



OSTEOPATHIC CLINICAL REASONING: AN
ETHNOGRAPHIC STUDY OF PERCEPTUAL
DIAGNOSTIC
JUDGMENTS, METACOGNITION, AND REFLECTIVE
PRACTICE

CINDY McINTYRE

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**OSTEOPATHIC CLINICAL REASONING: AN
ETHNOGRAPHIC STUDY OF PERCEPTUAL DIAGNOSTIC
JUDGMENTS, METACOGNITION, AND REFLECTIVE
PRACTICE**

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ABSTRACT

This thesis explores the use of reflective practice in osteopathic medicine and uses the method to narrate my work as an osteopathic practitioner. It explores the development of perceptual diagnostic judgments, and the role of metacognition, intuition and palpation in osteopathic clinical reasoning.

A qualitative interpretive approach was used with a novel narrative method as an organising structure. This was broadly based around reflective practice models of Gibbs, (1988), Kolb, (1984) and Carper (1978) and the ideas of Schön (1983). Descriptive texts were constructed from notes taken of my thoughts whilst in the presence of patients. This allowed access, as closely as possible, to my decision making process. Finally, the descriptive texts were expanded into narratives through dialogue with the existing literature and peer review. The narratives were then analysed using thematic analysis to derive an understanding of concepts arising from the data.

This thesis argues that osteopathic clinical reasoning involves multisensory perceptual diagnostic judgments that begin as soon as the patient enters the clinic, and arise as a result of the use of mental and visual imagery and embodied senses. The multisensory information that is detected by a practitioner activates pattern recognition, analytic reasoning and provides explicit feedback used in decision making. Diagnosis occurs as a result of piecing together and interpreting the multisensory information whilst maintaining awareness of other diagnostic possibilities.

The findings also suggest that osteopathic clinical reasoning involves the supervision of cognition by the metacognitive processes of meta-knowledge (MK), meta-experiences (ME), and meta-skills (MS). The latter are used to plan, monitor, analyse, predict, evaluate and revise the consultation and patient management as suggested by Pesut and Herman (1992). ME is demonstrated by the presence of judgments of learning used to ensure sufficient information has been gathered, and feelings of rightness that are used to perceive the correctness of information arriving and decisions made.

The use of reflective practice in this research has developed the understanding of osteopathic clinical reasoning, and demonstrated that it provides a powerful conduit for change in practice. As a result, it enables the provision of better patient-centred osteopathic healthcare incorporating the biopsychosocial model of healthcare. Although rooted in my own osteopathic practice style and strategies, it should have resonance for those within the discipline of osteopathy and has implications for osteopathic education, training and research.

For Marilize

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DECLARATION

I declare that this thesis is entirely my own work. It is submitted as part requirement for a Professional Doctorate at the University of Bedfordshire. It has not been submitted, in part or in whole, for any other degree or study at another University.

Name of Candidate: Cindy McIntyre

Date:

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LIST OF ABBREVIATIONS

3D – Three Dimensional

Agg. – Aggravate

A-P – Anterior-Posterior

Ant.– Anterior

Artic. - Articulate

BPS - Biopsychosocial

C7- Seventh Cervical Segment

CA – Conversation Analysis

CEST – Cognitive Experiential Self-Theory

Comp. – Compression

CONF – Confidence Judgments

CPD – Continuing Professional Development

CR- Clinical Reasoning

CSS- Critical Social Science

DA – Discourse Analysis

DM- Decision Making

DPT- Dual Process Theory

EBM - Evidence Based Medicine

EI – Emotional Intelligence

ESP – Extended Scope Physiotherapist

Extⁿ – Extension

FOK – Feeling of Knowing

FOR- Feeling of Rightness

GOsC - General Osteopathic Council

GT - Grounded Theory

H₂O- Water

HDR- Hypothetico-Deductive Reasoning

Innom.- Innominate

JOL- Judgment of Learning

L1-3 – Lumbar Vertebrae One to Three

L3 – Third Lumbar Vertebra

Lat. – Lateral

LB – Low Back

LBP – Low Back Pain

LES - Lumbar Erector Spinae

L/S – Lumbo-Sacral

LTM - Long Term Memory

ME - Meta-Experience

MK - Meta-Knowledge

MM - Musculoskeletal Medicine

MRI - Magnetic Resonance Imaging

MS - Meta-Skills

MSR – Model for Structured Reflection

NA – Narrative Analysis

NAD - Nothing Abnormal Detected

OEI – Osteopathic Educational Institute

OMM - Osteopathic Manual Manipulation

OT – Occupational Therapy

PIS - Patient Information Sheet

Post. - Posterior

PR - Pattern Recognition

PTSD – Post Traumatic Stress Disorder

RCT – Randomised Controlled Trials

RCGP – Royal College of General Practitioners

Rel. - Relieving

RP - Reflective Practice

SBS - Sphenobasilar Symphysis

SCT – Script Concordance Testing

SDM - Shared-Decision Making

SE – Somatic Experiencing

SI- Sacro-Iliac

SL - Side Lying

STM - Short Term Memory

T¹ – Type One Cognitive Processes

T² – Type Two Cognitive Processes

T2 – Second Thoracic Vertebra

T3-6 – Third to Sixth Thoracic Vertebra

TA - Think Aloud

TFL – Tensor Fascia Latae Muscle

TI - Tonic Immobility

TL – Thoraco-Lumbar Junction

UK - United Kingdom

USA - United States of America

WHO – World Health Organisation

WM - Working Memory

Chapter 1: Introduction

This study is directed at two areas of interest; a) the possibility that reflective practice (RP) may be able to be used to develop and inform osteopathic practice, and to maintain and enhance osteopathic clinical reasoning (CR) and diagnosis; b) to gain insight into the moment-by-moment decision making (DM) processes of an osteopathic practitioner undertaking CR in the presence of patients, with the aim of understanding how perceptual diagnostic judgments are made, and the role of metacognition, intuition and palpation in osteopathic CR. This chapter introduces osteopathic philosophy and the profession's focus of treatment, how osteopathy in the UK is situated in relation to the rest of the world, and the requirements of the UK regulator. It then briefly introduces where osteopathic research into CR is situated in relation to other healthcare research, and the current understanding of the role of palpation in osteopathic CR which provides the motivation for the study. The chapter then provides a summary of each chapter within the thesis.

1.1 Background to Study

The profession of osteopathy was founded in Kirksville, Missouri by A.T. Still in 1874, and introduced to the United Kingdom (UK) in 1898 (Collins, 2005). The profession now has a regulatory body, the General Osteopathic Council (GOsC), and has grown to contain a little under five thousand practicing osteopaths in the UK (GOsC, 2016). The profession has distinct philosophies which are organised around such concepts as the body is a unit; and the person a unit of mind, body and spirit; the body is capable of self-regulation; and structure and function are reciprocally interrelated. All of these philosophies inform osteopathic evaluation and treatment (Penney, 2013). Osteopaths largely treat musculoskeletal dysfunction using manual techniques such as, soft tissue massage, articulation and manipulation of joints, cranial and visceral osteopathy. When presented with a patient in pain the aim of the osteopath is to understand the patient and many aspects of their lifestyle, and to diagnose and treat somatic dysfunction. The concept has been challenged by some authors (Lucas and Moran, 2005; Licciardone, 2007), however, somatic dysfunction has been conceptualised as altered or impaired function of myofascial, skeletal and joint related components of the body (soma) and their related cardiovascular, lymphatic, and neural structures (DiGiovanna, 2005). The intent of the osteopath is to facilitate the patient's body back to compensation, and provide management strategies to avoid recurrence of the pain so that the person can continue with their activities away from the clinic.

In the United States of America (USA), osteopaths are medical physicians with full prescribing rights and are integrated into mainstream medicine. Only thirty-five percent use osteopathic manual manipulation (OMM) (McGrath, 2013), with only five percent

using it daily (ATSU, 2012). In the UK and other regulated countries, for example Australia, the profession has a chosen to continue its original scope of practice. As a result, the requirement to become an osteopath in the UK is via a four or five year masters course that provides the recipient with considerable medical and scientific knowledge, extensive practical skills, and clinical competency capabilities. Indeed, the regulator in the UK requires the osteopath to have well developed knowledge and skills to function and operate as a primary healthcare practitioner (GOsC, 2012). In addition, osteopaths are required to make accurate, ethical, and patient-centred assessments with CR and patient management part of the core competencies (GOsC, 2012). An osteopath's training allows the osteopath to operate as an autonomous healthcare clinician, and CR is suggested to be a fundamental requirement for autonomy in healthcare practice (Higgs and Jones, 2000).

As most osteopaths work as independent healthcare practitioners this requires them to be safe, effective, professionally accountable, and to strive to address the healthcare needs of their patients, (Thomson, 2013a). An osteopath is consulted each day by many different types of patients who present with varied conditions, personal circumstances and needs for healthcare. There is considerable overlap in the presentation of different conditions, for instance, chest pain may indicate myocardial infarction, pulmonary distress, thoracic spine dysfunction, or a rib lesion. In addition, a clinical encounter during which a case history is taken, examination, diagnosis and treatment is involved is often time constrained. The osteopath is required to make an accurate, ethical, and patient-centred assessment of the situation with CR and patient management part of the core competencies (GOsC, 2012). Their clinical knowledge base and reasoning skill enables the osteopath to provide a high level of patient care whilst operating as an autonomous healthcare professional (Esteves, Bennison and Thomson, 2013; Browning, 2014). It has been highlighted, that although CR has been studied and described by other health professions, there is a paucity of research within the osteopathic profession, and CR has only just begun to be explored in more depth (Moore et al. 2014).

The understanding of CR has developed over the years with healthcare research in other disciplines having explored the concept, for example in nursing (Benner et al. 1992); in occupational therapy (Fleming, 1991); and in physiotherapy (Jensen et al. 2000). It is now understood to be a complex and multidimensional phenomenon by which healthcare practitioners develop a multifaceted understanding of patients as the basis for DM and treatment (Smith, Higgs and Ellis, 2007). Osteopathic research in this area was historically absent, however, there has been an emerging focus occurring recently with studies investigating aspects of osteopathic DM and CR respectively (Thomson et al. 2014a; Roots et al. 2015). The results have suggested that we use similar cognitive processes in osteopathic DM to those used in medicine (Norman et al. 2007). These

cognitive processes are suggested to be both implicit and explicit, and that an osteopath dynamically alters their thinking during evaluations of a patient's presenting conditions (Roots et al. 2015).

The definitions of CR have become more patient-centred as healthcare has moved away from a biomedical focus where patients are the sum of their disease state, and toward a biopsychosocial (BPS) model of health (Engel, 1977). It has been suggested that the concept of patient-centred healthcare is embedded within the BPS model with the emphasis on placing the patient firmly in the centre of DM (Thomson et al. 2013a). Collaborative reasoning is a model that extends the concept of patient-centred care, and has been proposed in the field of physiotherapy (Edwards et al. 2004a; Trede and Higgs, 2003; 2008). It is proposed that the way decisions are made during consultations with patients impacts their persistence with treatment, sense of ownership, and perceptions of healthcare outcomes (Trede and Higgs, 2008). It is suggested that the profession's philosophy contains elements of the values portrayed by the BPS model of healthcare, and we should align ourselves more closely with its principles of patient care (Penney, 2013). Although Roots et al. (2015) identified collaborative reasoning occurring amongst the New Zealand participants in their CR study, whether this is used within the UK osteopathic profession is not known. Using RP this study closely investigates the CR of an osteopathic practitioner whilst evaluating patients. The concept of reflective practice (RP) has become synonymous with good practice in healthcare, particularly nursing and occupational therapy, but also more recently within the profession of physiotherapy (Donaghy and Morris, 2000; 2007). Within nursing, it is recognised as an essential component to the nurse education program because it is thought to have the ability to enhance and inform personal and professional philosophies and competencies (Parrish and Crooks, 2013). Developing a professional epistemology will arguably require clinicians to cultivate and maintain a high level of reflective capability and metacognitive proficiency. The reflective content may allow an element of access to embedded professional knowledge which it is acknowledged is inherently difficult to describe (Schön, 1983).

During CR and whilst diagnosing somatic dysfunction an osteopath uses visual and palpatory feedback to support their DM, the latter of which is recognised as a core osteopathic skill (Browning, 2014). Palpation is used to identify areas of tenderness, anatomical features, and differentiate between the tone of tissues, joint mobility and bony landmarks. It is recognised as a difficult subject to teach and research, and has been shown to demonstrate poor reproducibility between osteopaths (for example, Paulet and Fryer, 2009). To increase the complexity further, an osteopath's palpatory diagnostic capability is also underpinned by extensive biomedical and experiential knowledge. It is suggested by Ratcliffe (2013), that palpation is a unique sensory perception because it is

not possible to perceive the other without perceiving yourself, which creates a lack of differentiation between the two beings. Taken together diagnostic palpation becomes captured in complexity in the dynamic relationship between perception and cognition. In fact, Kappler (1997) suggested that osteopaths are often described as having 'seeing hands', which posits a multisensory dimension to our diagnostic endeavours.

Using a modified case study approach that combines narrative inquiry with analysis using grounded theory (GT) methods, the study addresses the moment-by-moment thought processes of an osteopathic clinician, and aims to explore perceptual diagnostic judgments. The purpose is to investigate how perceptual diagnostic judgments are made, the role of palpation, intuition and metacognition in CR, and whether RP has the ability to inform and enhance osteopathic professional knowledge. The intention is to add to the profession's discrete body of knowledge that will have implications for osteopathic education and clinical competency.

1.2 Thesis Outline

This section describes the structure of the thesis and summarises the content of each chapter.

Chapter 1- provides a brief overview of the osteopathic profession and the approach to CR and diagnosis in context with the study. It also provides an overview of the thesis and a brief description of each chapter.

Chapter 2- is the beginning of the literature review and focuses on CR, and analytic and non-analytic processing in both osteopathic and medical practice. It provides a definition of CR and a historic understanding of the developments that have occurred in diagnostic DM. It then looks at the cognitive processing strategies that have been identified in DM and their relationship to memory retrieval processes and think aloud (TA) protocols. The chapter then provides an overview of CR frameworks that have been developed in musculoskeletal medicine (MM) and the movement into a patient-centred focus. There is then an overview of patient-centred CR, collaborative reasoning and the BPS model of healthcare which adds further context to the study.

Chapter 3- is the next section of the literature review and addresses elements that constitute professional knowledge, including perceptual information and how it is thought to be organised in an expert's brain, and the concepts of implicit and explicit knowledge. The chapter then considers perception and its dynamic and intricate relationship with cognition, and the concept of embodied cognition where psychological processes are influenced by body systems. Finally, it addresses the concept of metacognition in relation to supervision of thinking during CR, and the concept of diagnostic errors and cognitive biases.

Chapter 4- the final part of the literature review examines the concept of reflection and RP. It considers current and historical models of reflection and its philosophical background. It then addresses the relevant RP models that have arisen as a result of the philosophical influences.

Chapter 5- describes the methods and methodology used in this study. It reviews my philosophical position and considers and justifies the qualitative methodology. It describes the methodology of ethnography which is where the methods used are placed, and the relevant ontological and epistemological positioning of the study. It describes the autoethnographic approach and positions RP in relation to the requirements of the study. The chapter then considers the steps taken to ensure the trustworthiness of the study. The method is then described in detail, looking at research design, ethical considerations, recruitment of participants, data collection and GT methods of data analysis. An example of the data analysis is also provided.

Chapter 6- the findings are presented in four sections, which correspond to the four main categories that arose from analysing the data. Explicit examples for each category and sub-category are provided that directly relate to the narratives that were developed throughout the study.

Chapter 7- the discussion chapter critically reviews the findings and discusses them in relation to the existing literature that is detailed in chapters one to four.

Chapter 8- this chapter contains the concluding aspects of the thesis in a summary of the findings, implications for osteopathic education and research, and evaluation of the methods and methodology.

Chapter 2: Literature Review: Clinical Reasoning, and Analytic and Non-Analytic Processing

2.1 Introduction

This chapter therefore begins by defining CR in the context of the changing understanding of its importance to the patient. The chapter then addresses historical research on the subject, and briefly discusses the changes in models of CR. It then looks at the manner in which knowledge is cognitively represented, memory retrieval processes that may occur during CR, and how memory has been accessed using think aloud (TA) protocols. The chapter then focuses on CR research and frameworks from within osteopathy and MM in general, before introducing patient-centred care, the biopsychosocial (BPS) model of healthcare, and collaborative reasoning approaches to CR. In reviewing the relevant literature, the author of this thesis critically appraises the quality of available evidence whilst identifying and evaluating gaps in the literature.

2.2 Defining Clinical Reasoning

Reasoning may be defined as a singular and deliberate cognitive activity that coordinates inferences so as to reach justifiable conclusions (Moshman and Geil, 1998). It is often envisioned as a singular process involving purely cognitive activity, but in the context of healthcare it has more complexity, and it is commonly accepted that it needs to include the subjective lived experiences of health and illness of the patient (Miles and Mezzich, 2011). Medicine has historically been concerned with disease and disease states, and the patient presented to the clinician with a problem for the practitioner to solve (Thomson, Petty and Moore, 2011). A result of this biomedical emphasis was that it placed an importance on diagnostic reasoning, with the clinician as authority making decisions for the patient. In addition, there are researchers who have been involved in specifically analysing the intricate cognitive processes that occur within a practitioner's DM, (Elstein, Shulman and Sprafka, 1978; Patel and Groen, 1986). The emphasis then focuses on diagnostic reasoning rather than the more complex interactive CR process.

There are a number of frameworks that have been developed over the years that help clinicians integrate the concept of CR in practice. There all share similarities, particularly the dual nature of the concepts that allow for the presence of analytic and non-analytic cognitive processes. They have also generally arisen as a result of research into diagnostic reasoning which is a more specific concept that concentrates on medical diagnosis, for example: hypothetico-deductive reasoning (HDR) (e.g. Elstein et al. 1978) pattern recognition (PR) (e.g. Groen and Patel, 1985), forward and backward reasoning (e.g. Arocha, Patel, and Patel, 1993), analogical reasoning (e.g. Eva, Neville, and Norman, 1998), dual process theory (DPT) (e.g. Croskerry, 2009).

In more recent times, with the advent of the biopsychosocial (BPS) model of healthcare first proposed by Engel (1977), and the move away from the autocratic nature of medicine, authors appear to be converging on the intricacies of clinical situations and the need to empower the patient within the DM process (Arnetz et al. 2004; Atkins and Ersser, 2008). This has resulted in new models of CR which account for the complexity of the individual patient and the management of their situation (Trede and Higgs, 2008).

There are a number of terms used that aim to describe what a practitioner does when diagnosing a patient's presentation, such as clinical problem solving, medical decision making, clinical judgment, diagnostic reasoning, and CR, and some authors use the terms synonymously when describing the concept, (Simmons, 2010; Elstein et al. 1978). For the purposes of this treatise I would propose to use the following as a definition of CR because it represents the current interpretation, accounts for the changes that have occurred within healthcare over the last four decades, and expands the explanation from a process view to CR as a contextualised phenomenon (Higgs and Jones, 2008).

CR is a critical capability that a healthcare practitioner requires for autonomous clinical practice. It includes a number of cognitive and metacognitive processes, including reasoning, decision making and intuition that are involved in the interrogation and application of declarative and procedural knowledge, reflection and evaluation, (Higgs and Jones, 2000, p3). It also includes the consideration and prioritisation of competing healthcare needs, the views and needs of different participants within the decision making process and the processing of all decisions and actions in the context of professional ethics and community expectations (Higgs and Jones, 2008, p4).

2.3 Cognitive Reasoning Strategies and Retrieval Processes

Research into CR has a long and varied history spanning more than 50 years, and has been mostly directed at trying to identify the processes that practitioners use when diagnosing a patient's presenting condition (Loftus and Smith, 2008). Early research, that occurred within the tradition of medical problem solving had an empirical bias, and was directed at understanding the behaviours used by novice and expert decision makers (Hayes Fleming and Mattingly, 2008). During one such study Rimoldi (1988), examined the diagnostic cue acquisition skills of medical students and doctors, and was able to distinguish that experts asked fewer questions than students, and maximized the information gained by asking them at the proper time and in the most effective sequence. These findings were corroborated some years later by Doody and McAteer (2002) in the field of physiotherapy, when they found that experts ask more pertinent, timely and effectively sequenced questions. A main aim of behavioural studies was to develop ways of teaching and improving the skills of medical students, and provide them with direct

remedial performance feedback (Rimoldi, 1961; Loftus and Smith, 2008). This early research alluded to the enhanced CR capabilities of expert physicians, but has its critics because it does not holistically investigate learning and ignores context, social interaction and inter-subjectivity (Loftus and Smith, 2008).

