying, able to try stuff and give it a go but also be quite creative and motivate each other or inspire each other.</p> <p>You have to have a staff member who's open, who doesn't think someone questioning them, is criticism....And I certainly found that when I was doing something I would, you know... "Right, XXX, what do you think of this?" ...it was the same in IDT meetings. It wasn't, "Why is this person not doing this yet?"</p> <p>Everyone was working was really hard, it wasn't like you're like, "Oh, those physios, they're sitting doing nothing"....Because we were like all working flat out.</p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day, the lead of that, whether it be the clinical lead or the management lead or the physio versus prosthetist, whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice. You don't go, 'Well, they said this but I don't agree with it, and I think, you say, they said this and that's what we're aiming for now.'</p>
Distrust	

MDT Team Dynamics

Positive	<p>I think we supported each other but I don't know that the wider MDT supported us.</p> <p>so I introduced (Name) to the concept of behaviour activation, he introduced me to the concept of adaptive sport and then together we just thought, "Well why don't we try and do some of this? Why don't we try and actually target this to a group of people who we think would benefit? Let's try PTSD".</p>
Negative	<p>I think probably the military nurses coming and going were not a benefit... you get a varying amount of motivation from them. For some of them, being posted here is about the last thing they ever want to do...that was not helpful.</p> <p>So, there was this real medical model is basically what I'm trying to describe, this real entrenched model of how they deliver their rehab and I had to fit in and when I didn't, it caused a degree of shock.</p> <p>it didn't look right to them (consultant) and because it didn't look right, they got upset about it. Because they got upset about it, conflict happened and then because conflict happened the military bits kicked in and all sorts of things went wrong.</p> <p>Yeah, no time for training, you were literally just in there running...I'd come from a standard NHS environment ... to seeing these really traumatic injuries with no sort of training prior to that. It's training on the job, you know, I remember tripping over my first patient ... double amputee, and just going, "Oh my God," ...it was full-on.</p> <p>...the bit that was demoralising is that we were viewed as a babysitting service, whereas in fact a whole raft of work was done during the nights here when a patient was up at 2am or 3am in the morning and they were in pain and they were coming to terms with what they'd lost.</p> <p>So, on two fronts; one is the therapists didn't get what we do and then you had part of nursing who didn't get what we had to do. So, we were finding it a bit tricky (laughs).</p>
Trust	
Distrust	<p>So, I would return the next day ...to...said patient and ...it's almost like a suicide watch going on within the Complex Trauma. So, there was never any tolerance (to allow them to grieve). This is a unique group and we don't know how they're going to respond... we have to have quite distinct red lines and everything before then we need to tolerate. Violence obviously and attempts to harm outside of that; everything else needs to be understood ...think about their headspace and think about the loss of control that they've just gone through in their life...it was hugely apparent that there was a lot of work to be done, not with the patients but with the treating Team.</p>

Joint Approach

(IDT) Joint Approach	
Positive	<p>I think we all respect each other so much and there wasn't really a kind of a hierarchy in terms of, even the consultants, you know, we could speak to them on the same level so then we didn't mind staying that little bit later</p> <p>...the consultants who worked with us actually had something tangible they were aiming at and feeding into...that must've been quite exciting for them because usually they're working in isolation to fix this, and then what.</p> <p>I feel like it was shared well amongst all of the IDT who would identify who would be best to sort of lead on a specific goal or how all of the physio, OT, ERI, nursing staff, how best to incorporate everybody.</p> <p>But it's such a challenge, I loved it, it was such a challenge to think, 'Right, what's my role in this big team of people to help this individual?' and it was so exciting to figure it out.</p> <p>...we did quite a lot of joint sessions. We were, kind of, always involved with each other weren't we...</p> <p>I think that was really good, the joint sessions, it started to be accepted that that was beneficial to the patient and to the staff...</p>
Negative	<p>I got my hand slapped very quickly when I left (Headley Court) because I was used to working with other clinicians from different disciplines and that we could be open like that and discuss it and I quickly realised that other people felt that I was criticising or questioning what they were doing rather than exploring and working together. And then I definitely got my hand slapped and had to step back.</p>
Trust	<p>It was like, "Oh well I could leave this another day, but I left this another day then that check socket is not going to be made and if I don't get that made that guy's, then he's not going to be able to do his physio and he can't do his physio then he's not going to be up".</p> <p>we're proud of ourselves as a Unit but actually we're really proud of allowing or helping those individuals to do extraordinary things with extraordinary injuries...</p> <p>And actually, there was so much cross-over between the ERI and physio all the time, and there was always this discussion, 'Okay, well what does the physio do, what does the ERI do?' And we have to really stick to our own professions. Once (we) merged...it worked so much better.</p> <p>I was already well on in my career, but I think it was more just, like you said, that everyone kind of built up trust between each other, and it went across age groups within those staff and the social side of things, I think things like the team building days and stuff like that, were everyone was mixed up and built really good relationships.</p> <p>Pretty much, we made it up as we went along, like, but, you know, and we really worked with the guys (patients) to say, 'I don't know'.</p>
Distrust	