As a result of the weaknesses of behaviourism and with the rise of the field of cognitive psychology, CR research became directed at trying to understand what was happening in the mind of clinicians when they were 'problem solving' (Higgs and Jones, 1995). Cognitivism was born and the research became more complex, and with the advent of computers, modelling and statistical analysis also became an option (Simon, 1979). Although cognitivism is interested in mental structures and access to them, a weakness is that it likens human cognitive processes to that of a computer and doesn't allow for the individual perceptions inherent in human brains (Loftus and Smith, 2008). However, the era of cognitivism has provided two main methods that have generally been accepted as indicative of the cognitive processes occurring during medical DM and CR, they are HDR and PR. They are examples of analytic and non-analytic reasoning processes respectively, and have recently been identified as strategies that are also used in osteopathic diagnostic and CR processes (Thomson, Petty and Moore, 2014a; Roots, Niven and Moran, 2015). The following section critically appraises the literature on PR and HDR in osteopathic and medical CR, and identifies possible gaps. It provides insight into how the subject has been conceptualised over the years, enabling an understanding of how it has arrived at its current position. The aim is to contextualise the study and its findings, and highlight the importance of understanding what constitutes analytic and non-analytic reasoning within osteopathy.

2.3.1 Hypothetico-Deductive Reasoning

Inductive and deductive reasoning date back to the 1600s to Bacon and Descartes. It also played an essential part much earlier in Freud's construction of psychoanalysis (Hanly, 2014). There is also a body of experimental psychology research aimed at discovering the intricacies involved in human reasoning (Heit and Rotello, 2010; Lassiter and Goodman, 2015). In medical DM however, Elstein and his colleagues (1972; 1978; 2009) were responsible for a large proportion of the early work dating back to the 1970's. They studied the differences between students and experienced practitioners, and the characteristics of expert DM, with the intent of providing medical students with enhanced instructional methods to increase their problem solving skills.

In one particular study, physicians with high levels of diagnostic skills were selected by nomination from their colleagues (Elstein et al. 1972). They were then given three simulated cases to study with trained actors in place of a real patient. The physicians were asked to problem solve and 'think aloud' in a similar manner to providing feedback

to students during a medical round. At the end of the encounter the physician was shown the video tape of the diagnostic session and asked to describe their thinking. This was designed to uncover the thought processes of the physician that were behind the observable behaviour. The method used does not prevent the physicians from regulating their description of their observable behaviour. However, the researchers found that expert physicians generate fairly specific hypotheses early in their diagnostic thinking and then look for further information to test their ideas rather than developing new formulations (Elstein et al. 1972).

HDR was the general model of clinical problem solving that emerged from these studies, and suggested, that in situations of uncertainty expert clinicians adopt this strategy. It was also discovered that both experts and novices utilised the same process and generated similar numbers of hypotheses, but the experts were more accurate (Neufield et al. 1981). It has been termed analytic, deductive, or 'bottom up' rationalisation because it involves gathering data to specifically test a hypothesis, or hypotheses (Norman, 2005). Other examples of research in this area are, Barrows et al. (1982), Bordage and Zachs, (1984), Gale (1982), Corcoran (1986) and Fonteyn (1991).

2.3.2 Pattern Recognition and Illness Scripts

Even though HDR is an established and accepted DM method, it has been suggested that we actually spend as much as ninety-five percent of our reasoning time in the non-analytic mode (Lakoff and Johnson, 1999). It has been suggested that clinicians are actually most likely to utilise multiple reasoning strategies, which include both top down and bottom up reasoning approaches, dependent on their level of expertise (Jones, Jensen and Rothstein, 1995). Experienced physicians use the bottom up HDR method when diagnosing difficult cases with incomplete or inaccurate information, or when they have limited knowledge of the specific situation (Arocha, Patel, and Patel, 1993). However, they use top down PR with cases that are more general and less challenging (Groen and Patel, 1986).

PR is represented by identification of a precedent where certain features that have been historically observed are brought forward to allow the clinician to develop a hypothesis (Loftus and Smith, 2008). The information is held as 'illness scripts' and has been posited to account for knowledge transformation over the lifetime of training and professional practice (Schmidt, Norman, and Boshuizen, 1990). Interestingly, Charlin et al. (2007) have argued, that biomedical knowledge in its encapsulated form constitutes the anatomy of an 'illness script'. The initial stage occurs during clinical education where a gathering of information from basic science, combined with the causes and consequences of disease, form '*elaborated causal networks*', (Schmidt et al. 1990; Norman, 2005). In the UK the osteopathic regulator requires that an osteopath can demonstrate an integrated

knowledge of anatomy, physiology, biomechanics, pathology, psychology and osteopathic principles. This is taught at undergraduate level and would form this basic structure. As the student's experience increases, the vast and diverse network becomes condensed which they believe happens when the student becomes exposed to patients. The student develops short cuts to understanding and diagnosis which are based on their previous experience of presenting patient cases to their tutors. These structural changes in knowledge, as better conceptual connections are made, result in significant changes in problem solving strategies (Boshuizen and Schmidt, 2008). The truncating continues and moves through *illness Scripts* into exemplars based on experience (instance scripts), when the practitioner in clinical situations commits information to memory that is based on specific patients, (Norman, 2005).

The *Illness Scripts* contain three main components; 1) *enabling conditions* which are background factors that are influential in the development of the patient's disease; 2) *the fault* which is the actual pathophysiological expression of the illness, and; 3) *the consequence* which are the complaints, and signs and symptoms to which the problem leads. When an illness script is activated there is no need for any linking intermediate stages or problem solving steps (Feltovich and Barrows, 1984; Boshuizen, and Schmidt, 2008). A physician may activate one or many illness scripts which are considered automatic and unconscious. They are then compared to the information that is given by the patient and any script that fails is deactivated (Boshuizen, and Schmidt, 2008). The advantage of PR is that it facilitates a rapid retrieval of information, which in a busy clinic is of significant benefit. However, it is thought it may stifle innovative thinking because of reasoning becoming habitual, and it is important for the practitioner to be aware of this and employ metacognitive skills that provide a method of self-examination (Jensen et al. 2000; Rivett and Jones, 2005).

2.3.3 Memory Retrieval Processes

The information that the undergraduate and experienced clinician require during their practice life is maintained in long term memory (LTM), which is divided into declarative and non-declarative. Declarative memory is often gained explicitly and contains specific information for example, that gained from learning about particular pathologies. In contrast non-declarative knowledge is often gathered implicitly and as a result may be task based. It would be activated if the osteopath needed to examine a patient's hip for example (Kirkhart, 2001). Declarative memory can be further broken down into semantic and episodic memory. Semantic memory relates to facts, figures and familiarity, and episodic memory allows access to individual experiences and may be of relevance to osteopathic CR during retrieval of 'instance scripts' (Gazzaniga, Ivry and Mangun, 2002). Studies undertaken by Rikers et al. (2005), suggest that biomedical knowledge is a

critical component of clinical knowledge and stays strongly represented in the LTM of expert medical practitioners. The expert clinicians in their lexical decision study were considerably faster and more accurate than students at judging both biomedical and diagnostic target items. Their findings also provide further support to the knowledge encapsulation hypothesis of Boshuizen and Schmidt (1992).

To perform complex cognitive tasks such as CR, human beings need rapid access to large, readily available, contextualised databases of information (Fougnie et al. 2015). These databases have been traditionally categorised as short term memory (STM) and LTM, with STM only able to maintain a maximum of 10 unrehearsed items, such as a string of numbers, at a single presentation (Waugh and Norman, 1965). The actual items are not held in STM but rather as a label that allows the content in LTM to be very rapidly accessed (Chase and Simon, 1973). More recently the concept of working memory (WM), which exists within STM, was introduced by Baddeley and Hitch (1974). Baddeley (2012) posited that both are short term storage systems, but WM is temporary storage with manipulation of a wide range of cognitive activities. Despite its extremely limited storage capacity virtually every cognitive activity is linked to WM (Fougnie et al. 2015).

WM is further comprised of an executive component and two temporary storage areas, one is linguistic and the other visuo-spatial. There are two major neurocognitive theories of reasoning, that of linguistics, which assumes that reasoning is mainly a language based process with activity occurring in the language centres in the brain. The other is the theory of mental models, whereby it is thought that humans construct mental models which they then test in order to find counterexamples, or to satisfy the supposition (Johnson-Laird, 2001). This latter model has strong relevance for osteopathy, because it is suggested in this study that we form mental images as a result of multisensory feedback. Based on results from experiments that interfered with the visuo-spatial storage system whilst participants were asked to reason, it is thought that during reasoning using the mental models theory, we process information using visuo-spatial WM (Klauer, Stegmaier and Meiser, 1997).

Functional MRI studies also support the mental model theory, because activity during reasoning has been witnessed in areas of the brain in which visuo-spatial processing occurs (Vandierendonck and De Vooght, 1997), and in the absence of correlated visual input (Ruff et al. 2003). In addition, lesions in these areas of the brain have been shown to have devastating effects on the ability to form mental images (Farah, 1995).

2.3.4 Think Aloud Protocols

It has long been considered that thinking is a temporal sequence of events, or states, with each state consisting of the end products of cognitive processes. These end products

could be for example, information retrieved from LTM, data perceived and recognised, and information generated by inference, (Ericsson and Simon, 1993). The information within a state is considered relatively stable and can be reported verbally, but the retrieval and recognition processes that bring the information forward cannot. At the end of the nineteenth century in the early days of psychological research, researchers relied on introspective analysis of thoughts to gain insight into this psychological phenomenon. This was intended to counter the difficulties of relying only on external observation to evaluate cognition (Ericsson and Simon, 1993). However, the methods used were found to be reactive and interfere with the thought processes of the participants. There was also no consensus across different theoretical backgrounds, and introspection as a method was abandoned until the early part of the twentieth century (Ericsson, 2002). At that point verbal reporting began to appear that asked participants to 'think aloud' (TA) whilst they performed tasks or solved problems.

There are two types of TA protocols, retrospective where the participant is asked to recall their thought processes after completion of a task, and concurrent that require the participant to verbalise their thought processes whilst completing the task (Ericsson and Simon, 1984). It is proposed that wherever possible concurrent TA are preferable because it is not feasible to exclude the possibility that information retrieved while performing a task is different from that verbally reported at a later time, due to the limitations of memory. Concurrent protocols were developed to resolve the problem of LTM and it is thought that as long as the participant is verbalising only their thoughts, and not describing the processes to which they are attending, the protocols do not change the normal sequence of events. Tasks that can be completed in 0.5-10 seconds are expected to provide opportunity for participants to recall their thoughts with high accuracy, and longer durations make it increasingly difficult for recall to be complete (Ericsson and Simon, 1993). However, Fowler (1997) speculates, that cognitive processes are potentially so rapid that the practitioner may not have time to capture all of their thoughts. Ericsson and Simon (1993) describe concurrent reports as eliciting levels one, two, and three verbalisations. Level one is an immediate unmodulated thought spoken aloud such as 'straight leg raise is positive'. A level two mediated thought is recoded into a verbal description of non-verbal stimuli for example, 'this patient is may have nerve root compression'. A level three modulated thought is recoded into predicting future actions/anticipatory guidance for example, there may be the possibility of a prolapsed disc which will need gentle treatment to prevent further exacerbation of the prolapse (Burbach et al. 2015).

However, it is suggested that concurrent protocols can be subject to confounding issues, such as underlying behaviour being unconscious and not accessible for verbal reporting (Ericsson and Simon, 1993). There are also the concepts of reactivity and non-veridicality

which can alter the outcome (Sanz et al. 2009). Reactivity occurs if the TA process changes the primary process, and non-veridicality is when the verbal report does not accurately reflect the underlying process. Similarly, Ericsson and Simon (1993) discussed the ideas of completeness, veridicality and epiphenomenality. They suggested that the process must be practised and consist of pure verbalisation of thoughts to provide an adequate method for discovering underlying thoughts. It should not contain explanations, descriptions, justifications or rationalisations which are more socially motivated verbalisations. According to Ericsson (2006) it is possible to validate TA protocols, however it appears that the theoretical sequence of events needs to be available in order to verify against it using task analysis. A process such as determining a multiplication calculation, or moves in the game of chess would potentially present such a process. However, within osteopathy the process of CR for different case presentations may be too fluid to provide a sequence of events that are sufficiently repeatable to validate.

Healthcare research has examples of TA being used to evaluate clinical DM strategies (Hoffman, Aitken and Duffield, 2009; Aitken et al. 2011; Lundgren-Laine and Salanterä, 2010) and CR (Burbach, Barnason and Thompson, 2015; Pottier et al. 2010; Fossum et al. 2011; Connor, 2012; Langridge, Roberts and Pope, 2015). All of these studies utilised TA in differing ways, as the sole method (Pottier et al. 2010; Fossum et al. 2011; Burbach, Barnason and Thompson, 2015), a multiple case study design (Langridge, Roberts and Pope, 2015), combined with retrospective interviews (Hoffman, Aitken and Duffield, 2009;) or observation and retrospective interview (Aitken et al. 2011). All were interested in how a practitioner thinks, whether they are expert or novice. Aitken et al. (2011) were interested in whether TA or observation yielded different DM strategies. They discovered that TA yielded more assessment data than observation which is in line with Ericsson and Simon's findings (1993). TA also tended to provide a greater number of assessment, diagnostic and evaluation decisions than observation. However, the numbers of decisions for diagnosis, and particularly evaluation, were very small and may not provide a true trend.

Early medical DM research by Elstein et al. (1972) involved TA protocols which were originally developed by Newell and Simon (1972). They also used a method within their research which asked the practitioners to verbalise their thoughts whilst watching a video of the patient encounter (Elstein et al. 1978). This is an example of retrospective protocols or 'debriefings', and it is thought that these verbalisations are likely to include information from long (LTM), short term memory (STM), and working memory (WM) functioning together to facilitate learning, understanding, and reactions to experiences (Unsworth, 2008; Newell, 2002). They are thought to operate at higher mental levels similar to problem solving and concept attainment (Simon, 1979). Concurrent TA protocols are considered to indicate the contents of STM and WM because the

researcher uses verbalisations as data without involving introspection (Arocha and Patel, 2008).

It is thought that using TA within healthcare is a method that would allow the cognitive processes of the professional to be linked to their actions in healthcare research, and potentially in a practice setting (Van Someren, Barnard and Sandberg, 1994). TA protocols can also be reliably used to investigate CR, and using a combination of retrospective and concurrent protocols may allow the investigation of cognitive features such as metacognition and the use of knowledge (Arocha and Patel, 2008). It is considered that TA protocols do not change the quality of the expert's performance, but may cause the subject who is verbalising to take a little longer over the task. They are also thought to enhance the performance of tasks (Gagne and Smith, 1962; Meissner, Brigham, and Kelly, 2001). In addition, if there is imperfect representation of a process by incomplete reporting it does not imply absence of process (Sanz et al. 2009).

In summary, TA protocols are considered valuable methods for evaluating the thought processes for healthcare practitioners. Concurrent protocols where the practitioner literally speaks their thoughts as they enter their mind, accessing STM and WM immediately before decay occurs, are the most reliable. However, retrospective protocols are considered accurate enough as long as the task is no longer than 10 minutes because of the fallibility of WM, STM and LTM. Combining concurrent with retrospective protocols in healthcare research is thought to provide access to CR and metacognitive strategies. However, there are researchers who suggest that cognitive processes may be so rapid they are not available to be captured.

So far the evidence reviewed in this chapter suggests that early medical research has provided healthcare in general, with an understanding of the behaviours and cognitive strategies used by practitioners when they making decisions. There are two main strategies that have arisen from the field of cognitive psychology and medical research, that of the more rapid intuitive PR and slower deductive HDR models of clinical DM. They are both utilised by clinicians during evaluation, examination, treatment, and management of patients, at times probably concurrently. The utilisation of these strategies is likely to be dependent on the difficulty of the task undertaken and the familiarity of the practitioner with the patient's presentation, which is partly effected by their experience levels. The illness scripts suggested by Boshuizen and Schmidt (2008) indicate a strong link between a practitioner's knowledge base and their CR strategies, and demonstrates WM in action. However, they are all diagnostic tools mostly directed at DM, and provide needed insights into some of the workings of the practitioner's action during reasoning. They suggest a clear delineation between analytic and intuitive cognitions which in reality are likely to be mixed and messy, and they do not account for

the complexities of clinical practice, patient management and continued patient care. The following section links these diagnostic strategies from medicine to CR in osteopathy and manual therapy, and discusses the development of different models of patient care.

2.4 Clinical Reasoning in Osteopathy and Musculoskeletal Medicine

Although there is limited information available from manual therapy professions, studies completed within the profession of physiotherapy have attempted to understand the nature of expert and novice CR and define the term expert (Payton, 1985; Thomas-Edding, 1987; Jensen et al. 1992; Rivett and Higgs, 1997; King and Bithell, 1998; Case et al. 2000; Doody and McAteer, 2002; James and Manning, 2002a; 2002b; Smart and Doody, 2006; Plummer et al. 2006). There are differences in the numbers of participants employed, the levels of their expertise and the methods used to extract data. However most of the studies concluded that, similar to medicine, physiotherapists used a combination of HDR and PR when reasoning.

The CR frameworks that have arisen from physiotherapy have gradually become more sophisticated and progressed to not only become more patient centred, but also depict the complexity involved in daily practice. Jones (1992) favours the HDR method of CR and adapted the problem solving method proposed by Barrows and Tamblyn (1980) for physiotherapy. He recognised the need for healthcare disciplines to not only problem solve as an intellectual process, but also the importance of actively applying knowledge to the assessment and care of patients with the end product being the therapeutic process. However, at the time there was still an emphasis on empiricism and 'solving' a patient's problem. Jones alluded to 'unsolvable' problems and the presence of contributing factors such as emotional, behavioural, environmental, biomechanical or physical. However, the examples given are biomechanical which highlights the difficulty that manual therapists experience in determining what percentage of a patient's presentation can be attributed to the different categories (Lucas, 2005).

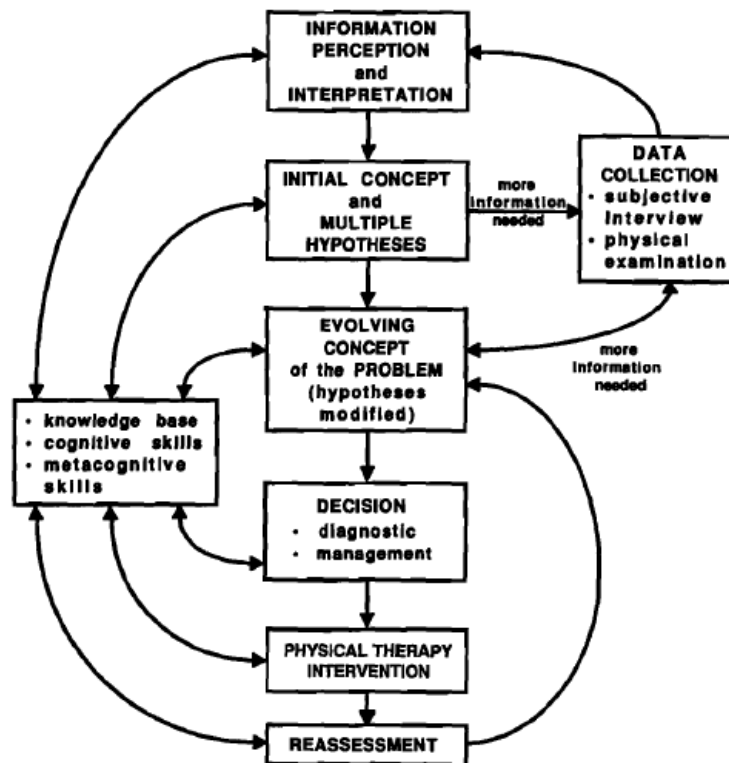


Fig. 2.1 Model of clinical reasoning for physiotherapy (Jones, 1992).

A framework for CR proposed by Edward and Jones (unpublished) appears in Jones and Rivett (2004), and is an enhanced version of Jones (1992) model. It emphasises the large range of factors that can impact a person's health, including social and environmental, and the importance of their inclusion in the dynamic process. Edwards et al. (2004a) posited, that it is the engagement in the field with the patient and their family that led clinicians to ask different questions of the nature of a patient's pain, illness and disability. Osteopathy does not necessarily involve the extended family, often the clinician is only working with the individual so information is mostly gained via visual indicators, cue acquisition, clinical examinations, and the emotional intelligence (EI) of the osteopath.

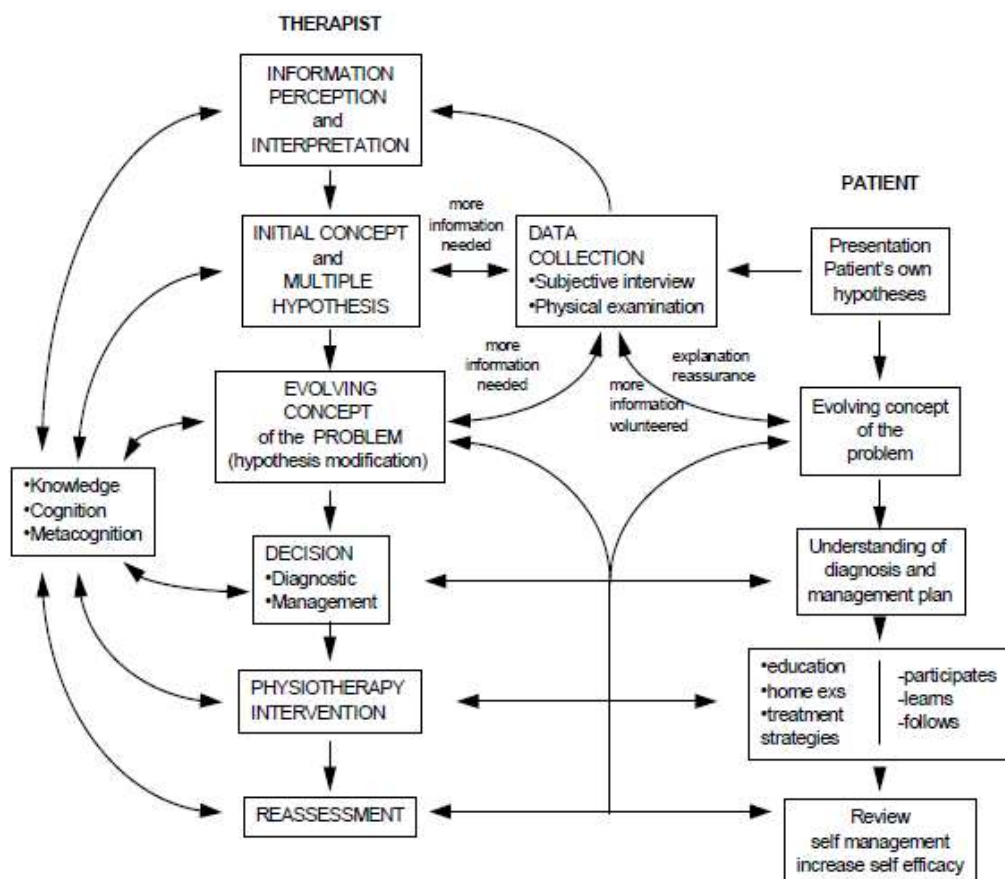


Fig. 2.2 Patient-centred, BPS model of CR (Edwards and Jones, in Jones and Rivett (2004).

Research by Doody and McAteer, (2002) supported the model of CR suggested by Jones (1992). They investigated the CR strategies of a purposive sample of 20 clinicians' half of whom were novice physiotherapists. The therapists were asked to evaluate and treat a previously unseen patient. Information was gathered by audiotaping and via field notes. Participants were then asked to retrospectively recall their experience using Newell and Simon's (1972) TA protocol. A semi-structured interview using the audiotape for guidance was carried out, and thematic analysis of transcripts performed. Results suggest, that all therapists, regardless of experience, begin their evaluation with cue acquisition followed by hypothesis generation, cue evaluation, hypothesis evaluation and treatment. These findings are in accord with the findings of Elstein et al. (1978). However, a person's ability to perform these stages fluidly or correctly did appear to be related to experience. All practitioners showed evidence of HDR but only experts demonstrated the use of PR, which was interpreted as due to the novice's lack of sufficient domain knowledge. Experts also spent much longer on the subjective examination and questioning phase of the consultation, which the authors suggested allowed them to then be more focused and

quicker during the objective physical examination. This research is significant because it demonstrates a difference from CR in medicine. A manual therapy practitioner utilises the treatment as well as the examination to evaluate and corroborate a hypothesis. They do this not only within the first consultation but during future treatments, demonstrating the interactive nature of physiotherapy with its emphasis on patient treatment and management as well as diagnosis. The relevance to osteopathy is interpreted with caution because the participants were physiotherapists within an outpatient department or an orthopaedic setting at a hospital.

However, Thomson, Petty, and Moore (2014a) using a grounded theory approach and combining semi-structured interviews and video observation, investigated the CR of twelve UK osteopaths. The results somewhat corroborated the findings of Doody and McAteer (2002). Participants had an average of fifteen years in clinical practice and a total of seventeen interviews were performed, with three of the semi-structured interviews occurring directly after the participants had been videotaped during a clinical appointment. These latter interviews were performed whilst observing the video evidence, in order to enhance the reflective capacity of the participants. They found that all participants initially focused on establishing an explanation for the patient's presentation. Early in the consultation they ensured that there was an absence of red flags in order to confirm that the patient was safe to treat and did not require a referral. Similar to the findings of Doody and McAteer (2002), all the participants spent considerable time on cue acquisition which was followed by hypothesis generation. They then evaluated and tested their hypotheses by generating further cues and using physical examination procedures. The authors felt that all the osteopaths demonstrated the use of either HDR or PR during their CR dependent upon the case complexity. They sometimes used a combination of the two and were able to move flexibly between the two types of reasoning approaches. This is in agreement with findings from other healthcare research (Edwards et al. 2004a; Doody and McAteer, 2002; Mattingly, 1991; Fleming, 1991) and more recently in osteopathy (Roots, Niven and Moran, 2015). The latter attempted to investigate these strategies further to provide more intricate information regarding the transitioning between PR and HDR by noting the time at which particular thoughts were reported during the DM process. The authors argued for PR occurring at the same time as light and moderate HDR.

The Thomson, Petty, and Moore (2014a) study participants also demonstrated metacognitive strategies when faced with a situation where the patient was not responding as expected. The participant would reflect on their reasoning and reconsider the diagnosis as suggested occurs in the metacognitive model outlined by Pesut and Herman (1992) for nursing. It would be of interest to know whether the four osteopaths who had more postgraduate training provided significantly different CR strategies as

found by Langridge et al. (2015) within physiotherapy. Also whether there was any perceivable difference between the participant's recall when the interview was held directly after the patient consultation, and those that were not. The authors were not intent on analysing the efficacy of verbal reporting, however, it would be a thought provoking addendum. According to Ericsson (2006), the closest connection between verbal reports and actual thoughts is the TA protocol, which occurs as the participant is performing the task.

More recently Langridge et al. (2015) evaluated the CR of generalist and extended scope physiotherapists (ESP) to establish the CR models adopted by each. They were not specified as musculoskeletal specialists but the practitioners were evaluating patients with LBP. An ESP differs from non-ESP because they are trained to have autonomy, and therefore could arguably be considered more aligned to osteopathic professionals. They evaluated sixteen physiotherapists in total in a two phase study, and used a GT methodology. They collected data via focus groups for both the ESP and non-ESP, which were then followed by semi-structured interviews and TA protocols for the ESPs alone. The semi-structured interviews occurred immediately after a patient appointment. It is not clear from the method described whether the researchers used TA protocols separately from semi-structured interviews or combined the two.

The categories they evaluated differ from that of Doody and McAteer (2002) and Thomson et al. (2014a) because it focused on seven themes; prior thinking, patient interaction, formal testing, safety and accountability, internal/external factors, time, and gut feeling. The authors did not directly address concepts such as cue acquisition or hypothesis generation but their dominant themes of prior thinking, formal testing, and patient interaction incorporate elements of those used by Doody and McAteer (2002) and Thomson et al. (2014a). The proposed model suggests that the main process of gathering information occurred using these three themes, with time, gut feeling, safety and accountability, and internal/external factors influencing the reasoning of the physiotherapist, more so in the case of the ESP. The authors suggest that the ESPs drew on the concept of 'prior thinking'. This is a combination of knowledge and PR which they linked to the presenting case. They suggested that this was different to the non-ESP who looked for patterns whilst assessing movement. This observation could be considered to fit within the PR model of Groen and Patel (1985). However, ESPs are additionally trained to be autonomous, and these findings may therefore indicate the importance of teaching CR and metacognitive concepts to students to ensure they are fully equipped for clinical practice. It also validates the findings of King and Bithell (1998), who found that experience alone did not produce the same level of expertise, and training is paramount.

The authors proposed a framework which highlighted the pressure that a physiotherapist encounters from safety, accountability, and time factors. These create anxiety and may alter the CR process. They also began to address the presence of gut feeling as core to the CR of an ESP. They suggested that a physical reaction, such as fear, was an indication of the presence of gut feeling which they argued was separate from PR. However, gut feeling could be considered to be intuition which is arguably experience based DM, which should be present in the PR mode of reasoning (Groopman, 2000). It could also be argued to be a metacognitive process of ME by which the physiotherapist determines the feeling of rightness (FOR) of a situation (Thompson and Morsanyi, 2012).

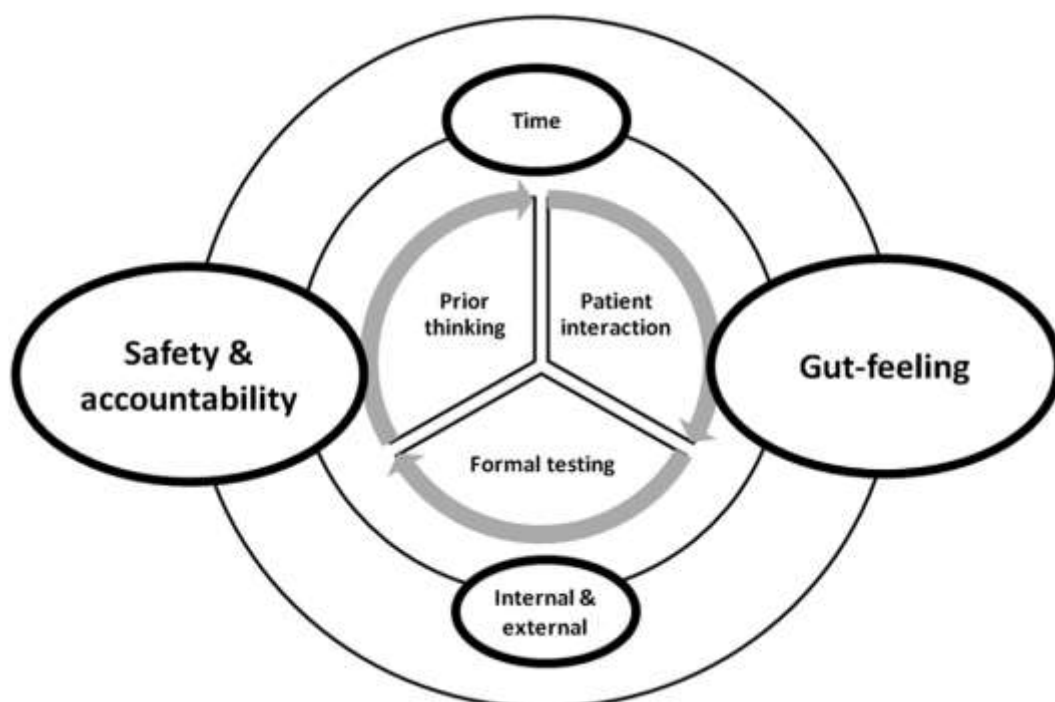


Fig. 2.3 Model of ESP clinical reasoning in the assessment of patients with LBP (Langridge et al. 2015)

In summary, the majority of research into CR in MM has occurred within the discipline of physiotherapy, with two osteopathic studies those of Thomson et al.(2014a) and Roots et al. (2015). Both physiotherapy and osteopathy support the cyclical model of Jones (1992), which suggests an interactive relationship between cue acquisition and hypothesis generation. The hypothesis is then further tested by additional cue acquisition, evaluation, and physical examination. There is also support for the HDR model of Elstein et al. (1978), and PR model of Patel and Groen (1986). In all three studies the authors found that expert practitioners utilise a combination of HDR and PR dependent on the complexity or uncertainty of the presentation. However, Doody and McAteer (2002) suggest that physiotherapists utilise treatment to further test their hypotheses. Langridge et al. (2015) investigated the CR of specifically trained ESP and non-ESP

physiotherapists, and suggested an alternative framework which nevertheless had similarities. In addition, they suggested the presence of gut feeling to enhance the CR process which could be argued to be a form of metacognition (Thompson, Prowse Turner, and Pennycook, 2011). Even though their study was published in 2015 it did not appear to be particularly patient-centred.

2.4.1 Patient-Centred Care, BPS Model and Collaborative Reasoning

There has been a move toward conceptualising CR as a holistic process which encompasses environmental and BPS factors that impact a patient's health (Trede and Higgs, 2008). This is in contrast to the more traditional biomedical models of patient care where a practitioner provides the patient with the solution to their problem. As a result of government initiatives toward patient-centred care, the medical profession has been exposed to information that encourages active patient participation in their own welfare, and research has been directed at the patient's role within medical care (Atkins and Ersser, 2008). Some medical research programs linked the importance of patient-centred healthcare and its likely contribution to improved psychological health, physical recovery, patient satisfaction, and healthcare outcomes (Rost et al. 1991; Michie et al. 2003). There have also been a few studies specifically directed at the effects of patient involvement in the medical DM process (Brody, 1980; Coulter, 1997; Larsson, 1989). However, most discourse on the subject of shared-decision making (SDM), has occurred within healthcare disciplines outside the medical profession, such as physiotherapy and occupational therapy (Edwards et al. 2004a; Jones et al. 2008; Atkins and Ersser, 2008; Trede and Higgs, 2008; Arnetz et al. 2004; Schell and Cervero, 1993; Hayes Fleming and Mattingly, 2008), possibly because of the patient management nature of these specialities requiring a different more comprehensive perspective (Hayes Fleming, 1991)

The models of CR could be viewed as unconnected, or they could be considered to exist along a continuum with practitioner-led at one end and patient-led, or critical social science (CSS) examples at the other. Within the traditional concept, the practitioner has the power to decide the patient's fate and they retain illness information. The patient, as in Parson's (1951) concept of the 'sick role', is a passive recipient of healthcare and technical expertise surpasses patient experience (Frank, 1995). At the other end of the continuum the CSS model of CR allows for the narrative of the patient and shares knowledge with the patient thereby empowering them (Frank, 1995; Trede and Higgs, 2008).

'the progressive application of the experimental sciences to the practice of medicine has endowed it with powers unimagined in earlier times. But, it is commonly complained, that this has been achieved at a price- that of "depersonalization" of the healing experience' (Redding, 1995, p87).

Traditionally, physiotherapy and osteopathy have placed emphasis upon outcomes related to patient compliance particularly in acute settings. As a result of a changing healthcare climate involving chronic conditions that require prevention and maintenance, both have started to adopt patient-centred models that highlight health promotion and collaboration when making decisions, rather than patient compliance (Edwards et al. 2004b; Penney, 2010). Some within osteopathy view the profession's working principles as already positioned in alignment with Engel's (1977; 1980) BPS model of healthcare (Penney, 2010). In response to medicine's biomedical view of disease Engel (1977) suggested that:

'...concentration on the biomedical and exclusion of the psychosocial distorts perspectives and even interferes with patient care' (Engel, 1977, p131)

Engel discussed the manner in which identical disease states can be expressed variously dependent on the person suffering, creating an illness that is subjectively experienced by the person. The difference between disease and illness has been expressed as the difference between nociception and pain. Nociception being the stimulation of pain receptors that send information to the brain resulting in pain being expressed in the person as a subjective experience (Gatchel et al. 2007). The experience of pain can produce varying pain behaviours such as fear avoidance, which is known to be involved in maintenance of chronic pain (Nijs et al. 2013). These pain behaviours are very dependent on the person, their values, beliefs, and cultural factors. Esteves et al. (2013) also found that chronic pain patients had an altered and reduced ability to process their emotions. The authors argued that this altered ability could adversely affect the person's experience of chronic pain, thereby contributing to their overall condition. It is not clear in this situation whether the person is more susceptible to chronic pain as a result of this altered ability, or in fact it was actually due to the pain. However, it does point to the possibility that hands-on therapies may help a person to improve their emotional processing and thereby help manage their pain.

The four working principles of the osteopathic profession are: a) the body is a unit, a person a unit of mind, body, and spirit; b) the body is capable of self-regulation, healing and health maintenance; c) structure and function are reciprocally interrelated; d) rational treatment is based on the above (Penney, 2010). It is the mention of a, b and d that creates the belief that osteopathy and BPS are intimately related. However, these principles do not allow for the differing personal beliefs systems, or educational emphasis, of the individual osteopaths. Indeed, Draper-Rodi, Vogel, and Bishop (2015) are developing an e-learning package specifically to educate osteopaths who have been qualified more than fifteen years. Clearly they see a need to include osteopaths educated using non-BPS models. There is a definite drive in the last five years toward BPS and

patient-centred CR depicted in the literature (Penney, 2010; 2013; Thomson, Petty and Moore, 2012). Also a suggestion that the profession redefine its principles and values (Tyreman, 2013).

Moving toward a new paradigm, or model of patient management, is not straightforward and requires education that is aimed at the varying attitudes and experience of the professional. In the field of physiotherapy, the work undertaken by Franziska Trede for her doctoral thesis employed methodology from the interpretive paradigm (Trede and Higgs, 2008). She looked at two groups of physiotherapist practitioners, one group with no experience of CSS were given no education on the subject. The second group received education in the form of a pre-implementation workshop, and were asked to trial changing their practice as a result of the new information that had been provided. Using critical transformative dialogues Trede explored the dimensions of 1) capacity for critical self-reflection; 2) rethinking professional roles; 3) rethinking professional power relations; 4) rethinking rationality and professional practice knowledge. She found that in the absence of education the practitioners tended to adopt the practitioner-led mainstream medical model for CR. She found group one, which she called *the uninformed*, lacked reflexivity and had an unconscious tendency to utilise technical rather than emancipatory methods, they also equated collaboration with compliance. However, as the study unfolded one of the three practitioners from group one appeared to develop reflexive tendencies as a result of reflecting upon a case study she was working on.

Analysis of the second group, who had received pre-implementation training, generated four categories of practitioners *a) the unconvinced; b) the contemplators; c) the transformers and d) the champions*. The 'unconvinced' tended to have a narrow definition of the concept of collaboration and associated it with the traditional idea of patient compliance. The 'contemplators' appeared to be unable to fully embrace the idea of collaboration and equated it as a loss of practitioner power, however, they could see that it may be useful at times. The 'transformers' were able to move toward a democratic relationship with their patients but found certain situations uncomfortable and in conflict with their own professional expectations. The 'champions' were the group that unreservedly adopted the collaborative style and appeared to be open to learning about the interests and goals of the patient. The overall results suggest that education has an important part to play in the ability of practitioners to adopt a new professional model. However, the latter two groups generally seemed to have a greater capacity for self-reflection, which evokes Atkins and Ersser's (2008) suggestion that the capacity of the practitioners to adopt the concept of collaborative DM is influenced by their attitudes, belief systems, and values.

There are a number of issues that arise within the more recent approaches to CR, such as how much information is revealed to the patient about their illness, the interruption of a fairly rapid DM process that the practitioner undergoes in order to include the patient, and a lack of practitioner expertise potentially limiting the process (Atkins and Ersser, 2008). Also, the notion of collaborative DM as suggested by Trede and Higgs (2008) in its true form is challenging to absorb into active clinical practice, because it can require a deep understanding and a significant adjustment in a clinician's belief system. However, clinicians do need to possess excellent self-awareness so that they can self-regulate their thoughts and actions for the benefit of the patient.

2.5 Chapter Summary

Research into and the conceptualisation of CR has changed and developed over the last fifty years. This appears to have occurred due to research findings altering our understanding of how a clinician creates a diagnosis, and with the need for medicine and healthcare in general to adapt to become less autocratic and more patient-centred. There are two main strategies for CR that have arisen from medical research and are utilised in osteopathy. The first is HDR, which requires the clinician to form one or more hypotheses and then test the ideas in order to arrive at a diagnosis. It is thought that novice practitioners utilise this as do experts when the diagnosis is uncertain or complex. The second strategy is PR which requires a high level of domain specific knowledge. The practitioner intuitively recognises the patient presentation from previously observed cases, and can utilise his or her experience to form the diagnosis. In reality it appears practitioners utilise both models and they could be considered to exist on a continuum the position of which is accessed depending on the particular presentation.

Possibly in response to the criticism of EBM, other ways of thinking about CR have appeared particularly within the musculoskeletal professions, occupational therapy and nursing. This is partly due to the difference in clinical practice from medicine, the need to account for management and DM strategies not just diagnosis, and the advent of patient-centred care. These frameworks emphasise integration, communication, and collaboration with the patient in the management of their condition. Physiotherapy research suggests that some practitioners easily can adopt these new strategies but others find it more difficult to accept the relevant concepts. The authors suggested that this was due to inherent values and beliefs held by the practitioner and applicable domain specific education. Within osteopathy there is discussion regarding the extent of patient-centeredness of the profession and whether our principles are in-line with that of the BPS model.