(MDT) Joint Approach	
Positive	<p>I really like the idea of the keyworker role and I think nursing staff should be incorporated into that role with another therapist, so either with a physio or an OT.</p> <p>IDT, yes, that was really good, so from the get-go, it was a – it was run by or led by a Consultant but it was very apparent that the clinicians had a real equal footing to put their point across. ... So, that was when I arrived, sitting in that space thinking, “This is really good”, you can really see that patient centred care.</p> <p>There was this real sense of Physios having confidence to disagree with a Consultant and likewise, there was this real – OTs saying they disagreed with another member of the team, in a healthy way and it was all very – that space felt very calm.</p> <p>But the joint working also... As you say, the diffusion of responsibility there for that one person’s life – because that’s what it was, wasn’t it – was within the group and the ethos of that is supposed to help with resilience because you’re making that responsibility of moving that patient forward together as opposed to that one person having responsibility for that.</p>
Negative	<p>With nursing, you know, you’re 24/7...you have no quantity of time with them, you have no set period of time with them, you don’t have “I’m looking after John between eight and four, I can do X, Y and Z”. People are coming at you 24/7 at no particular time for whatever reason, whether it be, you know, pain management, wounds, mental health issues, it’s just a myriad of things coming at you... So when you sort of talk about sort of the structure and the sharing it almost seems to stop at the door sometimes with nursing.</p> <p>There is an awful lot of – when you sit in IDT, if anything has gone wrong or it hasn’t happened, it will fall on the nursing staff, “So, why wasn’t that done? Why didn’t they go here? Why didn’t you do that?” or, “Why hasn’t that been done?” (LINK with Team dynamics / communication)</p> <p>We had a stage where the therapists would set goals and there was a lot of sleep hygiene. Well, we weren’t allowed to have that as a nursing goal because it was a therapists’ thing; well, surely, it’s both.</p> <p>I think... because the key to that where you’ve got successful physical outcomes, nursing was never about physical outcomes, and where we sat in the IDTs and where we sat in a ward round we could never justify our goals; there were no goals because we were doing everything. There was nothing we could say that “We’ve made this patient X amount better because we just were filling in all the gaps that were coming at us...</p> <p>That resilience piece, by sharing, didn’t then translate, it didn’t happen to the Nursing Team.</p> <p>So, I know that that individual, ****, felt conflicted almost between two bosses....they would often feel like they’re part of the IDT, great, but they...have this other professional channel and they’d often feel in conflict between the two.</p> <p>Another clinician is...becoming anxious about it and not trusting in the Mental Health staff to go, “It’s not that we can’t be arsed, we just think it’s better for him to do nothing at the moment and focus on other things and actually, the more we talk to him, the more he’s going to start thinking he’s got this illness which we don’t think he has”.</p>
Trust	<p>I don’t want to sound self-righteous, but too many boys that I have seen now in various states of recovery have said I was the only one that kept it real. That actually this is really shit, but it is going to be okay. Because you had the COs coming in saying it is going to be okay, it is going to be fine. And, obviously the main drive and thrust for the medics and the physios is we have got to keep going, moving forward, moving forward, because that is the right approach. But, actually I was able because I suppose I had the courage to do so...to say for now it is pretty shit, but it is going to be okay. And, so I suppose I have taken great comfort from hearing that, and getting that feedback.</p>
Distrust	<p>...because we haven’t got defined outcomes, we just take on everything else. So, then you do get to the point where, if it wasn’t an OT or a physio that should have done it, it had to be nursing and you’re just left with picking up the rest of it.</p> <p>So...when that risk assessment led to...something that they disagreed with, so for example if I said this risk should be tolerated for a period of time and the Complex Trauma Team didn’t know how to tolerate that, there would be clinician to clinician friction...I would say that clinicians outside of Mental Health would display – would have high expressed emotion and anxiety. The way they would verbalise that is, “This patient is a risk to himself or risk to another person because of X, Y, Z and he said this, this, this, you need to treat this, he’s got PTSD.” ...I would say, “This needs to be tolerated” ...I would lay out a Treatment Pathway that they didn’t agree with, it would cause conflict and almost panic buttons.</p>

Communication

(MDT) Communication	
Positive	<p>The keyworker system (is great)...now you have a centre person to go to and that's good for the patient...for the keyworker, often sometimes needing two keyworkers because the patient's quite complicated. But then I think, had the Nursing Team been involved as part of that keyworking process, you would have always had a constant link to patients and the rest of the team rather than feeling excluded,</p>
Negative	<p>So, the whole thing filled me with horror and dread. I had no terms of reference, I had no job spec, I had no direction, and I had no idea what the hell was expected of me.</p> <p>...when you were with them at night time and they were talking to you about family issues or their own health issues or wider family issues, that nurse then had that information and yes, it could be passed over in handover but there's an awful lot of information that got lost, that for whatever reason didn't get handed over...</p> <p>Because even with the IDT as a document it's never really been utilised by nursing staff...we sort of stick to our own little world and write our notes.</p> <p>So, really I think my own perspective would be for the nurses to know what the nursing role is and for the nurses to be able to project that in to the IDT so that the therapists know what the nurses are doing.</p> <p>it wouldn't have created the "them and us" scenarios of, "What are you doing if your patients aren't on the ward? Why aren't they at sessions?" If you had someone that said, "Well actually, they had a really difficult morning and this is why we couldn't get them to sessions. I was in with the patient, I was unable to come out and tell you that but I'm doing it now". There has to be an understanding of our role.</p> <p>...to be fair but I think (in the IDT meeting)... 1) they (junior nurses) probably didn't do their homework and work out what the patient was up to and 2) they may have felt a little bit intimidated by therapy because the patient sees their whole purpose of being here is to receive therapy.</p> <p>(In my role) You're almost the parent...because you're suggesting that they go to bed at a reasonable time, that they take their pain relief at a reasonable time, that they try and de-stress, unwind. Then you're going in in the morning, "Come on, it's time to get up for sessions now. Have you done this? ..." "I'm not getting out of bed", "Well you're going to need to go to parade", "No I'm not...."</p> <p>And I think the thing too with, you know, the 24/7 care, you know, most people bugger off at four o'clock, they've gone, "Thanks very much," you know, and then, you know, when these guys come back to the ward fatigued, drained and we pick up the pieces...</p> <p>I think the difficulty as well is if they were seeing the psychologist or the Mental Health Nursing Team you couldn't always see what had gone on, which is fine but then they brought that back to you and often on night duty they would sit there and everything would be over-thought and it would keep them up all night and then you had nowhere then to take that to the following day.</p>
Trust	
Distrust	<p>...one of the biggest frustrations was the lack of understanding and insight from the medical staff, all the nursing staff really, and I use that ITU example as an example of this business of not getting it, not getting it at all.</p> <p>So, to try and say to somebody, a treating team, "Look, to manage this guy what I want to do is I'm going to outsource this to this DCHM" or to this organisation, "And have their fortnightly appointments and then just get on with it really". There's real unease about, "Well but he's here and he's crying and he's depressed, you need to do something". "Yes, he is crying and he's depressed because his life is tough at the moment but he's employing his strategies, he's got his medication prescribed or whatever and actually we just need to support him in his – in following his Care Plan. So, there's no real need to sit down with him every day, it doesn't do anything, it doesn't achieve anything".</p>