To further develop the profession along current guidelines for patient-centred care, further research is needed into the precise nature of osteopathic CR at a contextual level, and

how we utilise these different models of healthcare, if at all. There are still many aspects of CR that are unknown, such as how much of an experienced practitioner's thinking is procedural, intuitive or metacognitive, and how our palpatory skill is utilised in CR.

Chapter 3: Literature Review: Professional Knowledge, Cognition, Perception, and Metacognition

3.1 Introduction

This chapter introduces the subject of professional knowledge, in relation to osteopathic CR, in terms of two main categories; that which is implicitly and that which is explicitly held. The chapter then moves on to examine the current understanding of the perception of available sensory information and how it is represented cognitively and physically, allowing for a phenomenological perspective of CR. It then moves on to discuss the concept of metacognition in terms of meta-knowledge (MK), meta-skills (MS), and meta-experiences (ME), and how they may be applicable to the supervision of cognition within CR. Finally, the chapter addresses the concept of heuristic short cuts to thinking and the possible errors in DM they arguably may produce.

3.2 Professional Practice Knowledge

There are many types of practice knowledge such as scientific, technical, tacit, embodied, experiential, personal, to name but a few. How we define knowledge is dependent on our individual worldview and ontological perspective, but it is thought that personal knowledge makes a significant contribution towards professional practice (Polanyi, 1958; Higgs et al. 2008a). The study of knowledge (epistemology) breaks the subject down into its component parts of 'knowing that', which is propositional knowledge that is generated theoretically and depicts understanding of how things are done, and 'knowing how', or experiential knowledge that is gained by time spent performing a particular task or activity (Ryle, 1949). Also important within healthcare is knowledge of oneself and in relationship with others (Higgs, 2004). A knowledge base that includes all three categories '*provides a sound foundation for human, ethical, holistic and patient-centred practice*' (Higgs et al. 2008b, p158).

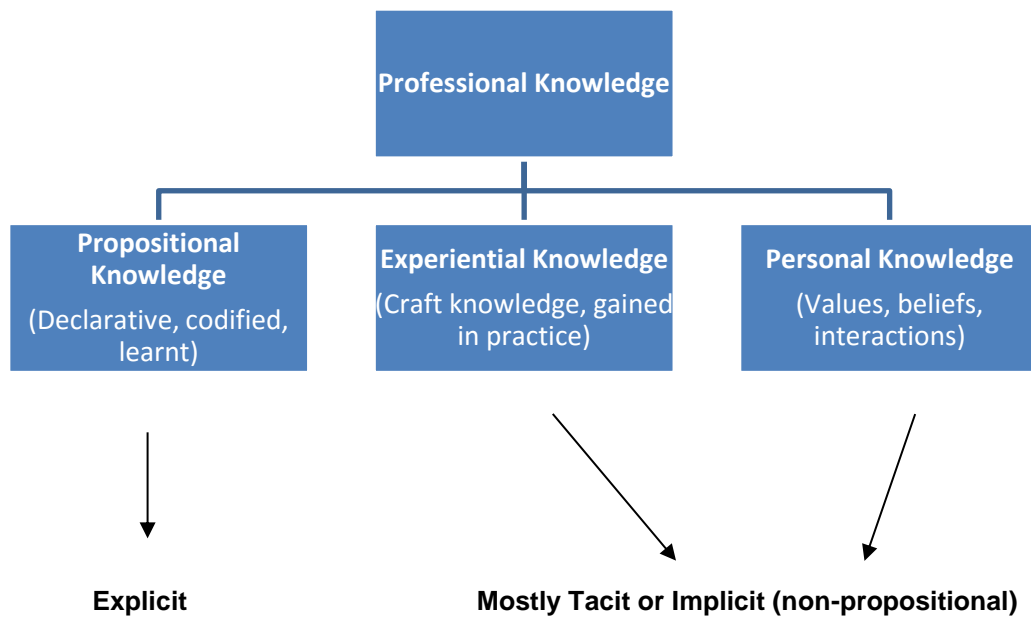


Fig. 3.1 Adapted from Eraut (1995) and Higgs et al. (2004a; 2008b)

3.2.1 Propositional and Experiential Knowledge

Osteopathic CR requires the clinician to evaluate, understand, interpret, treat and manage a patient's presentation, often during situations of uncertainty. This involves the diagnosis of biomechanical somatic dysfunction, but also involves psychological and social factors that contribute to the overall symptom picture. The experiential knowledge involved in CR is supported by a strong base of biomedical knowledge which is often described as propositional knowledge. It is specifically consigned to facts that can be organised, structured and communicated to others in a systematic manner and is gained via research and from the classroom, or through conversation (Richardson et al. 2004; Reason and Heron, 1986). It is thought that we take propositional knowledge from many sources, internalise and process the information, and regenerate it within our practice in ways that are not always able to be captured and communicated (Ryle, 1949; Higgs et al. 2004a). The narrative structures or 'illness scripts' described by Schmidt and Boszhuizen (1993) that experienced clinicians develop over years of exposure to clinical situations are underpinned by biomedical 'propositional' knowledge. It is the application of this propositional knowledge that Boszhuizen et al. (1995) suggest is the motivating force behind the encapsulation of knowledge. However, the laying down of 'illness scripts' is suggested occurs informally during clinical encounters and, importantly for osteopathy, often through multisensory perceptual feedback (Schmidt and Rikers, 2007). This process takes the multisensory information received via the consultation, including clinical examination and treatment, and allows it to be efficiently linked to the biomedical knowledge base.

The term non-propositional knowledge has been used to encompass all other types of practice knowledge that is not codified, and broadly it is described by the terms professional craft knowledge and personal knowledge (Higgs et al, 2004a). Professional craft knowledge is that which is learnt from professional experience, or 'knowing how' as suggested by Ryle (1949). Importantly for osteopaths, in addition to procedural knowledge such as clinical examinations and treatment techniques, it also includes deliberative processes such as planning and DM and the ability to monitor and control one's behaviour which are part of metacognition (Eraut, 1994). Non-propositional knowledge also includes personal knowledge, the latter being gathered due to life relationships with others and is becoming increasingly important with emphasis on the BPS model of healthcare (Trede and Higgs, 2003; Montgomery, 2006). It is believed to '*promote(s) wholeness and integrity in the personal encounter*' (Carper, 1978, p20) and requires the practitioner to be engaged, present and able to reflect upon their actions and the situation as a whole. It is an important resource that a person brings to a clinical encounter that allows them to think, perform, and self-reflect in interpersonal interactions (Higgs and Titchen, 1995; Eraut, 2000).

Critically for CR in healthcare, is the acknowledgement that it is difficult to know exactly what has been learned from the education and professional life of a clinician, and how much of that knowledge is utilised during professional life (Eraut 1994). It is also widely accepted that the mind of a clinician contains a large proportion of knowledge that is difficult to know and communicate to others (Benner, 1984; Schön, 1983; Eraut 1994; 2000; Higgs et al. 2004b). This tacit knowing, as Michael Polanyi classified it, is the instinctive awareness of many of our actions that allow us to perform certain tasks unconsciously (Polanyi, 1958; 1966). Polanyi appeared critical of the empiricist paradigm which considers that we must be able to verbalise and debate everything thereby exposing and expressing all knowledge, he is recognised for stating '*we know more than we can tell*' (Polanyi, 1966, p4).

Whilst most medical educational institutes place an emphasis on educating their undergraduates with biomedical knowledge, there is some suggestion in the literature that it is not as important as knowledge that is learnt by everyday practice (Patel and Kaufman, 1995; Eraut, 1994). An increasing body of research is suggesting healthcare professionals, such as physiotherapists and occupational therapists, possess dynamic practice-based knowledge (Jensen et al. 2000; Smart and Doody, 2007; Unsworth, 2008). Crucially for osteopathic education, is the suggestion that new information is difficult to directly encode and requires integration with existing knowledge which can be facilitated via TA, or 'self-explain' strategies (Chi et al. 1989; 1994). This could be utilised in a profession that relies on its applied and perceptual skills during CR. It is thought that the reason for its efficacy is the nature of constructed knowledge and the ability to

experience conflicts between the evolving mental structure and known information. It is also possible that grounding the self-explainer in the moment creates an awareness of knowledge held. This is a powerful facilitator for learning as has been shown with mindfulness training in sport (Zhang et al. 2016; Gardner and Moore, 2012). The empirical outcome of short and long term mindfulness training has been shown to be structural changes in the brain's grey and white matter that indicate learning have been demonstrated (Hölzel Carmody et al. 2011; Tang et al. 2007)

How much practice knowledge is essentially implicit and unable to be codified or transferred to others is debatable (Eraut, 1994), but the engineering industry spend valuable resources on investigating ways to make tacit information explicit so that it can be utilised in manufacturing processes (Scharmer, 2001). They believe that the relationship between propositional and non-propositional knowledge is dynamic, and tacit information is able to be captured (Adler, 1996). It is important for the osteopathic profession which relies heavily on its perceptual skills, that we identify methods for extracting as much implicitly held information as possible. This will enable identification of improved training methods at undergraduate and possibly postgraduate levels, and provide increased knowledge base for osteopathic practice and healthcare in general.

3.3 Perception, Cognition and Embodiment

During clinical encounters osteopaths are required to understand the psychosocial factors patients present with, their presenting condition, their body type, movement dysfunctions, and any predisposing and maintaining factors, in order to diagnose somatic dysfunction. The clinician's central nervous system is required to gather and process signals from multiple sensory modalities regarding body asymmetry, altered biomechanics, the assessment of tenderness, restriction of motion and tissue texture changes in the context of presenting symptoms and prior history (Esteves, Geake and Spence, 2008). This perceptual feedback provides the information that stimulates the osteopath's higher cognitive centres and initiates processes that require rapid access to large quantities of propositional and experiential knowledge base in the LTM (Ericsson and Kintsch, 1995). Cognitive information influences perceptual processes, but at the same time cognitive processes depend on perceptual information (Goldstone and Barsalou, 1998). These two tightly connected systems guide our actions and shape our beliefs whilst knowledge influences the way we perceive the world (Brewer and Lambert, 2001).

Empirical studies on concept acquisition suggest that a concept is represented by simulation at the sensory level that applies to the experience of the concept. This simulation involves the perceptual systems, such as vision and touch, in order to represent the concept at a cognitive level (Tacca, 2011). These are the perceptual

systems on which an osteopath relies. Research demonstrates that functions that are associated with cognition have their basis in perceptual systems (Barsalou, 1999), and that perceptual and conceptual processes share common mechanisms (Pecher, Zeelenberg and Barsalou, 2004). The Perceptual Symbol Systems (PSS) proposed by Barsalou (1999):

'assumes that a single, multimodal representation system in the brain supports diverse forms of simulation across different cognitive processes, including high level perception, implicit memory, working memory, long-term memory, and conceptual knowledge (Barsalou, 2008, p622).

According to Barsalou (2008), although these systems share the same multimodal representation they utilise different mechanisms in the brain to capture multimodal states and simulate them later. Brain plasticity is considered responsible for the acquisition of specialised sensorimotor skills in humans, such as musicians and, one could argue osteopath's, that are developed through repeated practise (Wan and Schlaug, 2010). This type of repeated sensorimotor practise is a strong multimodal stimulator for brain plasticity. Studies have demonstrated neuroanatomical changes in the brains of musicians by comparison with non-musicians (Schlaug et al. 1995; Gaser and Schlaug, 2003). It could be argued that these types of changes should occur in the brains of osteopaths due to the repeated sensorimotor feedback to their nervous system. Such neuroanatomical changes could be argued to change the perceptual processes of musicians (and osteopaths), and Sherwin and Sajda (2013) found that musicians were better able to detect musical anomalies than non-musicians. It has also been demonstrated that there is stimulation of action related areas of the brain during expert musician's perception of music (Baumann et al. 2007; Haslinger et al. 2004). A significant aspect of osteopathic CR is the identification of somatic dysfunction during which visual alterations in body balance, mobility, and tissue changes are combined with palpatory alterations in tissue texture and tension, and joint mobility. One could therefore argue that these research findings are relevant and applicable to osteopathic practice.

The perceptual processes that an osteopath uses are auditory, particularly during the cue acquisition stage of the consultation, visual through all stages, and tactile when palpating the patient's tissues for somatic dysfunction. Vision and touch are almost certainly used simultaneously within an osteopathic consultation, although it has been suggested that they are directed at different qualities, with touch emphasizing information about texture, and vision focused on spatial and geometric features (Klatzky and Lederman, 2002; Guest and Spence, 2003). It has been said that osteopaths literally diagnose using all their senses (Esteves and Spence, 2014). In a sighted clinician, the visual and palpatory

stages are particularly important during clinical examination and combine to provide the perceptual information that initiates the cognitive process. The later stages of vision combine all the information from early and intermediate stages and accesses LTM looking for evidence that will help identify and recognise the perceptual subject (Tacca, 2011). Late vision is described as the personal level because we have conscious access to information that we can use for action planning and thinking (Block, 2005). This consciousness is suggested by Cleermans (2011) to be possible due to the inherent plasticity of the nervous system enabling humans to learn to become aware of their own internal state(s) and to have an emotional connection to that state. It is thought that an osteopath's palpatory perception of the other is not possible without the clinician simultaneously perceiving themselves (Ratcliffe, 2013) thereby entering themselves into consciousness. Perhaps this perception of the self while perceiving others is true of all senses. In the field of physical therapy, Øberg et al. (2015) recently argued that the bodies of both the clinician and patient should be regarded as bodily agents, which together play an active role in the CR process. They argue for a phenomenological perspective of CR which allows for an embodied and enactive framework in which the clinician perceives, experiences and acts in an embodied manner. This is alternative to the objective biomedical model of CR which creates a third person distanced view of the patient and their presentation.

Embodied cognition is a recent concept in which theorists posit that cognition resides in the body, and the mind is used to guide action. In this system the brain develops as a function of interaction with the environment in order to facilitate motor and sensory functioning (Esopenko et al. 2012; Gibbs, 2006). In osteopathy, Esteves (2015) argues that osteopathic DM mostly resides in embodied cognition because there is no distinction between the perceiver and the perceived. He, and Ratcliffe (2013), suggest that this situation is distinct from other senses such as vision, because we are unable to touch someone without perceiving ourselves. Esteves (2015) proposes a model of embodied clinical DM in osteopathy in which a clinician's body, internal environment, and neurocognitive systems interact dynamically with the world and a patient's agency to allow the clinician to reach a diagnosis. It is possible that a similar perception occurs with aspects of visual feedback during osteopathic CR because of the complex interaction between vision and haptics creating an embodied perception. As a result of palpating tissues and visualising anatomy on a regular basis, a mixing of senses occurs that may be captured in the body and combined with information from LTM to create a cognitive state. Behavioural evidence supports a link between the neural systems involved in the perception of visual motion and the comprehension of language describing objects in motion. Words in isolation (Kable et al. 2002; 2005; Noppeney, Friston and Price, 2003) and sentences describing objects in motion had the ability to activate higher order visual

cortices involved in supporting the visual perception of moving objects (Rueschemeyer et al. 2010). This sharing of neuroanatomy is thought to be supportive of the concept of embodied cognition, and may support the opinion that CR is a highly imagistic and deeply phenomenological mode of thinking based on tacit experiential knowledge (Mattingly, 1991; Esteves and Spence, 2014).

Western philosophical thinking is still dominated by Cartesian philosophy, which sees the mind and body as separate and still influences scientific thinking. This makes the concept of embodiment difficult (Maclachlan, 2004). Lakhoff and Johnson (1999) suggest that philosophy should be empirically responsible, and we should radically change our understanding of reason by changing our understanding of ourselves. The philosopher Maurice Merleau Ponty presented a viewpoint that challenged the Cartesian perspective because he believed that the mind and body are inextricably intertwined:

'not seeing them as the sides of the one coin, but perhaps more in denying the possibility of the shape of the coin existing without the metal that constitutes it'
(Maclachlan, 2004, p3).

John Dewey also posited that our elemental embodied experience is responsible for everything we can mean, think, know, and communicate (Lakhoff and Johnson, 1999). What is also pertinent for osteopathic CR is that our study of the world should begin from how we actually perceive it because we cannot be someone we are not. We have to perceive the world from our own viewpoint. Within the embodiment framework it is thought that psychological processes are influenced by body systems such as body morphology, sensory, and motor systems, and various body conditions (Davis and Markman, 2012). The sense of touch gives rise to implicit and explicit forms of memory which by their nature influence our psychological state (Klatzky and Lederman, 2002). This is in contrast to the more standard and Cartesian theories of cognition in which knowledge exists within a separate area in the brain from that of perception, action and introspection (Barsalou, 2008).

Within osteopathic CR, a clinician will undertake a standing examination of the patient from which they will acquire valuable information about the way the patient's body interacts with their surroundings. An example of a purely biomechanical perspective is that foot mechanics will effect lower extremity angles and pelvic alignment. This should result in spinal adjustments, so that the body can align the eyes to allow the person to more easily perceive the world. We also however, can perceive the person from a more complex sensory perspective. The way that gravity affects the patient's body and the effect on antero-posterior (A-P) body alignment not only provides clues to the person's

general posture but can give an indication of their psychological state (Glenberg, 2010). The pallor of the person, the sense of their body in space, the look on their face and general demeanour, all add to the picture that the experienced osteopath silently builds within their mind before even attempting to reproduce the symptoms from which the patient is complaining. The information is embodied in the patient, in the interaction with the osteopath and within the osteopath themselves, as the practitioner senses the patient often before placing their hands on them. The practitioner literally perceives the person as a whole from within their own body. This is a more complex phenomenon than simple body language being communicated through the movements and expressions from the other. It is proposed that when we receive emotional information we reactivate neural pathways that have previously been stimulated by similar perceptual, expressive and affective experiences (Barsalou et al. 2003); Niedenthal, 2007). When individuals experience similar visual and auditory stimuli regularly they are able to recall the information introspectively and dynamically simulate similar feelings and behaviours. This can affect their facial expression and body posture (Oosterwijk et al. 2009; 2010; Hawk, Fischer and Van Kleef, 2012).

Muscle activation has also been witnessed by transcranial magnetic stimulation when participants were asked to judge the sensibility of a sentence. The results suggested that a sensorimotor activation occurs even when just understanding a sentence (Glenberg et al. 2008). This corresponds to sports science use of mental imaging techniques to improve performance (Howe, 1991; Hardy and Callow, 1999). There is a general lack of consistent terminology making systematic reviews difficult (Schuster et al. 2011). What does appear to be agreed upon is the use of mental imagery with physical practice improves sports performance over and above only physical practice (Kanthack et al. 2014). Interestingly for osteopathic practice, is that mental imaging results appear more effective if it is multisensory and used with closed skills (single participant sports such as golf or gymnastics) and more experienced sports people (Howe, 1991). Interestingly Guillot et al. (2009) report Yue and Cole's (1992) results that muscle strength increased after mental imagery training because of increased cortical output signal. There is clearly significant cortical activation during an embodied sensory event. Perhaps this could be extrapolated to include the kind of sensory experience such as the mental imagery interaction between an osteopath and patient. It may explain the difference between expert and novice intuitive events as the reactivation of neural pathways previously stimulated by similar perceptual events (Barsalou et al. 2003).

As an interim summary, the above section identifies professional knowledge as comprised of propositional, experiential and personal knowledge that is developed over the lifetime of the clinician. Experiential knowledge or craft knowledge is held within LTM

as 'illness scripts', and is underpinned by the practitioner's strong propositional or biomedical knowledge base. This is combined with the clinician's understanding of themselves, and in relation to others. This type of personal knowledge is vital within healthcare in order to appreciate the experience of the patient within their illness. There is an element of experiential and personal knowledge that is considered tacit, and some believe not able to be codified, but remains an important aspect of a clinician's professional knowledge base.

Importantly for osteopathic practice experiential knowledge is also enriched by information from multisensory perceptual feedback. This multisensory perception influences our cognition whilst at the same time our thought processes influence our perception, creating a dynamic interaction between cognition and perception. The acquisition of an idea is thought to be reproduced at a sensory level in the nervous system. The repeated multisensory stimulation that an osteopath encounters is arguably capable of creating long term changes within their central nervous system creating an embodied cognition. This embodied cognition is enhanced by the osteopaths use of palpation, which unifies patient and practitioner through a dynamic perception and is part of osteopathic CR.

3.4 Metacognition

During a consultation with a patient the clinician processes multiple types of information in order to formulate a decision on the precise problem and how to treat it. It is considered that before, during, and after the consultation a process of self-communication continually occurs (Pesut and Herman, 1992), which makes CR and DM a reflective process (Jones and Rivett, 2004). This process can be directed at the procedural, affective, and cognitive skill sets of a practitioner and it is suggested to be an important part of accurate diagnosis (Croskerry, 2000). It is vitally important that the practitioner has sufficient reflective ability to be aware of their knowledge, but as importantly, to be aware of gaps in their knowledge base. This enables them to have a clear interpretation of the diagnosis, but also when they may need to refer to another practitioner within their discipline or to another specialty. This reflective aspect suggests the presence of a monitoring process, or higher level of cognitive control over our thinking and reasoning which has become known as metacognition. It acts to regulate and fine-tune our goal and strategy oriented cognitive activities.

Articles on the topic of metacognition lack coherence and there is a plethora of terms that have arisen to confuse the subject (Zohar and Barzilai, 2013). Despite the inconsistencies, it is generally accepted that the overarching term describes a higher cognition about cognition, in that there is a supervisory element to our thinking that is dependent upon us having sufficient domain-specific knowledge ((Veenman, Van Hout-

Wolters and Afflerbach, 2006). Although there is a general knowledge element to metacognition, this study is applying the concept to CR in which domain-specific knowledge is required. The ideas of Flavell, Miller and Miller (2002) have been taken as a basis for understanding the concept because Flavell has been a leading researcher in the field of metacognition, and many of the subsequent frameworks have arisen as a result of his work. Flavell and colleagues suggest that metacognition can be divided into three main categories: meta-knowledge (MK), meta-monitoring and self-regulation or meta-skills (MS), and meta-experiences (ME):

MK – knowledge about a person, task and strategy

MS – skills and processes used to monitor, analyse, predict, plan, evaluate, revise

ME – affective experiences that stimulate cognition

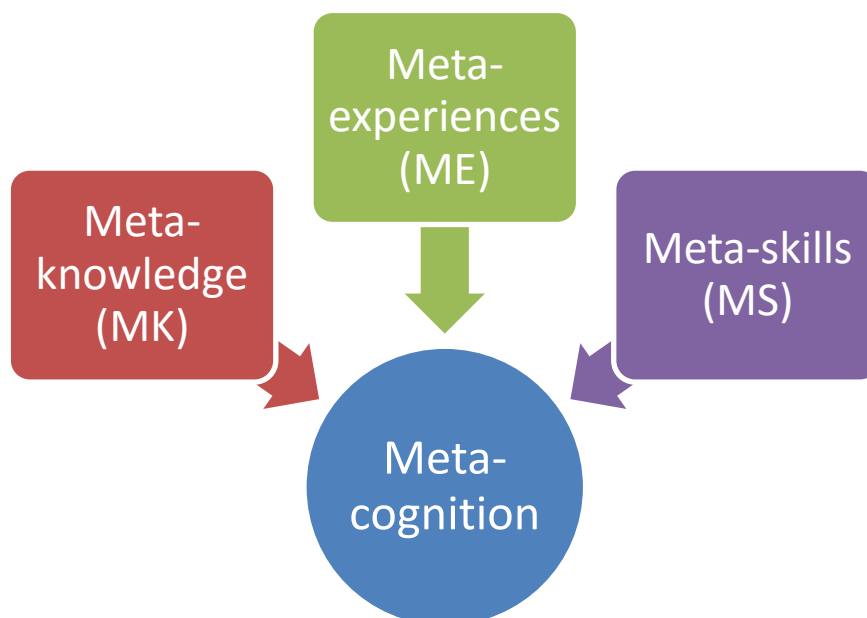


Fig 3.2 Metacognition (adapted from Zohar and Barzilai, 2013)

3.4.1 Meta-Experiences

ME is a metacognitive strategy that is described by Flavell, Miller and Miller (2002) as '*cognitive or affective experiences that pertain to a cognitive enterprise*' (p. 154). It is thought to comprise feelings, judgments and estimates occurring during reasoning, such as the impression that an answer is the correct one (Zohar and Barzilai, 2013), or the judgment that you have revised sufficiently and are ready to sit an examination (Nelson and Narens, 1996). Flavell (1979) suggests that you may also sense that you are either making or failing to make progress. Within an osteopathic consultation with a patient it may be the realisation that whilst you are performing soft tissue massage and mobilising

the lumbar spine joints you are failing to effect a change in tissue quality. ME is also related to the affective response that accompanies the intuitive cognition of T¹ processes (Thompson and Morsanyi, 2012). The dual process theory (DPT) is one of the many theories of cognition that have been suggested to describe reasoning and DM (Evans, 2010; Stanovich and West, 2000; Kahneman, 2003). It suggests there are two main systems for reasoning; that of T¹ a rapid, intuitive process which is likely to occur during PR in osteopathic CR when the clinician encounters previously recognised patient presentations. The second system T², is a slower more deliberate analytical system that occurs during HDR, also as seen in osteopathic CR but occurs when the patient presentation is more complex or uncertain (Thomson, Petty and Moore, 2014a). Dual processes are often discussed as though they are discrete entities, as though the information arriving is either complex or simplistic. However, Epstein's (e.g. 2003) Cognitive Experiential Self-Theory (CEST) posited that these are parallel processes that can occur simultaneously because they are distinct systems that probably have separate neural pathways. He suggests that intuition is part of experiential processing that is imbued with affect and acts as a default setting unless there is a need to be analytical.

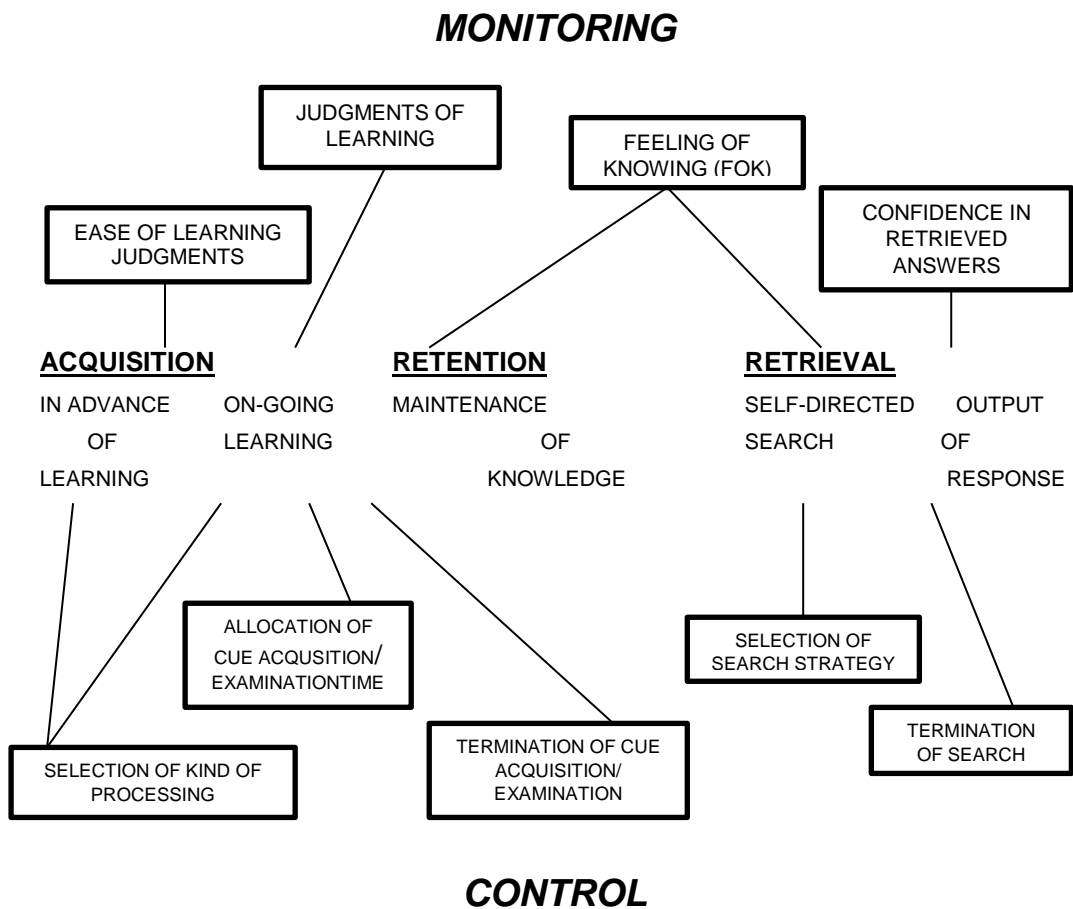


Fig 3.3 Framework of Meta-Memory (also interpreted as ME) (Nelson and Narens (1996))

It is interesting that Lieberman, Jarcho, and Satpute (2004) empirically identified two neural structures involved in information processing that were utilised dependent on the level of experience of the participants. It has been suggested in medical DM that novice clinicians utilise the analytic HDR, whilst experienced practitioners use a combination of HDR and PR, the latter being a more intuitive mode of processing (e.g. Norman, 2005). However, Sinclair (2010) suggests that this should not automatically be inferred to be intuition and it is important to identify between intuitive non-conscious processing and intuiting as a conscious outcome. Decision outcome research is not particularly interested in the pathways used, purely which process provides the higher quality outcome (Dijksterhuis, 2004) which in CR is important. Osteopathic research into CR found there was a dynamic transitioning between three levels of HDR and PR with light and moderate HDR sometimes occurring at the same time point as PR (Roots, Niven and Moran, 2015). Whether their method recorded simultaneous processing remains open to debate.

ME occurs in the affective domain and is related to feelings which are usually rapid intuitive and often automatic. It allows us to monitor the correctness of a judgment which generally does not occur via rational reasoning (Thompson et al. 2013). The correctness is often accompanied by a feeling of confidence in the answer and often results in no further examination of the decision because the answer is believable (Sinclair 2010; Thompson et al, 2011). The Feeling of Knowing (FOK), Feeling of Rightness (FOR), Judgments of Learning (JOL) and Confidence Judgments (CONF) are four metacognitive monitoring discernments that people can engage in during encoding and retrieval of information (Boduroglu, Tekcan and Kapucu, 2014) that enable monitoring of DM. FOR and JOL are particularly relevant for this study and will be discussed in more detail. Thompson and Morsanyi (2012) suggested that FOR is an affective experience and that T¹ processes give rise to both the content of a decision and a FOR of that decision. In addition, the probability and extent to which T² processes are engaged Thompson et al. (2011) believes is dependent on the strength of the FOR that accompanies the answer generated by T¹ processes. There is also the presence of a fluency heuristic that is based upon the ease of which the answer comes to mind and gives rise to a positive effect (Winkielman et al. 2003). Thompson et al. (2011) also found that the fluency with which an answer comes to mind correctly predicts the FOR and retrospective confidence judgments. These findings have implications for osteopathic CR because of the use of T¹ and T² judgments and the concern about the possibility of error in DM due to over-reliance on T¹ or PR processes (Croskerry, Singhal and Mamede, 2013a). The fact that the strength and ease of the decision creates a strong FOR means that analytic processing is not required or engaged in (Thompson et al. 2013), which has consequences for effective CR.

3.4.2 Meta-Knowledge

MK is our stored world knowledge and beliefs about people (including ourselves), tasks and strategies, and the way they interact to allow us to achieve cognitive outcomes (Flavell, 1979). Jacobs and Paris (1987) divide MK into declarative, procedural and conditional. Declarative MK refers to self-knowledge about a one's own ability to learn attributes that effect cognitive processing. Procedural is a person's understanding of how to execute procedures, and may also include the nature, extent and quality of information that is available, to allow a goal to be achieved. Conditional MK allows us to know when to use those procedures and the best strategy to achieve the outcome (McCormick, 2003). Declarative MK includes knowledge of the person, task and strategy (Flavell, 1979). A person perspective may include intra-individual differences and inter-individual differences to allow us the awareness that we are different and the understanding of how we differ from others. This should be an often utilised strategy in osteopathy, probably unconsciously, because of the need to understand the patient from a psychosocial perspective. It would also give us information about our ability as an osteopath, perhaps in comparison with a colleague, which could help us reflect upon and improve our ability to execute the technique of which we are less capable. Also within the person category, Flavell (1979) suggests there are universal properties of cognition which allow us to make sense of the world, such as the fact that there are different degrees of understanding which may block our ability to perceive a person and their situation correctly. If we do not pay attention to, or misunderstand the explanation that a patient is providing, we may fail to gain a rational portrayal of their symptom picture and potentially misdiagnose.

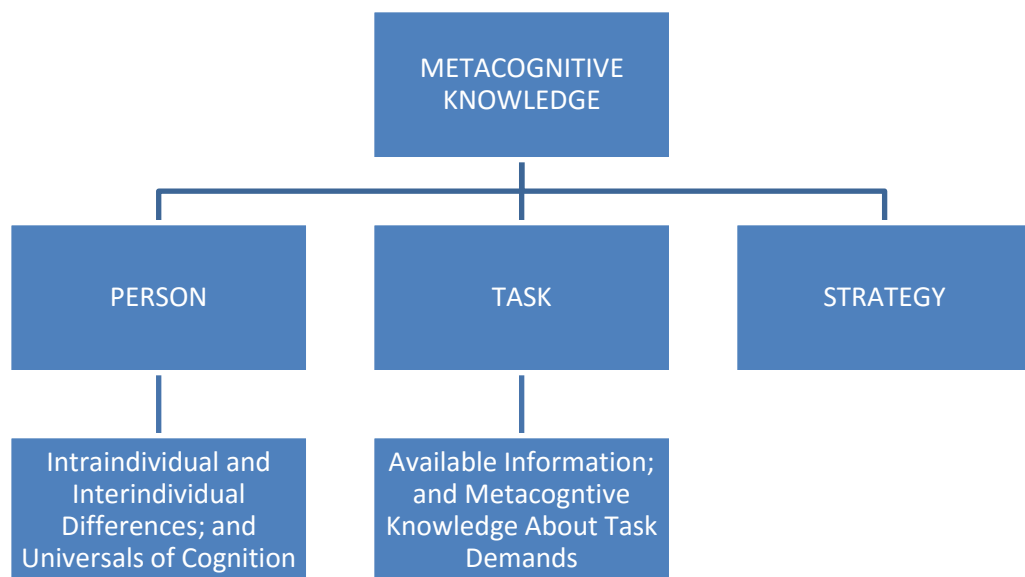


Fig 3.4 Schematic representation of Meta-knowledge (Flavell, 1979)

3.4.3 Meta-Skills

The concept of MS was described as monitoring and self-regulation by Flavell, Miller, and Miller (2002), however others have utilised the term skills (e.g. Efklides, 2006). It refers to a person's procedural knowledge for regulating one's problem solving and learning activity (Brown and DeLoache, 1978; Veenman et al. 2006). A MS framework of CR for nursing was proposed by Pesut and Herman (1992). It is an example of the metacognitive skills of monitoring, analysing, predicting, planning, evaluating and revising which surround and interact with the procedural elements of CR. They suggest that monitoring and analysing is utilised during data collection and the gathering of cues, when a clinician is collecting the enormous amounts of information about the patient and their presenting problem. Predicting occurs when the clinician comes to determine what the problem is and how the aetiology corresponds to the presentation, this is done usually by generating multiple hypotheses. Planning is associated with determining the correct intervention for the problem, and particular patient, and the expected outcome for the them. Specifically, for osteopathy this stage involves hands on treatment for the patient and the development of a plan to prevent re-occurrence of the issue by influencing the aetiology of the problem. Evaluating and revising are the final MS used in the CR process. Evaluation occurs as a result of the patient outcome and undergoes a revision if the outcome is not as good as expected.

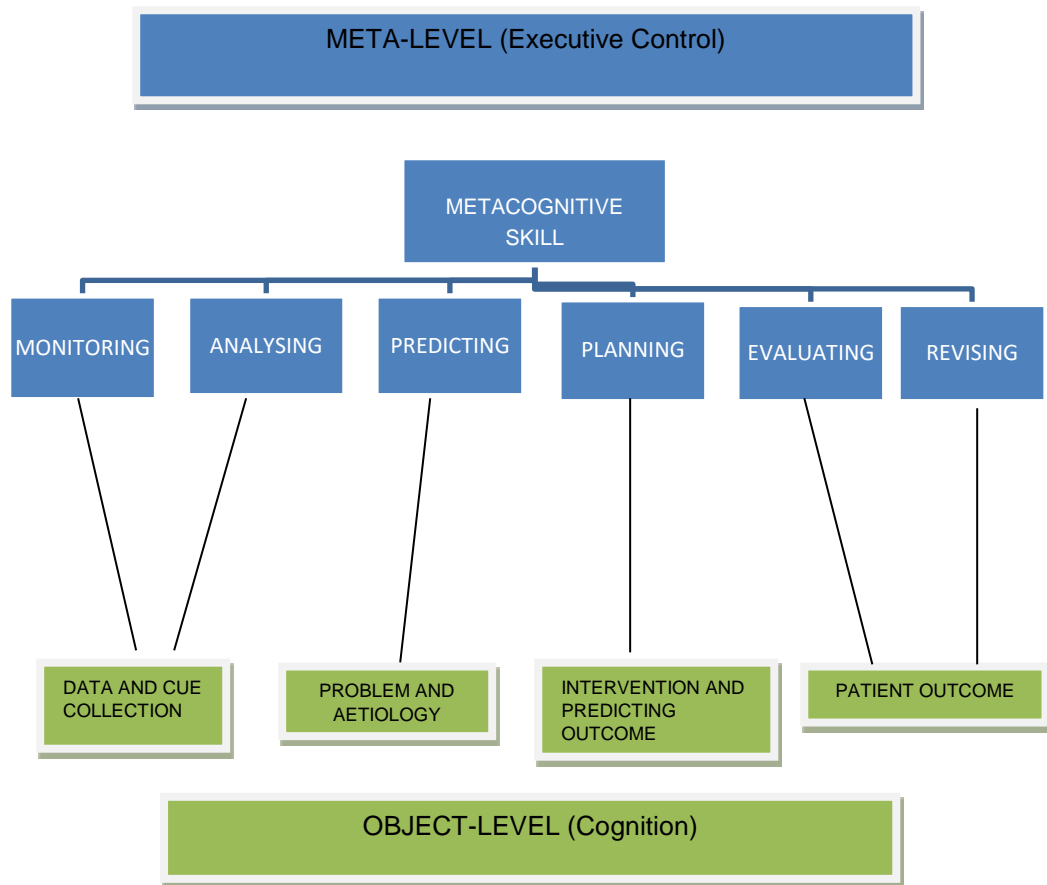


Fig 3.5 A simplistic schematic representation of meta-skills and how they relate to clinical procedures, produced from combining the ideas of Nelson (1996) and Pesut and Herman (1992).

It is thought that MK can either be correct or incorrect, which is an issue if the person does not detect the latter. However, MS have feedback mechanisms built in because it is thought that if the planning process is incorrect the procedure will fail (Veenman et al. 2006). Empirical studies suggest that MS develops as a domain specific entity but becomes more task general (Van der Stel and Veenman, 2013), whereas MK is both domain specific and domain general (Kuhn et al. 1995 cited in Zohar and Barzilai, 2013).

As McCormick (2003) highlighted, in addition to MK and experiences there is the concept of metacognitive control. This can be relatively simplistic as suggested by Nelson (1996) with his model of metacognition aimed at trying to determine the nature of consciousness. He proposed an object-level at which cognitive activity occurs and a meta-level, of which there can be more than one, which monitors and controls the object-level. An example for osteopathy of the object-level could simplistically be the cognition involved in the active examination of a patient with low back pain to try to determine what is happening at a segmental level. There would be a dynamic interchange of information between the

object-level and meta-level such that the status of the information and cognition retrieved from the examination is fed to the meta-level at which point the latter decides what further action is needed to progress the situation effectively.

The above models of metacognition discuss the idea of a higher level of control over our procedural thinking that allows us to regulate our actions and decisions. However, even within their complexity the models do not account for tacit concepts that occur within our thinking that are informal and constructed without our awareness. Schraw and Moshman (1995) believe this information is not accessible and therefore unable to be confirmed. It is also likely to have an input to the cognitive heuristics and biases to which human brains are subject which can create faulty decision making (Elstein, 1999).

3.5 Heuristics and Biases

Clinical decision making is a process that can occur in situations of uncertainty often with limited and imperfect information (Elstein, 1999). It is required to be accurate, effective, and expedient in order to maintain excellence in medical care (Croskerry, 2002). It is thought that diagnostic error accounts for a small proportion of medical error although it is difficult to determine exact figures (Norman and Eva, 2010). They report the Berner and Graber (2008) study that suggested in perceptual medical specialities the error rate is <5%, but in emergency medicine it rises to approximately 10-15%. Arguably osteopathy can be regarded as a perceptual profession and one could therefore reason that it is in the low error end of the spectrum, but there are no empirical figures to support this suggestion. Cognitive errors are considered to mostly occur within the T¹ mode of reasoning and are not usually corrected because they are made unconsciously (Croskerry, Singhal and Mamede, 2013). Empiricists within medicine have tried to improve clinical DM by using normative statistical models, but it remains an inherently uncertain and intuitive process. In addition, many clinicians do not use statistical decision theory as an assistant to making diagnoses and managing patients and this is the case for osteopathic practice.