(IDT) Communication	
Positive	<p>Proximity and regularity of conversation. That new building gave us what we needed.</p> <p>No, because you were constantly talking to the person.</p> <p>There was no option not to know them.</p> <p>You could even pop across to the physios' desk or just, you know, pop downstairs and people were open to that, it wasn't, "Oh no, I'm busy working".</p> <p>(Consultants) had contact with the surgeons (at RCDM). We might personally not have. (Link to networking beyond the IDT) ...having that communication between Headley from the prosthetists and the consultant, but also the fact that it was the level there.</p>
Negative	<p>The computer system strangely is also on my list, a working computer system that everybody can communicate with and everybody uses the same way. So, both within Headley and outside of Headley.</p> <p>Yes, but it was impossible to speak to their surgeons as well, you just had to go through layers of bureaucracy.</p>
Trust	<p>You have to have a staff member who's open, who doesn't think someone questioning them is criticism. And I certainly, like I found that like when I was doing something I would, you know, doing a cast or something that I would finish it and I'd think, "Right, (name), what do you think of this?" or (name), what do you think of this?" And if they said, "Oh, I don't understand why that's there," it's not an insult.</p> <p>We were honest with the patients when we said that, as well. We'd say, 'We're going to give it a go, but it might not work or this could happen,' and the patients were happy to take that risk too. .</p>
Distrust	

Hierarchy

(IDT) Hierarchy or Equivalence	
Positive	<p>(in the NHS) rehab consultants would not really be part of the team. They, kind of, sit above the team, whereas here they're part of the team.</p> <p>I think we all respect each other so much and there wasn't really a kind of a hierarchy in terms of, even the consultants, you know, we could speak to them.</p> <p>it was a sharing of ideas with the rest of the staff, so you got an idea and that's disseminated within the rest of the group very quickly and you take a good idea and you run with it and you very quickly wean out the things that don't work.</p> <p>So, decisions were made about prioritisation ...even in the acute setting...it was that ownership of the process and saying, 'No, this is what we are doing and planning,' which was massive</p> <p>... it was the consultant because that did allow us all to put our points forward, consensus of opinion, and that, made you feel bombproof of, 'I'm doing this with good cover.'</p> <p>It was the consultant debate in the IDT and the ward round. We took control of it. I'm talking as a generic group, you know. Their interactions, the meetings, and all the rest of it, which was good.</p> <p>I felt we managed ourselves, so we made our own fun. We got creative, we were hard-working, we covered for each other, and we made it work, and so it was a very different environment. We, I can't say we, I felt I wasn't being led. I didn't have a leader. I felt that my team around me, and the people I worked with, we led each other</p>
Negative	<p>the difference between civilian and military is civilian had chosen to work there, so we had all actively applied for that job whereas if you were military, you were posted into a role, and we had someone who had said they didn't want - military, who had said they didn't want to work in complex trauma because they'd been in Afghan, they didn't want to work in complex trauma, had made it really, really clear, no, and they were told, 'No, you're going in there,'</p> <p>I always felt like we were contractors and stuff. I think the nice thing was from the patients you never felt that. Like it was something that you might have felt it from certain members of staff or whatever but I distinctly remember like patients talking about civilians and being like, "Oh, they're just civilians," and I'd be like, "Hold on, I'm a civilian". And they would be like, but they would say, they were like, "Yeah, but you're basically military".</p>
Trust	<p>We didn't feel like we were just staff at the bottom, we could, you know, have a voice to, you know, create change.</p> <p>you are very much encouraged to have an opinion and to express that opinion and even if it's a stupid opinion, it may get to the point where the consultant says, "Right, I've heard what you're saying, that's enough", but they will listen to what you say, you're not just the scumbag clinician and, "I'm the big consultant".</p> <p>But then having the respect for each colleague throughout the whole team, that even if you don't agree with an outcome, at the end of the day, the lead of that, whether it be the clinical lead or the management lead or the physio versus prosthetist, whoever's running on it, once you've had your heartfelt conversation, you then, as a team, all have the same voice.</p> <p>I felt that we were all learning together about the particular injuries that people were having, and how to deal with it...so it did feel as though it was a bit of a leveller,</p>
Distrust	<p>And I certainly, like I found that like when I was doing something I would, you know, doing a cast or something that I would finish it and I'd think, "Right, (name), what do you think of this?" or (name), what do you think of this?" And if they said, "Oh, I don't understand why that's there," it's not an insult.</p>

(MDT) Hierarchy or Equivalence	
Positiv	
Negative	<p>...for a long time, as you know, I was under the Physio Major (laughs) to be reported on, who had no idea what I was doing, didn't understand the work...she didn't support me at all. It would be, "Well why are you not doing that then?" "Because there's a clear policy that says I don't do it"..."You need to do it, he's a Colonel and he's coming to me complaining about you"</p> <p>You can have a significant impact upon the Treating Team and allow them to understand things in a different way...but it's got to be allowed to look different to everything else that goes on. And, that's what didn't happen...it looked different and they didn't like it.</p> <p>Well, of course as an experienced mental health practitioner, having recognised that actually not only was what I was doing at that very early stage of recovery not therapeutically beneficial, it could have been counter-therapeutic...These guys were waking up, missing their limbs...realising the enormity of what had happened...they (hierarchy) wanted me to go in and say there there, it is all going to be okay. And, I refused to do that, because it wasn't about being okay, it was far from okay!</p> <p>We would go, "Right, this patient has not done this, not done that...and he's been told and told and told and we want the consultant to discharge him" and the consultant would go, "No, his head is not in the right place, we can't do it".</p> <p>It is a difficult thing to work here as a civilian and always has been because we are made aware quite quickly that military comes first. So, not only, if you've got a senior military person who's never run a ward, they will be in charge of a ward.</p> <p>Very early on in my tenure, I asked all of the senior service consultant, psychiatrist leads to...give me some direction, because I didn't have a clue what I was doing. The first mandate was that I would be the decompresso...very early on I realised it was counter-therapeutic, because it was completely undermining the enormity of what these boys had gone through.</p> <p>you had [name- hierarchy] trying to build this huge empire of mental health capability at XXXX, and I was saying no, we have got to pull away from XXXX, have a presence but the main effort needs to be at YXXX</p>
Trust	<p>...but that's not to say that people can't come in and change things, but do it in a way that acknowledges the people that are currently working, their skills, their experiences and marry the two together to see if they can work (LINK to ?peer support / team dynamics)</p>
Distrust	<p>it was a negative side of life at Headley because it was very tribal, I didn't feel there was any great degree of professional respect...some of the Senior Consultants, didn't have a professional respect for us as individuals. So, the concept of, "You will do what I say because I'm the Consultant" applied in their mind.</p> <p>...instead of asserting herself going, "Of course he hasn't got PTSD, he's just had both his legs blown off! This is about the time and space he's in and actually giving him EMDR will make him worse and there's a policy that says that you idiot!" Instead, she's there going, "Well okay Sir..." and coming to me going..."He's just told me that I need to do this and get on with it otherwise the patient is going to be at risk" ... you need that leadership but the rank slides and what we were there to do all went in the wrong direction.</p> <p>...the most beneficial thing I can do here is follow these guys that are not seriously injured, because what we knew is that the ones who were seriously injured...would go onto Headley Court and there would be support there...But, the others wouldn't so...so every single person that came back in I would interview, and that lasted I think three weeks and then the OC (hierarchy) at the time...said no I don't think that is good use of your time...</p> <p>...there was this real lack of understanding about what adjustment is, what adjustment to injury is and bearing in mind this was my first exposure away from the textbooks in to this type of environment. You're there thinking, "Right, how much do I believe in myself here when I'm saying this is going to be okay?" so it's a real – it was a real straight off the bat. (LINK to negative / peer support).</p>

Proximity

	(IDT) Proximity
Positive	<p>Proximity and regularity of conversation. That new building gave us what we needed.</p> <p>what worked was the geography, we fact we could go down and see Prosthetics, we could go down and see.</p> <p>if you look at the patients now, they self-selected where they went for their subsequent surgery because they chose avenues where they could get access to a surgeon, where they could speak to the surgeon.</p> <p>That, kind of, comes back to the expertise within the IDT though, doesn't it? It's being able to access what you needed within the IDT when you wanted it.</p>
Negative	
Trust	<p>I think (name) sheltered us and allowed us to create that down at the Jubilee and feel confident that we could and we had the time and we can have those discussions and the ... there was like a barrier.</p> <p>It's being able to access what you needed within the IDT when you wanted it. But, also, that your opinion was as important as everyone else's.</p>
Distrust	

	(MDT) Proximity
Positive	We did turn things around so we were eventually given our own space and our own offices that were well away from the ward, which took an unbelievable amount of graft because of one particular Consultant that wanted it all on the ward and that's where it should work, this bedside concept. We were able to say, "No, we need to be a different space, we need to be away; not hidden but we need to be away from the ward because that is not the area to be delivering the therapy, it needs to be away from these Treating Teams".
Negative	<p>(Talking about Headley Court before the transition to the IDT structure)...you had your Nursing Squadron, you had your OTs, you had your Social Workers, you had your Physios and there was this real (tribal atmospher) – when we arrived in terms of Mental Health... "How do we deliver to this vulnerable group in Complex Trauma?" we're there – we're trying to pacify these tribes and it was pacifying tribes. Luckily, from the get-go, OT were Friendly Forces.</p> <p>I think the hardest thing with our lot though... Because, as you say, you know, within your therapy group, you know, your dynamics don't really change, you have the set staff over a set period, and you've got that continuity. With nursing, I mean, my God, in the eight years I've been here I must have seen about 200 or 300 nurses come through the door. So that continuity of care is really hard.</p>
Trust	<p>So, there was this real medical model is basically what I'm trying to describe, this real entrenched model of how they deliver their rehab and I had to fit in and when I didn't, it caused a degree of shock but over time, over certainly the next six months when we got our own offices, we moved away, we started operating in a way that would be not dissimilar to how Mental Health operates in the military right now...book an appointment, someone makes a referral, you do an assessment, following assessment you commence treatment and you commence treatment within set physical and time-lined boundaries as opposed to just dripping in and out and responding to people that are upset on the ward.</p> <p>(Is this showing a move away from 'proximity' in an effort protect their service from interference and define a service structure.)</p>
Distrust	

Appendix 26: Framework of veteran data coded to prosthetics and attitude

The following framework divides data coded to prosthetics services and sub-themes (left vertical column) into positive and negative statements. Focus group number from which they arise appears at the end of each statement (i.e., FG2 = Focus group 2).

	Positive	Negative
Mutual Partnership	<p>And then you'd have the technician coming out going, "Right, what's not right," so you could talk to a person (Vet FG2) it's to do with the service provided, which allows you to just get on with life. that's all we're after... (Vet FG2)</p> <p>...I'm not having to do the whole get a cast, go away, come back for a check socket, go away, come back – I've not got time to do that ...So, we've worked around that...I've got a guy who's straight out of training, never dealt with a military amputee before and he's nailed it, he's absolutely the best I've ever had. (Vet FG6)</p> <p>she is from that Headley Court, so she knows how to deal with the lads, it is pretty chilled...I came in and said look I have researched this leg, I need this because it is going to do this for me, and instead of turning around and saying well have you thought ... she just said right I will do my best ...then I have got it. (Vet FG4)</p> <p>So, I think it is that adjustment in terms ... the treatment can be good. We have got the infrastructure to offer a really good service, we just have to almost adapt our understanding of how quickly things are going to happen and ... put a little bit of pressure on us to be a little bit more forthcoming with information(Vet FG4)</p> <p>Whenever I (am in the gym) if a prosthetist are walking in ...I just ping one, like last week and I just had a quick adjustment within two minutes. ...I mean here we are lucky (Vet FG4)</p> <p>My prosthetics team know me as well as anyone, they know what I like to kind of get up to, they can tell by my gait what I have been up to, like you have been overdoing it (Vet FG4)</p>	<p>... they say it was going to be able to deliver veterans...to meet veterans' needs, and it was just such a load of bollocks. It was just a way of plugging an NHS gap ... I'm sick of hearing the excuse that they're over-stretched or under-staffed or whatever, because it's just not good enough. (Vet FG2)</p> <p>I just don't think it's very joined up, and I think because, we were talking about numbers...there are two here, four there, five there, six there, you lose any of that kind of collective knowledge and gained experience. (Vet FG2)</p> <p>I'd change shape in three months because I'd been sat in my chair so much I'd reduced in volume, and we had to go through the whole process again. And we did that twice over a six-month period and then at that point, I was like, I've heard there's a system to be referred back to Headley Court, can you please do that. (Vet FG1)</p>
Consultant as the leader	<p>I think Malvern's really good. I'm in touch with the consultant, he's on point. (Vet FG5)</p> <p>HEADLEY COURT: The doctors who were officers, they didn't feel like officers anymore, they just felt like someone you could approach. (Vet FG4)</p> <p>... continuity, Colonel (name) is still my consultant...And he understands me and I understand him, we have a great relationship... We talk honestly...it's all about getting to know people personally. (Vet FG1)</p> <p>(Consultant) said I might know you for the rest of your life, but you might know me for the rest of mine. ... it really knocked the wind out of me...this could potentially be my ... I could be</p>	<p>I've never met the consultant... (Vet FG5)</p>