Heuristics remain a universal inherently human form of DM that allow us to make inferences in problem solving situations (Cioffi, 1997). They are described by Schafer and Tversky (1985) as thought experiments that are used to estimate subjective likelihood in order to reach decisions. Information used during a heuristic strategy arises from experiential learning, and it allows us to take a short cut during cognition in order to reduce the complexity of a cognitive task (Tversky and Kahneman, (1974). It is thought that the majority of the time experienced professionals tend to make the correct decisions without engaging in conscious consideration (Norman, 2005; Osman, 2004). However, we can be subject to bias which some suggest tends to be due to faulty T¹ processing (Croskerry, Singhal and Mamede, 2013a).

In order to help identify and understand errors of judgment Kahneman and Tversky (1982a) developed a set of diagnostic labels. The five most relevant to clinical DM and the most frequently discussed are representativeness, availability, and anchoring heuristics, confirmation bias and premature closure (see Croskerry, 2002 for a full list). Representativeness is a heuristic that we can rely upon when trying to determine the probability that our object of interest is related to a particular group or classification e.g. that object A belongs to class B. The closer A resembles B the more we will think it likely that A is from class B. Tversky and Kahneman (1982) use the example of a man that has the look of a librarian but needs to be categorised as either a librarian, farmer, salesman, or lawyer. They suggest that people have the tendency to select the career based on the man's characteristics that are most representative of a particular line of work. If no description is given Tversky and Kahneman (1974) previously found that we revert to classifying using the more robust methods of analytic thinking. The problem with the representativeness heuristic is that it is not influenced by important factors that should affect judgements of probability and can lead to serious errors. If there are many more farmers than librarian's in the population then the probability that the man is a farmer must affect the cognitive selection. However, if we use the heuristic of representativeness then we can bypass the effect of this base-rate frequency (Tversky and Kahneman, 1982b).

The availability heuristic occurs because humans have the tendency to assess the frequency of a class, or the probability of an event, by the ease with which they can call the class or event to mind, (Kahneman and Tversky, 1974). This is an accepted way of assessing frequency and probability because the tendency to recall events from a large rather than small occurrences is likely, however it is not infallible and is also subject to a number of biases. Anchoring is the tendency to fixate on specific features of a presentation too early in the diagnostic process, and to base the likelihood of a particular event on that information at the outset (Gigerenzer, 1996). The clinician then can fail to adjust their diagnosis despite receiving information to the contrary later during the consultation. Premature closure is the acceptance of a hypothesis without considering other possibilities. This may be valid in more simplistic cases where there really are only one or two possibilities however, it is suggested that the clinician should maintain an open mind and look for symptoms that the diagnosis cannot explain (Trowbridge, 2008).

Elstein (2009) points out that heuristics are necessary to allow time saving short cuts to occur, but they also make the process difficult to reproduce and potentially untrustworthy. They are a fact of DM, therefore to understand where and how we use heuristics, and where we make possible cognitive errors, is important for all practitioners (Cioffi, 1997). Awareness and reflectivity is imperative so that the clinician can be mindful of the potential diagnostic traps that they can fall into (Trowbridge, 2008; Mamede, Schmidt,

and Penaforte, 2008). The problem with the concept of heuristics is they appear to be theoretically determined for situations that are uni-dimensional or binary, and they have tended to be used to identify when decisions do not comply with statistical theory (Tversky and Kahneman, 1983). Clinical DM generally does not conform to these characteristics because of its complexity. There are detractors from the ideas of Kahneman and Tversky who believe that human cognition is more complex than has been suggested and decision theory must account for environmental differences (Simon 1992; Campitelli and Gobet, 2010). There are also those who believe the research strategies used by them are flawed, and that just because there are instances where we invoke a particular heuristic to answer a posed question does not mean we will do that in all circumstances (Gigerenzer, 1996).

The reality of CR is that due to the complexity of human perception it would be difficult to invoke a simplistic reductionist model for cognition and clinical DM. The work of Kahneman and Tversky (1982a), Gigerenzer (1996), Campitelli et al. (2010) and Hogarth et al. (2007) suggested that it is likely that we utilise a combination of processes to evaluate and judge our world. As an osteopath a patient may arrive suffering from neck pain with apparent radiating pain into the arm that could also be nerve root pain. The clinician assesses the problem but cannot reproduce the pain with any active movements or neurological tests that they perform. The osteopath has options at this point, they could stop and refer for further tests if they felt there were red flags present, or they could continue to treat based on a diagnosis that fits using the representativeness heuristic and then determine the changeability of the symptoms. The issue with utilising a heuristic is that the clinician could not reproduce the symptoms from which the patient was complaining, or corroborate their thoughts with objective tests, which could mean that the diagnosis may not be musculoskeletal in origin. Using the representativeness heuristic may bypass important information that is crucial to patient management. However, the experiential intuition of the clinician may tell them that their diagnosis is likely to be correct.

There is conflicting evidence in the field of clinical DM for the validity of using analytic versus intuitive deliberating. A series of experiments by Dijksterhuis (2004) and Dijksterhuis et al. (2006) suggested that deliberation-without-attention was more efficacious when thinking about simple problems, but the more complex the issue the more analytic cognition confused the situation. However, other research opposes that view and suggests that there is little evidence for the advantage of unconscious processes on normative DM (Alter et al. 2007; Acker, 2008) and that it is important for experts to deliberate on more complex decisions and doing so aids the decision (Mamede et al. 2010). The findings by Dijksterhuis et al (2006) were explained as deficiency in capacity of WM, which meant that if there was too much information then

WM would only use part of the available information. However, Mamede et al (2010) posited that there were several methodological shortcomings and the use of student decisions makers with no domain specific knowledge would prevent them making rapid but informed decisions. Experts have more relevant and available knowledge and this knowledge is better organized in order to be directed to the task required. Once activated, knowledge in LTM provides a framework for incoming information, which bypasses the WM limitations of the novice (Chi, Feltovich, and Glaser, 1981; Ericsson and Kintsch, 1995).

The problem of extrapolating the research to CR is that the methods used in heuristic research have tended to use questions that do not represent the types of clinical situations in which a practitioner would find themselves. There is a need for more research directed at error in CR and for osteopaths to be made aware of the concept of heuristics and biases. The presence of conflict sensitivity during biased reasoning suggests that we are aware that the decision we are making is incorrect (De Neys, Moyens, and Vansteenwegen, 2010; Bonner and Newell, 2010). This suggests the use of metacognitive strategies for supporting our CR. Part of the focus of this study is to provide more information on metacognitive strategies utilised by osteopaths during CR in order to provide a baseline for further research.

3.6 Chapter Summary

This chapter examined the types of professional knowledge particularly propositional and experiential and how they are thought to be organised within the brain of an expert clinician. There is also a discussion of the presence of large amounts of experiential knowledge that are tacitly held and difficult to extract and transfer to students, and the potential for the TA protocol for accessing this information.

The chapter then moves on to address the relationship between perception and cognition, and the requirement of an osteopath's central nervous system to process information via multiple sensory modalities. The possibility that this multisensory processing creates neuroanatomical changes in the brain, as seen in expert musicians, and allows the clinician to become aware of their own internal body state. The role of palpation in development of this self-awareness and perception of the other creates a dynamic embodied cognition. The chapter then explores the evidence for metacognitive strategies in reasoning and use of MK, MS and ME, the latter in the form of FOR and JOL which are regulated by a fluency heuristic. The chapter finishes by addressing the concepts of heuristics, biases and diagnostic error and explores the evidence for the use of heuristics in DM.

CHAPTER 4: LITERATURE REVIEW: REFLECTIVE PRACTICE

4.1 Introduction

This chapter critically reviews the existing diverse literature on reflection and RP. In doing so, the review considers reflection as a concept and its philosophical background in terms of the ideas of John Dewey and Jürgen Habermas. The chapter then addresses the concept of reflection in professional practice, and the beliefs of Donald Schön regarding reflection in, and on action. There is then a brief review of the relevant literature associated with RP in healthcare to outline where authors have attempted to provide evidence for the usefulness of RP in different, but limited, healthcare environments. The chapter then moves to present the relevant RP models, both cyclical and structured, that have arisen as a result of various philosophical influences which are, and can be used when assessing and informing learning and professional development.

4.2 The Concept of Reflection

It is recognised that the literature on reflection and RP is diverse, emanates from many different sources, and cuts across professional boundaries (Moon, 1999). There is a lack of clarity of definitions of reflection and RP, and to add further confusion the terms are often used synonymously (Nguyen et al. 2014). The heterogeneity has prompted some authors within healthcare to attempt to define the concept (Bannigan and Moores, 2009; Jarvis, 1992). Within the discipline of physics reflection means throwing back from a surface, such as with heat or light (Taylor, 2008). When this occurs there is an element of distortion possible, as can occur with human thought which is subject to the distortions from our values, beliefs and the lens through which we view the world. There are a number of interpretations of the concept of reflection from the early ideas of John Dewey (1933) to more recent ideas of Agyris and Schön (1974), Boyd and Fales (1983), Boud et al. (1985), Mezirow (1981), Hatton and Smith (1995), Moon (1999), Kember, (2000; 2008), Mann et al. (2009) and Sandars (2009). However, from the physics interpretation, Taylor defined reflection as:

‘the throwing back of thoughts and memories, in cognitive acts such as thinking, contemplation, meditation and any other form of attentive consideration, in order to make sense of them, and to make contextually appropriate changes if they are required’ (Taylor, 2006, p2).

An alternative viewpoint is:

“a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation” (Boud, Keogh and Walker (1985, p19).

There are subtle differences between the interpretations, but they appear to generally depict a self-analytical critical analysis that is directed at one's beliefs, knowledge, and experience with a view to learning and effecting change in behaviour or thought processes. Freshwater (2008) also concurred that there is a change in the individual and their behaviour that occurs as a result of undertaking reflection. In the health professions, reflective capacity is often quoted as an essential characteristic for professional competence, and to learn effectively is critical in developing and maintaining competence across a practice lifetime (Mann, Gordon and MacLeod, 2009).

In order to understand the concept at a philosophical level, frameworks have been suggested such as the seven levels of reflectivity described by Mezirow (1981). These levels are directed at objects of reflectivity such as perceiving, thinking and acting. The levels are 1) reflectivity; 2) affective; 3) discriminant; 4) judgmental; 5) conceptual; 6) psychic; and 7) theoretical reflectivity. The levels describe deeper intensity of reflection as the person becomes more aware of their cognition and is able to access more profound understanding. Levels one to four he described as consciousness, and five to seven as critical consciousness which Mezirow suggested is becoming cognisant of our awareness and critiquing it. Schön (1987) proposed three levels, that of conscious reflection, criticism, and action. In a review of the literature, Atkins and Murphy (1993) suggested that once they distilled the differences between various author's opinions of reflection they were left with three main stages. The first stage is the awareness of uncomfortable feelings and thoughts that arise from a realisation that there is a lack of knowledge or understanding of a situation. It could be argued though, that there should be a balance of good and bad reflections (Newell, 1992). Similar to Schön, the second stage they posited is one of critical analysis of the situation that is faced and the knowledge available. Examination of the situation may bring about the realisation that the existing knowledge is sufficient, or that new knowledge is generated. The final stage, involves a change in the perspective of the practitioner which may or may not involve a change of behaviour.

More recently Nguyen et al. (2014) proposed a five component model of reflection which is intended to make explicit the understanding of the concept of reflection for use in medicine, nursing, and other health science professions. Based on their systematic review of the literature they developed the following categories: a) thoughts and actions, which encompass the entire range of content on which one can reflect, such as beliefs, feelings, experiences, action, situation and ideas; b) attentive, critical, exploratory and iterative, is how one must think in order to be reflective; c) the underlying conceptual frame both conscious and unconscious, that underlies our thoughts and actions, and reflection involves becoming aware of why we perceive, feel, think and act as we do; d) view on change, which pertains to the fact that reflection produces a change in conceptual perspective; and e) the self, where the thinking process becomes reflective

when the four components are in the presence of the self. The self-component is not only thinking about something related to the self (my actions), but also includes thinking about something as related to the self (what do my actions say about me). This may be a valuable addition to previous models, as it may help practitioners understand themselves in relation to their practice and patients, at a deeper level than just assessing themselves pragmatically.

Their final definition is as follows:

Reflection is the process of engaging the self in attentive, critical, exploratory and iterative interactions with one's thoughts and actions, and their underlying conceptual frame, with a view to changing them and with a view on the change itself.

(Nguyen et al. 2014, p1182)

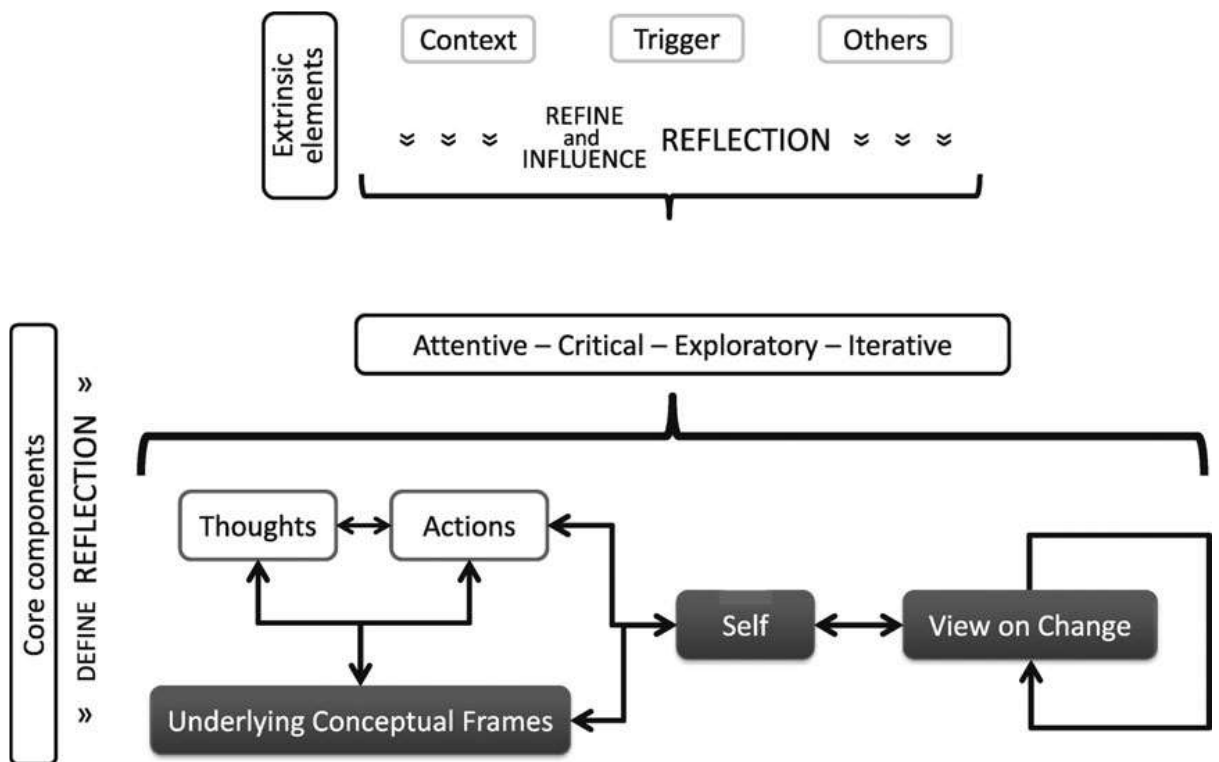


Fig 4.1 Conceptual model of reflection (Nguyen et al. 2014)

The model proposed has the advantage of evaluating and combining the opinions of a large number of the established and accepted authors in the field of reflection, rather than accepting any single definition. In doing so they have helped to clarify, and even extend the interpretation and practicality of reflection. However, there are those that believe that the need to be able to exactly define something is a rationalistic method for controlling and manipulating it (Johns and Freshwater, 1998). Moon (1999), from an educational

background, deliberately did not attempt to develop one precise definition because she recognised that many people had intentionally defined reflection differently. She instead attempted to draw borders around the concept in order to make it more comprehensible.

However, others suggest that a lack of clarity of definition may prevent researchers from making comparisons between works, and practitioners may think they are reflecting when they are not (Ruth-Sahd, 2003).

4.2.1 Philosophy of Reflection: Dewey and Habermas

John Dewey was an influential American philosopher who wrote on the topic of education amongst others. He challenged traditional positivist views on education which focused on subject matter, the learner's weakness, and the omnipotence of the teacher (Brockbank and McGill, 1998). Dewey (1938) stressed the importance of personal growth and experience in lifelong learning with the emphasis on being rather than aims and goals. He argued that for learning to occur a person needed experience to provide the information that is required to generate thought and action. Real situations will allow the person to reflect, learn, and change. His interpretation of reflection involves a number of descriptions, such as turning a subject over in one's mind, giving it serious thought, and a chain of linked ideas that aims at a conclusion and is more than a stream of consciousness. He believed that for reflection to occur there needs to be complexity in a situation that creates uncertainty which then generates:

'Active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it leads...it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality'(Dewey, 1933 cited in Moon, 1999, p12).

This direct quotation suggested that although Dewey challenged positivist thinking within education, he also appeared to maintain the need to utilise rationalist and objective analytical processes. There have been criticisms of the work of Dewey, suggesting that he did not consider emotion within his philosophical evaluations (Boud, Keogh and Walker, 1985). Nevertheless, his theories have influenced a number of authors interested in experiential learning, problem solving, and professional practice, such as Kolb (1984), and Schön (1983; 1987).

Dewey was interested in reflection in terms of learning and making sense of experience, and similarly Jürgen Habermas considered reflection as something that one can use as a means of creating knowledge. However, Habermas was interested in the epistemology of knowledge that humans have adopted, or generated, and are able to generate as a characteristic of themselves as humans. He called these 'knowledge constitutive

interests' because they determine categories relevant to what we interpret as knowledge. They also determine the mode of discovering knowledge, and for establishing whether knowledge assertions are warranted (Mezirow, 1981). Habermas concentrated on the nature of the different processes that motivate the generation of knowledge, reflection being one of these processes.

In describing how human knowledge is generated and shaped Habermas invoked three knowledge constitutive interests. Technical or instrumental, which attempts to understand the environment in which we live in an effort to gain control over it. An example of this would be science, which aims to analytically objectify the world and our existence within it. In contrast, the social sciences and humanities are interested in knowledge generated as a result of human action, interaction, and communication. This type of information cannot be scientifically analysed and lends itself to the interpretive form of investigation. The final constitutive interest is directed at the emancipation of social groups also found within the social sciences and humanities. It is through this awareness that specific groups in society can experience social freedom. It is concerned with generation of knowledge by evaluative and critical modes of thought and enquiry, such as reflection, as a way of understanding the self, the human condition, and the self in the human context (Habermas 1971). He went to lengths to argue the need for evaluative modes of enquiry within the social sciences and humanities, and posited that analytical and interpretive forms alone cannot provide an adequate basis for understanding within these fields.

Dewey and Habermas both considered that reflection can be used to generate knowledge, even though Dewey's main emphasis was on the process of reflection and Habermas considered the place of the process in knowledge creation (Moon, 1999). However, the distinction between them is that Habermas' work was directed toward emancipation and empowerment (Morrison, 1995), whilst Dewey's exploration of reflection rests within an interpretation of ourselves and our environment in the interests of effective education. Having two similar but distinct theories can create a separation of opinion, but reflection could be viewed as a cognitive process that is couched in a framework of purpose or outcome. This suggests that it can be used for many different purposes as it is the framework of intention that distinguishes one act of reflection from another (Moon, 1999).

In the context of osteopathic professional practice both theories find resonance. There is a recent movement of osteopathic practice toward the BPS model of healthcare (Penney, 2010; 2013; Thomson et al. 2013). Also in medicine there is a drive toward inclusion of the patient in decisions about their health via the concept of SDM (Makoul and Clayman, 2006; Legare and Thompson-LeDuc, 2014). This has brought emancipation of the patient to consciousness. It could also be argued that the future of the profession lies in the

hands of the OEI's at undergraduate and to some extent postgraduate level, with effective tutoring of novice clinicians and maintenance and development of competency in experienced osteopaths. There is also the call for the osteopathic profession to use critical reflection to continually self-evaluate and question, and to expand and develop the research base in order to establish the epistemology of osteopathic practice (Thomson et al. 2014b). This incorporates Dewey's interpretation of reflection. Establishing an epistemology of osteopathic practice involves knowing what it is we know, and arguably knowing what it is that we do, rather than what we say we do (Bolton, 2009). This study is utilising RP as a method for understanding and improving professional knowledge with the intention of enhancing current information regarding CR in osteopathic practice.