	<p>coming here until I am an old chap hopefully... and you think, yes, it is bloody important, if you have got a good relationship. (Vet FG4)</p> <p>... a lot of credit has got to go down to our consultant, because he is phenomenal. (Vet FG4)</p>	
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	Positive	Negative
To be known To be looked after	<p>if I needed an appointment she'd get me in in the next few days ...she was pretty quick turnaround on the sockets. If I needed orthotics, I didn't have to make a separate appointment. (Vet FG5)</p> <p>They care. The funding goes through straight away. You don't go to the bottom of the pile. I am quite a priority there, being in the military, I feel. And if they are slow, it's probably because they've got a backlog. (Vet FG5)</p> <p>They're learning. When I first probably went there, they were not that great. And they do try and get military guys in pretty quick. (Vet FG5)</p> <p>the prosthetists are pretty good. I broke my stubby foot last Saturday and on Tuesday I got a new foot...That was amazing, really good. (Vet FG4)</p> <p>HEADLEY COURT: I found ...physios and ... it wasn't just that you were talking to them, and they were like, 'yeah, yeah, yeah, ...', sort of giving you lip service...you'd see them on Monday and they're remember what you said, so you're like, okay they're actually listening. (Vet FG1)HEADLEY COURT: It meant something; you know. You were almost part of their world as much as they're part of your world. (Vet FG1)</p> <p>I come in for an appointment here, and (prosthetist) will come and find me, she will put me in my room, and she will be with me and that is my appointment...it is what we say about Headley Court, you feel like when you are here they are here for you, (Vet FG4)</p>	<p>...it was literally months before I got my first prosthetics appointment through. And in that time, well, all the problems I ...got the old Dremel out and literally tape, ridiculous things, because I didn't have access to anything else. (Vet FG3)</p> <p>I think it's not surprising that the system can't accommodate those individuals ... My prosthetist has got 1,500 patients on his list. I'm one of them, so why would he invest the time and the energy to discover the new sockets that I've got, how to deal with the leg. (Vet FG 2)</p> <p>It's just not...that's not the military covenant, is it? (Vet FG2)</p> <p>it's nothing to do with missing the military, it's to do with the service provided, which allows you to just get on with life and that's all that we're after, is to just get on with life. At the minute, the NHS are just frankly failing. There's no nice way to put it, they're just failing. (Vet FG2)</p> <p>At Manchester, I would go, they come and find you in the waiting room and they go and put you in a room and they come back two hours later because they will be seeing like four different patients at the same time. (Vet FG4)</p>
IDT working / problem solving	<p>We have it down in Dorset, there's always a physio will pop in... they've taken that model...but that's the prosthetist from Headley Court have gone off to work in Dorset. (Vet FG2)</p> <p>I think the gym is the best place to work side by side and with sporting physios on the doorstep as well...not everybody wants to be the fittest man on the floor, but everyone wants to get to a good level of fitness that they can live a comfortable life. (Vet FG4)</p> <p>The prosthetics part as well has been phenomenal. Like obviously playing golf for a living, they have</p>	<p>...trying to slide into a socket that doesn't fit, and ...get on with your day, you never know whether it's the socket that's (causing the pain) or whether your leg would've done that anyway. (Vet FG 1)</p> <p>I have never had a physio come in prosthetics on the NHS. (Vet FG5)</p> <p>But now you go out and you go and see your prosthetist and you're like, "My back's hurting," and they're like, "Oh, okay..."</p> <p>...They're looking at it from an prosthetic view (only)(Vet FG 2)</p>

	<p>found the best leg to suit my golf, and then the second I come in and say oh I want to play rugby as well now, right we will sort that out. And they do, they keep you going. (Vet FG4)</p>	<p>I don't fault my prosthetist, they're over-stretched, they haven't got enough time, there's not enough technicians. (Vet FG2)</p> <p>At Headley Court, if you had an issue, it got sorted. Now, it's like...it takes you half a year... if the prosthetist didn't know something she had someone ... "Right, his socket's not quite working..." But they're overstretched, (in the NHS) ... (Vet FG2)</p>
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	Positive	Negative
Organisational Culture	<p>I can phone up and get an appointment say a week, two weeks later... I know it is a lot better than some of the guys (Vet FG4)</p> <p>I think obviously the physios, the wheelchair people and the prosthetics all on one site, it is like a mini-Headley Court. (Vet FG4)</p> <p>...there needs to be a section of the NHS, or a section that veterans can go back to. Because we are a different breed of people. We push boundaries, the NHS don't understand that. (Vet FG1)</p> <p>HEADLEY COURT: ...they'd always make time..." Oh, come back in, I've got half an hour at the end of this." Or if you had to wait because someone else was being seen. (Vet FG3)</p> <p>HEADLEY COURT: They were willing just to take risks, yeah. (Vet FG2)</p> <p>HEADLEY COURT: If you had an issue, someone would know how to help us, there and then. Whereas now, it is...I wouldn't say I'm worried about the future... (Vet FG 2)</p> <p>HEADLEY COURT: It's about being honest with people...I think back to the army core values. Integrity, self-respect...respect of others.... I looked at the people here and I got all those things and it made life so much easier, because we all sang off the same song sheet. (Vet FG1)</p>	<p>they're that terrified also of letting you push the boundaries because in civvie street(?) there is a lot of, if there's a blame, there's a claim. So, they're all so terrified, they want you to kind of progress, but they're also so terrified that if they allow you and something goes wrong- (Vet FG1)</p> <p>I struggled to get a prosthetic socket from my centre, it took them three months to make them. It takes that a week, less than a week to make one down here and that was one of the problems I had, that led me to this conclusion here. Now, it's difficult when you are trying to cater for the masses, and you want some tailored care for you. And I know the NHS tries its best but it's just not budgeted for that amount of tailoring, it just doesn't work like that. (Vet FG1)</p> <p>I understood that the relationships you have outside of the military are completely different to the ones you have here. We are very forward, direct speaking people here, because you have to be. But, out there, they think differently, they speak differently, they use different language, and there is a different comparison of what's acceptable language wise than it is here. ...You've got to talk softly out there, because people get upset.... when you understand it, you can get over your barriers a whole lot quicker. (Vet FG1)</p>

Appendix 27: Verbatim transcript of experiences managing mental health, medication and alcohol.