4.2.2 Reflection in Professional Practice

Even though as Jarvis (1992) pointed out, there were many more who discussed the idea before Schön, such as Dewey (1933), Habermas (1971), Freire (1972) and Mezirow (1981), Donald Schön's book *The Reflective Practitioner- How Professionals Think in Action* (1983) brought reflection into the auspices of professional practice. He highlighted the tacit nature of professional action and knowledge, suggesting that we make judgments and decisions based on diverse information, and often have no concept of how we arrived at the conclusion. Dissecting the thinking of the professional architect and psychotherapist, he suggested that we can turn our gaze inward on our action whilst we are in the middle of a procedure and ask questions of ourselves. Schön described this as reflection-in-action as opposed to retrospective reflection-on-action, '*when practitioners reflect-in-action they describe their own intuitive understandings*' (Schön, 1983, p276). The two types of reflection have the capacity to make sense of and influence future practice and theory including the level of care provided (Atkins and Murphy, 1993; Burton, 2000). What is clear from Schön is that there is a different type of thinking that is needed so that we can become aware of our actions and thought processes, and allows us to be sufficiently cognisant to question ourselves. He suggested that we need to be taught to reflect methodically to ensure the best outcomes for both the patient and clinician (Schön, 1987). It is indicative of a metacognitive process and one that De Neys (2013) believed we may already be aware of due to emotional feedback mechanisms that alert us to situations that do not feel right.

Similar to the philosophy of Habermas (1971), Schön argued that professionals face situations in practice that cannot be solved by technical solutions alone, and the reliance on objectivity excludes the roles of art and intuition in professional practice (Schön, 1987). He compared the Technical Rationality Model, that has been dominant in healthcare for decades, with reflection and referred to a '*crisis in confidence in professional knowledge*' (Schön, 1983, p3). Possibly as a result of this comparison Schön invited criticism from

rationalist circles because he appeared to be developing a dichotomy between knowledge based on research and that derived from experience (Eraut, 1995; Taylor, 2003; Kinsella, 2007). Whilst evidence based medicine (EBM) judges that uncertainty and chaos are unsatisfactory practice, supporters of reflection claim that such situations are a necessary part of everyday professional life and are grist to the reflective mill (Taylor, 2003). However, it is unclear whether Schön (1983) intended an either-or situation or that reflection-in and on-action should in fact complement technical rationality (Eraut, 1995; Kinsella, 2007).

4.2.3 Evidence Based Reflective Practice

The rise in the popularity of RP in education and healthcare is attributed to Schön's (1983; 1987) seminal books (Bleakley, 1999; Kinsella, 2007). However, Bleakley (1999) also criticised Schön for not progressing his concept further and ensuring that it was rigorously examined for use in education and research. This critique has since been attempted by various authors such as (Eraut, 1995; Bleakley, 1999; Burton, 2000; Kinsella, 2007), some of whom ask the question whether the idea should have been adopted with little previous evidence to support its use (Burton, 2000). It is argued, that RP is eminently suitable for use within the qualitative research paradigm because both value experiencing the person within the research. They also have lived experience, context, and subjectivity as central concepts (Taylor, 2008). It appears sensible to suggest that reflecting upon one's practice in detail, within a framework that allows for supervisory feedback, integration of current opinion, and best research evidence from the literature, would enhance one's praxis (Johns, 2009). Often the changes that occur are subtle, may even be personal or affective and perhaps not quantifiable. However, it also seems reasonable to request further evidence to document the advantages and disadvantages. Rolfe (2006) in response to Newell's (2002) critique of reflection in the nursing curriculum, argued against the suggestion that RP should be justified by evidence based research. He posited that there is no research evidence to support the accepted paradigm of EBM, it should not therefore be expected that reflection require it.

There are however, researchers who have started the process of providing RP research evidence within healthcare. Powell (1989), assessed eight nurses, mostly community based with one nurse practitioner. She used Mezirow's (1981) reflective hierarchy and Colazzi's (1973) reduction as a basis for determining the presence of reflective stages in a nurses thinking. It was a small observation and interview based study. Her participants work settings were very diverse and Powell tried to semi-quantify the results. It is arguable that had she remained interpretive the study may have yielded more valuable results. However, she found that the more autonomous the nurse the greater their use of reflective stages, although she only used one truly independent practitioner. She

suggests that nurses use reflection-in-action to describe and plan action, and its use leads to learning occurring.

A study of qualified nurses reflecting on their practice, but not specifically addressing the concept of RP, found that group reflection could be very powerful. It identified many barriers to, and facilitators of, reflection in practice (Platzer et al. 2000a; 2000b). Paget (2001) also attempted a semi-quantitative analysis of nurse's opinions on whether RP had influenced their clinical practice. He found that most participants reported a difference in their clinical practice from specific changes in procedure, such as re-evaluating pain control regimes, to more affective changes, such as the confidence to express an opinion. Participants also reported that RP had the ability to allow them to understand how to implement research evidence within clinical practice. However, the study was assessing practitioner's opinions on whether attending courses on RP was beneficial. This could entail many different kinds of reflection, and even its absence, and not specifically the use of the process of RP within their own work environment.

Gustaffson and Fagerberg (2004) undertook a phenomenographic research project, in which they interviewed four nurses who were known to use reflection as part of their practice. They found that nurses used reflection to think back and consider often on experiences of poor nursing care or forgotten tasks. They reflected before and after an experience, and on nursing situations such as ethics. They also found that it allowed them to develop as practitioners, and importantly, to consider the unique person in each patient encounter with empathy. They felt this would not happen unless they practised reflection. A consequence of the retrospective study is that nurses were not able to describe the effect that reflection had on their personal development, purely what effect they thought it had.

Ruth-Sahd (2003) undertook a systematic review of the literature addressing studies of RP published 1992-2002. Conceptual articles were excluded in order to address the scarcity of evidence for RP. The findings suggested that RP was used in diverse settings such as education, nursing, physiotherapy, management, social work, and science education. It gave rise to benefits such as integration of theoretical concepts with practical, increased learning from experience, enhanced self-esteem through learning, acceptance of professional responsibility and continuing professional growth, enhanced critical thinking and judgement in complex and uncertain situations, empowerment of practitioners, increased social and political emancipation, improvement in practice by promoting greater self-awareness, and helping students develop their clinical knowledge and skills. She suggested that the findings of Lowe and Kerr (1998), who evaluated two matched groups of nursing students, were negative or problematic to RP use in nursing education. They found no difference between the two methods of teaching, either via

conventional methods or reflective learning. However, the fact that reflective learning is as effective as conventional methods is arguably not negative. They also only evaluated one type of reflective learning. These students were studying for a foundation diploma in nursing, which suggests little practical experience. Perhaps reflection is more effective when a person has a greater practical experience (Barbour, 2013). Reflective learning methods also require a level of active contribution and motivation, they are non-linear and require creativity and confrontation (Glaze, 2001; Day, 1993). Consequently, they may require greater selectivity of participant than would be provided by a novice.

A study evaluating the use of reflective diaries as a method for supervision of OT assistant practitioners was undertaken by Mackey and Whitfield (2007). They used Gibbs (1988) Reflective Cycle and focus groups as tools to guide the practitioners through the reflective process. They found diary users generally had positive experiences compared with non-diary users, although there were some who had a fear of making mistakes. The diaries were used as an aid in the allocation and delegation of work, as a means of building confidence, as a tool towards developing critical thinking and self-directed learning, and as a debriefing device. This study was directed at the supervision process and not at the effectiveness of RP, and so did not show the potential for professional change that is expected to occur when undertaking RP. However, the reflective diary system appeared to enhance or create critical thinking and self-directed learning, but more research would be needed to demonstrate long term change.

4.2.4 Interim Summary

The above studies appear to suggest that whilst utilising reflection, or RP, nurses were very motivated by the way it made them feel about personal and professional development. Some reported changes in their procedures and approach to care, and the enhanced use of critical thinking as a result of reflective processes. In one study the use of reflection allowed the practitioner to perceive the patient as a unique being. This is consistent with the movement toward patient-centred care in healthcare. The studies provide inspiration for the use of RP in healthcare, and some suggested the possibility of a lasting change in professional practice. There appears to be scope for significantly more research directed at the ability of RP to influence professional practice.

4.3 Models of Reflective Practice

The development of models and frameworks has been directed at enhancing the capability and education of highly developed reflective practitioners (Kelsey and Hayes, 2015). The early opinion of Johns (1995) was that RP could provide the route to achieving desirable and effective practice, he also stated that RP should always be guided. The argument for structure is that although we all possess the capability to be

reflective, there may be a requirement to learn a framework in order to remain attentive and develop the skills that will extend our boundaries (Esterhuizen and Freshwater, 2008). It is also posited that critical self-appraisal and reflection are required to develop the advanced knowledge structures, such as 'illness scripts', that occur by building on previous knowledge (Schmidt, Norman, and Boshuizen, 1990; King and Bithell, 1998). Frameworks and RP are challenged by Kelsey and Hayes (2015) as being constraining. They claim that rather than being emancipatory RP can be utilised to manipulate and control a profession, and frameworks stifle creativity. Indeed, later in his development Johns (2009) moved away from a more structured model and ultimately promoted creativity and mindful practice, and being in the moment. However, he has continued to suggest that RP should be guided by supervision (Johns, 2009). It has been suggested that frameworks should be considered as aids that support the process of RP (Scaife, 2010). She stated that '*the decision to facilitate reflection with the aid of a structure is probably of greater importance than the specific choice of framework*', (p25).

There are many models and frameworks in the existing literature, but there are three that are often cited in RP and reflective articles, they are those of Gibbs (1988), Kolb (1984), and Boud, Keogh and Walker (1985). The models originate from within the field of education and are influenced by the concept of experiential learning, which means deriving knowledge from observations of practical situations leading to improved action (Moon, 2004). There is also the model of Atkins and Murphy (1993) from within healthcare who reviewed and summarised the literature on reflection, drawing on the work of Boyd and Fales (1983), and Boud, Keogh and Walker (1985). The following section reviews these models, and the structured frameworks of Johns (2004;2009), and Carper (1978) from within healthcare disciplines. The frameworks have been organised under two main headings: cyclical and structured models of RP.

4.3.1 Cyclical Models of Reflective Practice

4.3.1.1 Kolb (1984)

A central framework for experiential learning is that of David Kolb (1984), which is a cyclical model that engages an experience. The practitioner then reflects upon it by observing their thoughts, feelings, values, beliefs and actions (Scaife, 2010). This produces an abstract concept which can then be experimented upon by the practitioner in order to decide upon on a particular course of action. It does not in itself expand and progress the concept of reflection, but locates it in a sequence of activities of learning from experience (Moon, 2004). The model is fairly uncomplicated but would require some guidance for effective use. Although represented as cyclical, it could arguably be presented as a linear process because active experimentation does not automatically bring the novice reflector back to the concrete experience in a way that creates learning.

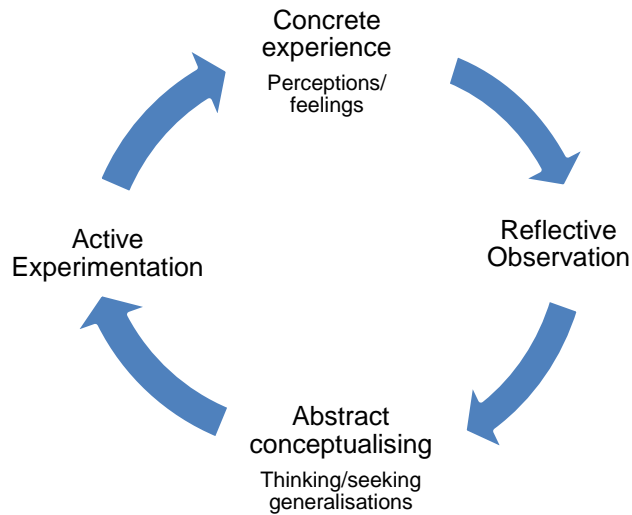


Fig 4.2 Experiential Learning Cycle (Kolb, 1984).

4.3.1.2 Boud, Keogh and Walker (1985)

Fairly shortly after Boud, Keogh and Walker (1985) produced their cyclical model that was presented as a triangle. If considering educating a novice in RP both this model and that of Kolb (1984) would require some explanation in order to achieve effective performance. The advantage is that these apparently simplistic models would allow the experienced reflective practitioner the freedom of interpretation of their material for reflection.

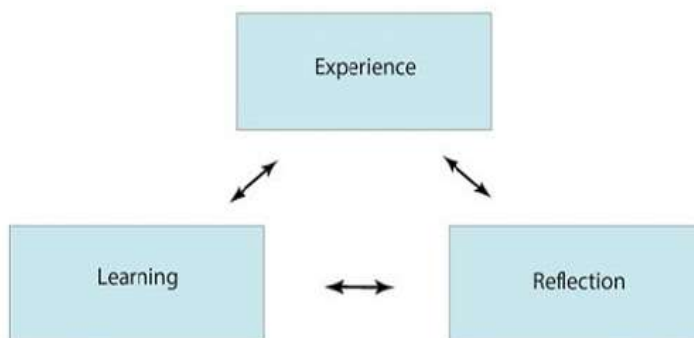


Fig. 4.3 Boud, Keogh and Walker (1985)

4.3.1.3 Gibbs, (1988)

Gibbs (1988) Reflective Cycle is more prescriptive because it directs the learner to what is understood by each concept. A potential consequence of being prescriptive is that the student will look no further in their interpretation of the event. Similar to Kolb (1984) it is cyclical, which is intended to prompt the learner to continue to ask questions of the experience, and not simply accept their conclusions. However, it could be argued that the formulated questions inhibit the intended freedom and, like the Kolb model, the format could be argued to be linear not cyclical. Scaife (2010) favoured the simplicity of Kolb's model because it allowed her to keep it in mind without dominating her thinking. She is an experienced reflective practitioner and she stated that it fits with her style of learning. This suggests that the type of model one chooses depends upon the lens one looks through, and the level of experience that has been gained. Moving between Kolb's cycle and that of Gibbs (1988) could create a more structured framework. This could potentially be directed at novice practitioners, because it simplifies the learning cycle but provides room for creativity.



Fig 4.4 The Reflective Cycle (Gibbs, 1988).

4.3.1.4 Atkins & Murphy, (1993)

In their review of reflection Atkins and Murphy (1993) combined and distilled the reflective process as suggested by others. They suggested that although there is a difference in terminology most authors reviewed appear to believe the process begins with awareness of uncomfortable feelings and thoughts. These often arise as a result of an appreciation

that the knowledge one is applying may be insufficient. This is a critical aspect of metacognitive experience (ME) that can be sensed as a judgment of learning or FOR (Nelson and Narens, 1996). It requires the clinician to be sufficiently self-aware to be able to identify the concept within the emotions they are experiencing. Stage two of the model involves a critical analysis of the uncomfortable thoughts or feelings. This involves examining the components of a situation, identifying existing knowledge, challenging assumptions, and exploring alternatives. This critical analysis allows us to identify how relevant the knowledge is that is being examined. The stage of synthesis evaluation is described by the authors as making judgments about the value of something against standards and criteria. This could be argued to be an important stage in the RP process when access to the existing literature guides understanding and decisions. The final stage occurs when a new perspective on the situation arises. Atkins and Murphy (1993) suggested that affective and cognitive changes can occur which may, or may not result in behavioural changes. The authors expanded the models they reviewed providing a more critical reflective framework that arguably allows access to deeper levels of reflection. This is presented with the flow of information moving in one direction, however all the descriptors have the potential to feed into and effect all the others.

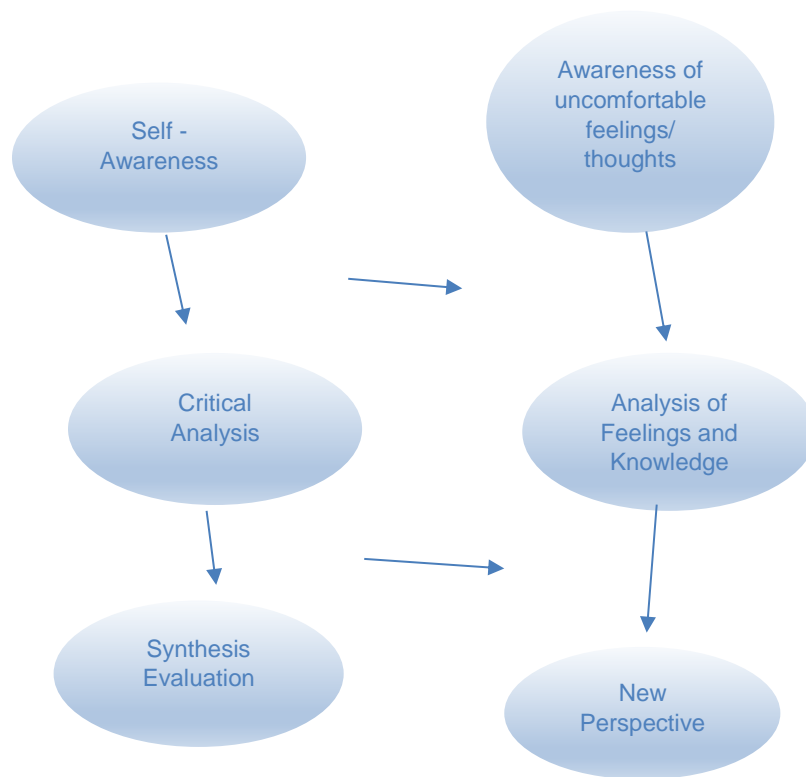


Fig 4.5 Adaptation of Atkins and Murphy (1993)

4.3.2 Structured Models of Reflective Practice

4.3.2.1 Carper (1978)

The framework developed by Carper (1978) involved the creation of a set of cues informed by science but designed for nursing practice. The cues appear heavily prescriptive which would favour a novice practitioner of reflection. It is possible that as one becomes used to them they become tacit, but are there for prompting as necessary. Carper (1978) described four patterns of knowing that occur as RP changes knowledge and behaviour: empirics, ethics, personal, and aesthetics. Empirical knowing is associated with technical rationality, as discussed by Schön (1983), and is measurable and objective. Ethics corresponds to making decisions about what is right and wrong, and means confronting values, norms, interests, and principles. Personal is concerned with monitoring and understanding the self in the context of clinical practice, and aesthetics is grasping, envisioning and responding to clinical situations with the appropriate action (Johns, 1995). These patterns are interrelated and they exist within all experience. The work of Carper (1978) was intended to encompass all aspects of practice, from intuitive artistry to the high hard ground of EBM described by Schön (1983).

Description....	Write a description of the experience What are the key issues within this description that I need to pay attention to?
Reflection....	What was I trying to achieve? Why did I act as I did? What were the consequences of my actions? For the patient and family? For myself? For the people I work with? How did I feel about this experience when it was happening? How did the patient feel about it? How do I know how the patient felt about it?
Influencing Factors....	What internal factors influenced my decision making and actions? What external factors influenced my decision making and actions? What sources of knowledge did or should have influenced my decision making and actions?
Alternative Strategies...	Could I have dealt better with this situation? What other choices did I have? What would be the consequences of these other choices?
Learning....	How can I make sense of this experience in the light of past experiences and future practice? How do I now feel about this experience? Have I taken effective action to support myself and others as a result of this experience? How has this experience changed my ways of knowing in practice? Empirics Ethics Personal Aesthetics

Fig 4.6 Adapted from Carper (1978)

4.3.2.2 Johns (2004: 2009)

Carper (1978) and Johns (2004: 2009) are the most well-known of the structured models of RP, with Johns (2009) having been through a number of revisions. He was also influenced by the ideas of Carper and those of Schön (Johns, 2000). He posited that his reflective framework, the model for structured reflection (MSR), was intended to provide a structure for a way of being in practice that allows the practitioner to become more mindful of the ways they think, feel, and respond to situations. He developed his framework initially directed toward nursing, but broadened the remit to include all healthcare practitioners (Johns, 2004). Throughout his descriptions it is possible to gain a sense that his philosophy is grounded in the affective domain. Also that his intent is to assist healthcare practitioners in a quest to return to 'caring' for patients, by understanding their philosophical foundations. The MSR provides 'cues' for questioning our actions and thoughts. They are arranged in a logical order and are intended to provide guidance rather than be rigid and inflexible. He developed the questions during his doctoral study, by analysing patterns of dialogue that occurred during guided reflective relationships and framed with Strauss and Corbin's grounded theory paradigm (Johns, 1998). He was also influenced by the four patterns of knowing suggested by Carper (1978), but added the idea of reflexivity to which he suggests is '*looking back and seeing self as emerging towards realising desirable practice*' (p102). This allows a change in perspective of future clinical situations having learnt through previous experience. Johns (2009) sees narratives as being process not outcome focused.