The following extract is taken from Veteran Focus Group 6, p22-24.

Male 5:

(Inaudible 0:54:45) completely honest with people, I should be in prison now and I've escaped it, I don't know how; I'm on a suspended sentence, I've had two now back to back over the last four years and when I think about it more and more and people talk about it to me, they go back to – I had all this money coming out of the Army, I didn't have a job, I started gambling lost an absolute fortune which then I turned to drink. Got married, had two young children but then I could see the marriage going wrong, just breaking down. The more I drank, the more aggressive I became. Constantly getting in the trouble with the police and then she had enough, she said, "Fuck this, you're gone" she kicked me out, I had nowhere to go so I just slept in my car at first and then I sorted myself out, got a job at a special needs school. We separated for a couple of years. She's a nurse in the Army now and I was having my two young children all of the time just as much even more than her, so it wasn't a problem, she was at Frimley and I was working in Farnborough so it was close and then she turned around one day and said to me, "Oh I'm going to Germany and I'm taking the kids" and I'm, "Well legally you can't, so you're not" so I got that stopped from my solicitor and then they said, "Okay we're posting you to Catterick" and I was, "Oh fuck, I can't stop it" so then stupidly I said, "Okay, I'll come with you". We were staying in a house, I was training my arse off at Phoenix House twice a day just to keep myself busy and I didn't really know what the triggers were for me, until one night I got boozed up so badly I didn't know what I was doing. Some violence took place between us two and now I've lost all access to my children, I'm sleeping on my mum's couch. I've had to see psychotherapists at different places in London, my medication now has been altered and it's literally I'm starting again now. And, other than doing physical stuff, like I do loads of cross fit, if I didn't find that, if I didn't start doing that, 100% I would have ended up in prison 100%.

Facilitator:

So, do you think that there could have been a point somewhere earlier in your treatment that – where that -?

Male 5:

I don't know because I blame myself. It goes back to being injured, people say, "Oh (inaudible 0:57:13" but at the end of the day, it was me that joined up and I wanted to do what I did, and I loved it and I wouldn't change it and I don't really know to be honest with that question.

Facilitator:

So, in terms of the support you're getting, are you accessing it with ease or is it -?

Male 5:

At first, I wouldn't. At first everyone thought I was fine, and I liked everyone, I said everything was fine, I wouldn't talk to anyone and then, when I hit rock bottom I had no choice. My mates have been amazing, they still are; the lads that were in the Regiment with me then, my civvy mates, my family have all been amazing and it's what you put in to it, how you engage it and what you get back and you just have to be honest and I've had to learn the hard way but one thing that I would never not do again is not – just say it, because once you've said it as well it's –

Male 2:

It's out, isn't it?

Male 5:

- a relief.

Male 3:

Do you know what the triggers are now?

Male 5:

Alcohol, massive.

Male 2:

I'm glad you never told me that before we – I took him to the Bahamas three weeks ago and he's getting the Jagers in! (Laughter) He's told me all this afterwards (over speaking and laughter).

Male 5:

I was on the medication and the wrong dosage, and I had other things that I didn't – hadn't been diagnosed so I started opening up and telling people what was going on and how I was actually feeling.

Facilitator:

The medication came from the treatment for your limbs, your leg or was it -?

Male 5:

Well, I've been on so many different ones. I ended up – once I've got diagnosed with PTSD they put me on an antidepressant, Sertraline, but they put me on 250 mg.

Male 3:

It's fucking horrible shit that.

Male 5:

250 mg and then I was speaking to the (inaudible 0:58:50) blokes and they were, "I'm on 20(?)" and then I couldn't get off it. I tried (over speaking) and it wasn't really working.

Facilitator:

Was this when you were in service or out of service?

Male 5:

The Army – initially I got put on it from a Major in Aldershot, she put me on it and whacked it right up straight away and I didn't know no better so I was, "Yes, fine I'll take it".

Male 2:

That was one of my points on how it could be better is pain relief, education of medication because I had a guy who was on Fentanyl, and he was an addict and literally Headley would be trying to get them back and he'd kick off like a drug addict and – but he never realised that he was so dependent on it.

Appendix 28: Transcript Sample Illustrating Inter and Intra-Group Verification

The following extract is taken from Focus Group 4, p21-24. It uses the topic of 'pain management' to show how the researcher sought verification of findings from previous focus groups as well as confirming understanding in the current focus group.

Facilitator:

So, one of the comments you made ...was about medication. You were talking about services, ...about the amount of medication that was flying around.... it was certainly 2010 we were starting to be really proactive with it. But then, what we didn't sort out was how do we get the guys off the drugs at the end, or when they feel they need to? So, there was a lot going cold turkey, just getting rid of the meds.

Male 3:

: *I did that, I did cold turkey.*

Facilitator:

... what were your experiences with that?

Male 3:

: *Some of the medication the guys were saying that they were on, it was just like Jesus, a proper, hard ... because I come out now and I go and someone says oh tramadol, that is oh my God, that is lethal stuff, but that was like ... I was taking that like Smarties at Headley Court, and I was thinking oh tramadol is nothing. No, I was pretty much taking eight to ten a day or whatever I was prescribed and –*

Male 2:

Do you not find like now they are the only type of thing that will work, though? If I have any pain now, I take paracetamol, it is shit, it doesn't touch the site, so I end up taking tramadol, as though it is paracetamol.

Male 1:

I think they were good with the meds; I think they were really good.

Male 3:

: *Oh yes!*

Male 2:

They sorted your pain out instantly, didn't they?

Male 1:

No, just the whole system of giving you the meds, if you needed extra, you ... you would go and ask for them, and then within the hour they have been to see you, your consultant, and he is cleared it and saying maybe we will talk about it Monday or whatever, when you have your clinic. But the transition to coming off maybe ... maybe they should bring you down off them ... not quicker but quicker into your rehab. I know different people have different injuries, but I think sometimes you can be held back by them a little bit.

Male 3:

: *I agree, I was addicted.*

Male 2:

you? *On your prosthetics, you do have to go through that, the pain of wearing your prosthetic, don't*

Male 3:
: *It is there!*

Male 2:
But, if it is a pain from having an injury still, then yes you do need that med, but the pain of wearing a prosthetic isn't – you have to get used to, you can't go oh my legs ache, because I have been wearing my prosthetic for an hour. Oh, I will pop a tramadol. It is that you have to.

Male 3:
: *You take your leg off and you rest it.*

Male 3:
: *The education on drugs were poor. I think they were great to give them to you, not telling you exactly how addictive and strong they were, but a lot of people still take them now because they can. They don't need them, but you can still get a good fix.*

Male 2:
Because somebody mentioned to me about cyclofenil the other day, and I thought I was given that to help me sleep at night, they didn't even know what it was for!

Male 3:
: *But yes, the education was poor with drugs, but they were good drugs. The come down with cold turkey was horrific, and some people are still on them, they don't need them, they just need to take their leg off and rest.*

Male 2:
I know some people that have converted because of the come down and gone cold turkey that are on recreational drugs instead now.

Male 4:
: *I think what made it ironic is sometimes you thought they limited the amount they handed out, but then when you went home for your four to six weeks, right there is four to six weeks' worth of medication! Okay! So, you have just been saying I can't have it all this time, and now you have just given me four weeks supply in one go!*

Male 3:
: *And then some oramorph just in case!*

Male 1:
Like you said at the start, the lads who go home who are vulnerable, who don't have a good family background, they have got a lot of drugs just sitting there.

Male 2:
And they are the ones that you find –

Male 1:
But then the problem is between communication with Headley and your personal doctor, are you going to get those meds?

Male 3:
: *Yes, I mean that is the game you are playing as well, where you are at?*

Facilitator:

So, when you were going to Headley, you were at the latter stage, so we had the pain nurse by that point, but you still felt that it was you were very much left alone?

Male 4:

: To be fair, if you wanted drugs, you could get them.

Male 1:

It is more about getting off them, though!

Male 4:

: It was, I mean luckily, I didn't have the issue of stopping, I didn't feel that I was addicted and pretty much if I wanted to stop, I did. But I would imagine some people there like Bernie said, you got addicted to them, and if you were saying if you wanted more, you could say to them oh I am feeling in a lot more pain and they would – it was almost like free prescriptions, going to your doctor and saying oh I want this, and they would always give it to you. So, it is almost like you had a free will to say this is what I want.

Male 3:

: ...also, medication sharing, I can't find mine, oh I have got some, have some of that! A lot went on, people would just share their drugs around.

Appendix 29: Body Mass Index Adjustment Following Limb Loss.

Within ADVANCE Baseline data, Body Mass Index (BMI) was adjusted for those who had suffered limb loss. Adjusted BMI was calculated by ADVANCE and provided as part of the data request made by this researcher. The following description of how BMI was adjusted was provided in email communication with an ADVANCE study researcher on 4th Mar 2021. An extract from this research has been provided below:

Equation/Algorithm: Adjusted Body Surface Area.

Adjusted Body Surface Area (ASA) = Intact Body Surface Area (ISA) / (1 – amputation surface area percentage) (1-amp%) (ASA=ISA/(1-amp%))

ISA: Adjusted Body Mass (shown below) and subject height using equation from Haycock et al (1978). Therefore,

ISA (cm²) = 0.024265 x mass (M, kg) to the power 0.5378 x height (H, cm) to the power 0.3964 / 1 – amputation surface area percentage (ASA= (0.024265 x M^{0.5378} x W^{0.3964})/(1-amp%))

Adjusted Body Mass: Adjusted Body Mass = Actual Body Mass/ (1- amputation percentage)

Amputation percentage of body mass (1-amp%):

(Data from references below):

- Below knee: 5.9%
- Above knee: 10.0%
- Bilateral below knee: 11.8%
- Bilateral above knee: 20.0%
- Below plus above knee: 15.9%
- Entire leg: 16.0%
- Both entire legs: 32.0%
- Foot: 1.5%
- Both feet: 3.0%
- Hand: 0.7%
- Forearm and hand: 2.3%
- Both forearms and hands: 4.6%
- Entire arm: 5.0%
- Both entire arms: 10.0%
- **Trans humeral: 3.6% (estimate – not based on literature)**
- **Through knee: 8% (estimate – not based on literature)**
- **Multiple limbs not shown above – simply add the relevant areas together**

References for Adjusted Body Mass Calculation:

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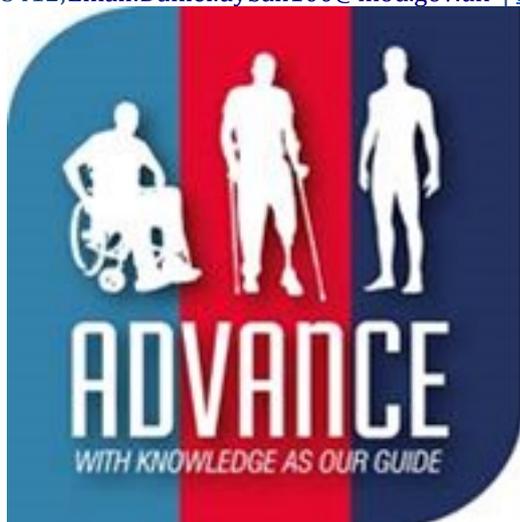
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Appendix 30: Statistical association between psychological outcomes and factors raised by participants in focus group discussions.

During focus group discussion, participants highlighted social or demographic features which they felt predisposed individuals to a poorer outcome. No statistical association was found as shown in Table 30.1.

Parameter	Amputee Groups				Uninjured Control
	UNI	BI	TRI	Total Amputees	
Number	82	63	12	157	157
Association between PHQ-9 and veteran highlighted variables:					
Amputation Count					p=0.076 ^a
Community v non-community walker					p=0.778 ^b
Age (at injury)					p=0.555 ^c
Military Rank (at discharge)					p=0.436 ^a
Working / Not working					p=0.160 ^b
Living alone (y/n)					p=0.956 ^b
Association between GAD-7 and veteran highlighted variables:					
Amputation Count					p=0.267 ^a
Community v non-community walker					p=0.828 ^a
Age (at injury)					p=0.783 ^c
Military Rank (at discharge)					p=0.254 ^a
Working / Not working					p=0.101 ^b
Living alone (y/n)					p=0.733 ^b

Table 30.1: Summary table of associations between psychological outcome and individual social features or demographics.

Abbreviations: UNI, unilateral amputee, BI, bilateral amputee; TRI, triple amputee. NOTE: All data was non-parametric. ^aKruskal Wallace H Test, ^bMann Whitney U Test, ^cSpearman rho correlation, ^dChi Square Test.

Appendix 31: Table of association between GAD-7, PHQ-9 and back pain, residual limb pain, phantom limb pain.

Parameter		GAD-7 (condensed) (Anxiety)					
Sample		Amputee Group			Control		
		0-9		10-27	0-9		10-27
Back Pain							
severity	0-3/10	87 (73.7%)	$\chi^2(1)$ =11.787, p=0.001	31 (26.3%)	108 (79.4%)	$\chi^2(1)$ =0.683, p=0.408	28(20.6%)
	4-10/10	6 (33.3%)		12 (66.7%)	15 (71.4%)		6 (28.6%)
Frequency	0-3/10	85 (72.6%)	$\chi^2(1)$ =10.976, p=0.001	32 (27.4%)	107 (79.3%)	$\chi^2(1)$ =4.913, p=0.027	28 (20.7%)
	4-10/10	6 (33.3%)		12 (66.7%)	12 (57.2%)		9 (42.8%)
Impact	0-3/10	93 (79.5%)	$\chi^2(1)$ =13.389, p<0.001	24 (20.5%)	112 (82.96%)	$\chi^2(1)$ =3.107, p=0.078	23 (17.04%)
	4-10/10	7 (38.8%)		11 (61.1%)	14 (66.67%)		7 (33.33%)
Residual Limb Pain							
severity	0-3/10	91 (69.5%)	$\chi^2(1)$ =7.797, p=0.005	40 (30.5)	-	-	-
	4-10/10	7 (36.8%)		12 (63.2%)	-	-	-
Frequency	0-3/10	92 (70.2%)	$\chi^2(1)$ =14.004, p<0.001	39 (29.7%)	-	-	-
	4-10/10	5 (26.3%)		14 (73.7%)	-	-	-
Impact	0-3/10	100 (76.3%)	$\chi^2(1)$ =16.035, p<0.001	31 (23.7%)	-	-	-
	4-10/10	6 (31.6%)		13 (68.4%)	-	-	-
Phantom Limb Pain							
severity	0-3/10	94 (72.3%)	$\chi^2(1)$ =9.548, p=0.002	36 (27.7%)	-	-	-
	4-10/10	7 (36.8%)		12 (63.2%)	-	-	-
Frequency	0-3/10	99 (75.6%)	$\chi^2(1)$ =6.547, p=0.011	32 (24.4%)	-	-	-
	4-10/10	9 (47.4%)		10 (52.6%)	-	-	-
Impact	0-3/10	116 (88.5%)	$\chi^2(1)$ =8.548, p=0.003	15 (11.5%)	-	-	-
	4-10/10	12 (63.2%)		7 (36.8%)	-	-	-

Table App-31.1: Association between GAD-7 and pain. All data was non-parametric, association tested using Pearson Chi-Square test. Clinically significant GAD-7 scores

Parameter		PHQ-9 (condensed) Depression					
Sample		Amputee Group			Control		
		0-9		9-27	0-9		9-27
Back Pain							
severity	0-3/10	85 (73.3%)	$\chi^2(1) = 8.736,$ p=0.003	31 (24.8%)	101 (80.8%)	$\chi^2(1) = 2.180,$ p=0.140	24 (19.2%)
	4-10/10	8 (40.0%)		12 (60.0%)	22 (68.8)		10 (31.2%)
Frequency	0-3/10	82 (71.3)	$\chi^2(1) = 11.932,$ p=0.001	33 (28.7%)	102 (82.2%)	$\chi^2(1) = 11.932,$ p=0.001	22 (17.8%)
	4-10/10	9 (45.0%)		11 (55.0%)	17 (53.1%)		15 (46.9%)
Impact	0-3/10	91 (79.1%)	$\chi^2(1) = 10.334,$ p=0.01	24 (19.1%)	105 (84.7%)	$\chi^2(1) = 5.944,$ p=0.015	19 (15.3%)
	4-10/10	9 (45.0%)		11 (55.0%)	21 (65.6%)		11 (34.3%)
Residual Limb Pain							
severity	0-3/10	89 (70.6%)	$\chi^2(1) = 9.773,$ p0.002	37 (29.4%)	-	-	-
	4-10/10	9 (37.5%)		15 (62.5%)	-	-	-
Frequency	0-3/10	92 (73.0%)	$\chi^2(1) = 24.026,$ p<0.001	34 (27.0%)	-	-	-
	4-10/10	5 (20.8%)		19 (79.2%)	-	-	-
Impact	0-3/10	96 (76.2%)	$\chi^2(1) = 11.592,$ p=0.001	30 (23.8%)	-	-	-
	4-10/10	10 (41.7%)		14 (58.3%)	-	-	-
Phantom Limb Pain							
severity	0-3/10	91 (72.8%)	$\chi^2(1) = 8.937,$ p=0.003	34 (27.2%)	-	-	-
	4-10/10	10 (41.7%)		14 (58.3%)	-	-	-
Frequency	0-3/10	97 (77.0%)	$\chi^2(1) = 9.704,$ p=0.002	29 (23.0%)	-	-	-
	4-10/10	11 (45.8%)		13 (54.2%)	-	-	-
Impact	0-3/10	110 (87.3%)	$\chi^2(1) = 2.438,$ p=0.118	16 (12.7%)	-	-	-
	4-10/10	18 (75.0%)		6 (25.0%)	-	-	-

Table App-31.2: Association between PHQ-9 and pain. All data was non-parametric, association tested using Pearson Chi-Square test. Clinically significant PHQ-9 scores

Appendix 32: Conceptual map of themes and subthemes from clinician focus groups and interviews