Reflective Cue

- Bring the mind home
- Focus on a description of an experience that seems significant in some way
- What issues are significant to pay attention to?
- How do I interpret the way people were feeling and why they felt that way?
- How was I feeling and what made me feel that way?
- What was I trying to achieve and did I respond effectively? (**aesthetic**)
- What were the consequences of my actions on the patient, others and myself?
- What factors influence the way I was/am feeling, thinking and responding to this situation (**personal**)
- What knowledge did or might have informed me (**empirical**)
- To what extent did I act for the best and in tune with my values (**ethical**)
- How does this situation connect with previous experiences? (**personal**)
- How might I reframe the situation and respond more effectively given this situation again? (**reflexivity**)
- What would be the consequences of alternative actions for the patient, others and myself?
- What factors might constrain me responding in new ways?
- How do I NOW feel about this experience?
- Am I more able to support myself and others better as a consequence?
- What insights have I gained?
- Am I more able to realise desirable practice? (**framing perspectives**)

Fig 4.7 Model of Structured Reflection, Edition 15A (p51). (adapted from Johns, 2009),

4.4 Chapter Summary

The literature reviewed in this chapter evaluates the opinions of several authors on the concept of reflection and its relevance to increasing knowledge and understanding. The interpretations appear to generally depict a self-analytical critical analysis that is directed at one's beliefs, knowledge, and experience with a view to learning and effecting change in behaviour, or thought processes. The chapter also provides evidence for the relevance of RP to the creation, synthesis, and maintenance of an osteopathic clinician's knowledge and understanding. There are studies that have examined the presence of reflective strategies in nursing which imply that RP is responsible for creating change in nursing procedures. There is also evidence to suggest that reflection improves patient care by increasing practitioner empathy, which is vital for patient-centred practice. However, there is scope for increasing the evidence base for the effectiveness of RP in enhancing professional knowledge.

Current models of RP provide a framework that support the use of reflective strategies. Some are flexible and require a level of experience, whilst others are more prescriptive which may be relevant for educational purposes. There is general acceptance amongst the authors of the frameworks that reflection begins with awareness of uncomfortable feelings and thoughts. This leads to a critical examination and evaluation, with the intent of changing cognition and/or behaviour.

As a result of critically reviewing the literature the study has developed the following research questions:

1. What aspect of the researcher's daily clinical encounters and osteopathic practice inform and increase the researcher's professional knowledge? Is RP an appropriate vehicle to enhance professional knowledge?
2. How are perceptual diagnostic judgments made?
3. Is there a relationship between palpation and intuition in the clinical decision making process?
4. Can intuitive judgments be captured? If so, what is the role of metacognition in the development and maintenance of the practitioner's clinical competence?

CHAPTER 5: RESEARCH DESIGN, METHODS, AND METHODOLOGY

5.1 Introduction

This chapter describes the methodological paradigm in which the research project is placed. It discusses the choice of methodology with regard to the theme of the research questions, and the concept of osteopathic CR. It begins with a section on the qualitative nature of the study, and the relevance of this paradigm to healthcare research and this study in particular. The chapter then addresses epistemological and ontological considerations of an ethnographic study, before moving on to consider the philosophical basis of the researcher involved in the study. Autoethnography and the concept of insider-insider research is discussed, as are the methods that have been used to address the potential bias associated with this position in order to ensure trustworthiness of the study. The chapter continues by addressing the influences on the study design and methods used within the project. It also addresses the ethical considerations of the project including those specific to autoethnography, before moving on to explain participant profiles and ethics associated with the inclusion of patients within the study. The process of data collection and thematic analysis is then detailed which includes GT methods used for data analysis.

5.2 Methodology

5.2.1 A Qualitative Approach

A healthcare practitioner's thought and decision making processes are idiosyncratic and arguably tacit. Therefore, the study of this phenomenon requires a unique methodology that may attempt to elicit this tacit information. The intent of the study was not to collect data to objectively analyse, but rather to understand and interpret the phenomena under investigation. According to Nicholls (2009), qualitative research addresses the kind of questions that are particular to allied healthcare, and that these questions are pivotal to the nature of our thought and practice. It is suggested that the reliance on quantitative research methodology within healthcare has led to a narrow understanding of the nature of practice (Petty, Thomson, and Stew, 2012a). They call for a paradigm shift and the increased use of qualitative research to increase and enhance the available data for healthcare professionals.

A qualitative approach was embraced because qualitative data is thought to provide a source of well grounded, rich descriptions, and explanations of processes in identifiable local contexts (Miles and Huberman, 1994; Denzin and Lincoln, 2003). It is the role of the researcher to interpret the situations in which they find themselves. The findings are not facts, but are a result of an interactive process between the inquirer and the inquired into (Guba, and Lincoln, 1994). Qualitative research aims to emphasise how social

experience is created and given meaning. It involves the studied use and collection of a variety of empirical materials that describe routine and problematic moments and meanings in individuals' lives (Denzin and Lincoln, 2003). Qualitative research, within which the data is located, is interpretivist. Fundamentally, it is accepted that there are multiple realities that are constructed by social actors and people's perceptions of reality. Around these are based a multitude of philosophies, perspectives, and methods (Nicholls, 2009). Interpretivism tries to understand what it is to be human, and it is associated with a phenomenological tradition that seeks to understand experience through the eyes of the person experiencing it (Van Maanen, 1990 cited in Nicholls, 2009). Accordingly, qualitative researchers deploy a wide range of interconnected interpretive practices, hoping always to get a better understanding of the subject matter at hand. It is understood that each practice makes the world visible in a different way.

CR is a set of complex cognitive and non-cognitive processes that healthcare practitioners engage when carrying out their clinical practice. It involves conscious cognition and metacognition, and unconscious intuitive processes within a social interaction. It also focuses on the DM processes that are involved in patient evaluation and management (Higgs and Jones, 1995, 2008; Roots, Niven and Moran, 2015). Osteopathic CR is a fundamental part of practice that enables the practitioner to be effective and operate autonomously within the wider healthcare system. However, despite the familiarity with the procedure most clinicians would find it hard to describe the actual cognitive processes they use when reasoning in practice as it appears to be mostly tacit and not open for introspection (Schön, 1983; Mattingly and Hayes Fleming, 1994). In order to improve our understanding of the processes used by the healthcare professions, CR has been theorised and modelled at length particularly within medicine, for reviews see Norman (2005) and Elstein (2009). The intent has been to provide an understanding that, in addition to philosophical perception, can be used to educate others more effectively. Other healthcare disciplines such as physical therapy (e.g. Edwards et al. 2004a; Smart and Doody, 2007) and occupational therapy (e.g. Mattingly and Fleming, 1994; Unsworth, 2004b) have investigated their professions' CR processes. More recently a small amount of research has been undertaken that is aimed at particularising the methods that osteopaths use within their CR (Thomson, Petty and Moore, 2014a; 2014c; Roots, Niven, and Moran, 2015). Qualitative methods that have been utilised in such studies include for example, methods in GT (e.g. Thomson, Petty and Moore, 2014a) autoethnography (e.g. Denshire, 2010), TA protocols (e.g. Banning, 2008), observational methods (e.g. Smith, Higgs and Ellis, 2007) and video-recording (e.g. Unsworth, 2004b). A unique feature of the qualitative studies is the emphasis on studying small numbers of episodes in detail rather than gross average measures of many situations, as can be seen with quantitative research (Arocha and Patel, 2008). There is

no previous osteopathic research which has provided an in-depth analysis of a clinician's subjective experiences of interactions with patients. This study aims to generate knowledge of the nature of CR from a single osteopathic practitioner perspective. The subjective nature of this single practitioner experience is socially constructed, negotiated and value laden and cannot be described by objective analytical approaches.

5.2.2 Ethnography

Historically, ethnography has its origins within Western anthropology where it was used to develop a descriptive account of a foreign community or culture. Latterly the meaning has become varied and blurred with other descriptions, such as fieldwork, interpretive method and case study (Hammersley and Atkinson, 2007). Fundamentally it is still the study, using observation and other ethnographic methods, of a particular group of people within a specific culture in order to understand the social interactions, behaviours and perceptions (Reeves, 2008). However, the landscape in which the methodology sits has changed, and ethnography now encompasses many variants, such as virtual ethnography where data are downloaded solely from the internet, and the study of individual life histories via autoethnography (Hammersley and Atkinson, 2007; Wall, 2006). Ethnography may address different aspects of a culture, such as those that occur in groups, teams, organisations and communities, allowing the investigation of practices and norms within the workplace (Edwards and Bélanger, 2008). It has also been used, via autoethnography as a reflexive means by which a single researcher-practitioner can consciously embed themselves, amidst theory and practice, and explicate a phenomenon under investigation (McIlveen, 2008). This is achieved by intimate autobiographical account which describes and systematically analyses a personal narrative as a way of understanding a broader culture (Ellis, Adams, and Bochner, 2011).

The aim of ethnography is to provide rich, holistic accounts of the actions and perceptions of people and the nature of the situation they inhabit, and there is an emphasis upon exploring the situation in context rather than testing hypotheses (Reeves, 2008). Rather than observe others from an intimate distance, modern ethnographers participate in the culture they wish to learn about, as O'Conner (2005) described when he set out to understand the tacit elements associated with the practice of glassblowing. According to Geertz (1973), although ethnography from one point of view is selecting informants, establishing rapport, transcribing texts, taking genealogies, mapping fields, keeping a diary for instance, at it's very roots is the thinking and reflecting that produce the 'thick description' of the phenomena under investigation. It allows the investigation of a small number of cases which Flyvbjerg (2006) suggested often provide the type of context dependent knowledge that phenomenological educational research demonstrates is required to assist in developing beginners into experts. It is interested in examining and

interpreting, in-depth, the strata and micro-strata that exist; interpreting the winks, twitches and symbolic actions of people within the cultures they represent. Hammersley and Atkinson (1995) suggested

'in its most characteristic form it involves the ethnographer participating overtly, or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said, asking questions – in fact, collecting whatever data are available to throw light on the issues that are the focus of the research'.

Hammersley and Atkinson (1995, p1)

It then extends the analyses to wider context and generalisations, drawing conclusions about how phenomena are connected in a situated manner (Mitchell, 1983). It is considered to exist within the paradigm of naturalism which proposes that a phenomenon should be studied as much as possible in its natural state, and not under experimental conditions. The main objective is to describe the happenings within the setting, the perceptions of the participants on their and other's actions, and the context in which the action occurs (Hammersley and Atkinson, 2007).

5.3 Epistemology and Ontology

There is an array of conceptual explanations and terminologies used to describe the philosophical positioning of research studies. For the purposes of this study the following interpretations have been used to clarify the concepts of paradigm, theoretical perspective, ontology, epistemology, methodology, and method:

Paradigm – An integrated cluster of substantive concepts, variables, and problems attached to corresponding methodological approaches and tools (Kuhn, 1996). It is often described as a worldview, belief system, or set of assumptions about how things work. This then serves as an implicit thinking framework that guides the behaviour of the researcher (Wahyuni, 2012). It is categorised by Crotty (1998) as theoretical perspective, and has three main locations that of positivism, anti-positivism, and critical theory.

Epistemology – the theory of knowledge, which describes the nature of the relationship between the knower and what can be known.

Ontology – is commonly described as the theory of the nature of reality, and asks the question 'what can we know about reality?'

Methodology – is the overarching research approach adopted for the study, for example experimental research, grounded theory, ethnography. It is concerned with how we approach finding out what may be known.

Methods – the actual procedure used to collect data, for example; focus groups, analysis of documents, interviews, and observations.

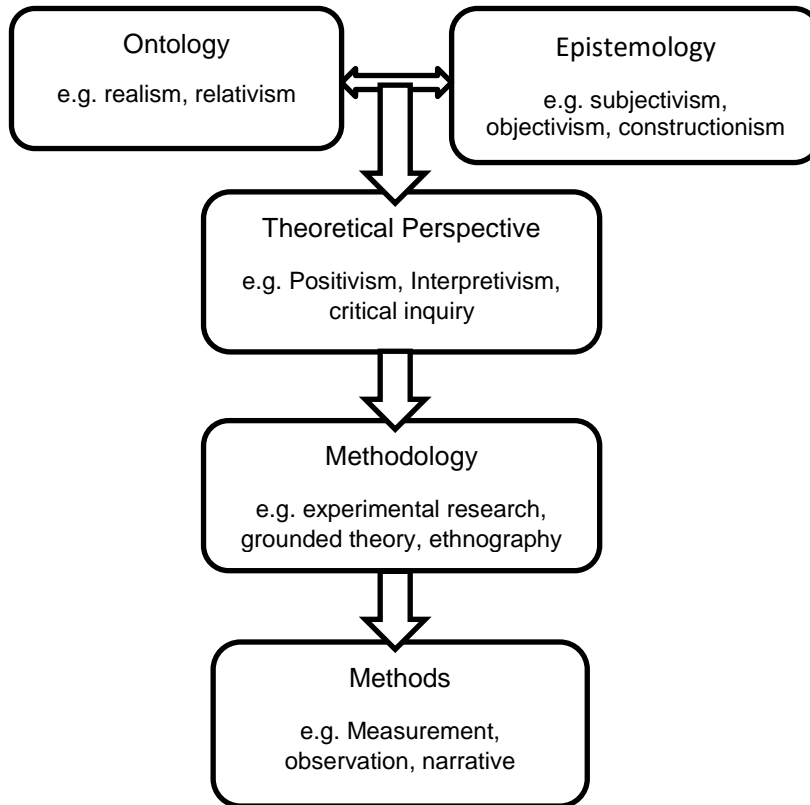


Fig. 5.1 Elements in the Research Process (adapted from Crotty, 1998)

According to Crotty, ontology sits alongside and tends to merge with epistemology. They inform the theoretical perspective because each paradigm ‘*embodies a certain way of understanding what is (ontology), as well as a certain way of understanding what it means to know*’ (Crotty 1998, p10). Positivism and interpretivism are both theoretical perspectives or paradigms in social science research (Williamson, 2006), and arguably take divergent positions. Positivism takes the position that knowledge can only be based on what can be observed objectively with the facts of the world existing independently of the observer (Schwandt, 1994). The emphasis is on measurable phenomena which results in the use of quantitative methods. It also adopts a realist ontology because the world is real and unchanging regardless of the person observing it. Alternatively, interpretivism is a more comprehensive term and encompasses other paradigms, for example; symbolic interactionism and phenomenology (Hammersley and Atkinson, 2007). It takes the stance that people are intimately involved in interpreting their ever-changing world, and that the social world is constructed by social beings (Williamson,

2006; Wahyuni, 2012). It adopts a relativist ontology, which takes the position that there are multiple realities and no one absolute truth because it is dependent on the person interpreting the situation studied and the data arising (Guba and Lincoln, 1994). It allows for different perceptions and perspectives, and acknowledges that *the way things are* is more actually *the sense we make of them* (Crotty, 1998, p64). Adopting this viewpoint allows the researcher to be less dogmatic and certain about their own perceptions and interpretations. Methods used within the interpretivist paradigm are more often qualitative, although it does allow for measurement and quantitation, as is sometimes used in ethnography.

5.3.1 Epistemological and Ontological Considerations of the Study

The overarching methodology in this study is ethnography, which allows for flexibility in research design and permits the researcher to be open to the setting and situation of the participant(s) (Williamson, 2006 cites Gorman and Clayton, 1997). The study combines the methods of a modified participant observation case study approach to collect the data, an autoethnographic and RP approach to develop the narratives. The narratives were then analysed using elements of grounded theory methods often used in ethnographic studies (Babchuk and Hitchcock, 2013). A solely qualitative approach was used to examine the CR characteristics of a single practitioner-researcher. I am exploring, in as much detail as possible, the moment by moment diagnostic decisions I make and perceptions that I have. As suggested by Geertz (1973) I am attempting to interpret the winks and twitches that occur in myself as a result of my interactions with patients. The objective is to assist the understanding of how osteopathic perceptual diagnostic judgments are made, the role of metacognition in osteopathic CR, and whether RP can inform and enhance osteopathic professional knowledge. This places the study within the interpretive paradigm which seeks to understand and interpret social processes in context (Willis, 2007). It posits that facts and values are interlinked, creating a moving shifting sense of the world (Charmaz, 2014) and creates a relativist ontology with the researcher acknowledging the existence of multiple realities. Previous research into CR in physiotherapy and osteopathy (e.g. Jensen et al. 2000; Edwards et al. 2004a; Thomson et al. 2014a) has been situated in the interpretivist paradigm, which is recognised to provide a multidimensional approach to an activity that is task, time and context dependent.

The methods used and the intent behind their use imparts a natural complexity from an epistemological standpoint. I wrestled with where to position the study because there were times when I collected data as closely as possible to that emerging, and analysed it using GT methods. However, during narrative writing my feelings, insights and experiences were and are integral to the study. It could be argued that I am crystallising

ways of knowing as described by Ellingson (2009), which would lend itself to constructionism. Although Crotty's suggested definition of constructionism is as follows:

'all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context' (Crotty, 1998; p42)

Fundamentally, the insider-insider nature of this study relies on my interpretation of the information arising from my own thought processes. I have a natural understanding of my profession's culture as suggested occurs in native research (Bonner and Tolhurst, 2002). However, I am not co-constructing knowledge in the same manner as if I were investigating the actions of other osteopaths, even though the RP method encourages supervisory feedback and peer review. Taking into account all of the above, the study adheres to the description of a subjectivist epistemology suggested by Denzin and Lincoln, which posits that the knower and subject create understanding (Denzin and Lincoln, 1994).

5.3.2 Researchers Philosophical Basis

The complexion of a clinician's thought processes and perceptions, and their interpretation, is their own lived reality, and is influenced by personal and professional factors. It is therefore important for researchers to make their preferences clear because it influences the interpretation of the study, and provides an insight into how they construe the shape of the world (Miles and Huberman, 1994; Creswell, 2009; Neuman, 2011). My background is one of medical research, which was grounded in the positivist framework in which there is a belief that objects are real and exist regardless of any surrounding influence. As Nicholls (2009) explained, a pen is a pen regardless of the person holding it, and a chronic lung disease that limits a person's physical functioning exists as a 'real' physical entity regardless of our lived experience. Post-positivism allows space within the framework for relative uncertainty due to the work of scientists Werner Heisenberg and Nils Bohr, whose ideas separately challenged the positivist statements of certainty and objectivity. The work of Karl Popper also detracts from the perception of science as totally objective, and allows for an element of selection due to the presence of theory and expectation (Crotty, 1998). However, objectivity and certainty are still fundamental drivers of scientific method, and as a consequence of my early experiences in medical research, and to an extent in my osteopathic training, I initially found it challenging to understand how reflection, or autoethnography, could be placed in a research paradigm.

As I began to develop my critique of the role of scientific knowledge and the presence of dualism in society (Polanyi, 1958; Kuhn, 1977; 1996), I found that my opinions became

extreme in favour of subjugated ways of knowing (Boyce-Tilman, 2005). With time my opinions have softened and my understanding has developed. I now take the view that within the multiple ontological and epistemological perspectives, methodologies and methods that exist there can be dialogue between and across the various concepts (Crotty, 1998). It would therefore allow for a relativist ontological position with constructivist epistemology that is pragmatic, and able to combine qualitative and quantitative approaches. As Crotty suggested, Merleau-Ponty and Heidegger are not post-positivists but they frequently discussed the concept of the world still being present in the absence of human beings. There is also the possibility of multiple ontological perspectives directed at the same experience (Mol, 2013). Theoretical perspective, ontology, epistemology, methodology, and method are all relevant for studying phenomena, and the identification and choice of each helps to ensure the soundness of the research and make its outcomes convincing (Crotty, 1998). If researchers achieve this, then the standard of new information portrayed will allow the efficacy of qualitative methodology to communicate itself. Ideas should be fluid, developing with time and information gained (Schwandt, 2013).

The dominant paradigm in medicine is realist, and if one exists within the medical system there is a constant reminder via EBM requirements (EBM Working Group, 1992; Sackett et al. 1996; 2000). Osteopathic professional practice straddles traditional and alternative archetypes and as an osteopath it is possible to witness the world along that continuum, which is where I find my thoughts lie. It has the potential to create an interpretation of practice that may at times feels disjointed. However, it has also allowed me to adopt multiple perspectives that are driven by the situation I find myself in. Thus the ontological and epistemological orientation of the researcher will dictate to some extent the selection of methods used within the ethnographic methodology in order to study the phenomena of interest (Lincoln, Lynham and Guba, 2011). It was interesting when carrying out the analysis of the narratives that I favoured the GT methods of Corbin and Strauss (2015) and Charmaz (2014), rather than those of Glaser. The latter does not have a stated philosophical position, but he is known to employ a positivist stance which is depicted in his version of GT (Bryant and Charmaz, 2007). He stated that truth emerges from data representative of a real reality (Glaser 1978). It is likely that this stance arises from the quantitative training that he received at Columbia University (Bryant, 2009).

Juliet Corbin who worked alongside Anselm Strauss for many years, informed us that Strauss practiced pragmatism and symbolic interactionism, two of the theoretical perspectives that sit within the paradigm of interpretivism. Pragmatism is recognised as a precursor to symbolic interactionism, and it emphasises the role of humans in the production or creation of objective and meaningful reality (Chamberlain-Salaun et al. 2013). It also aims to establish how we can gain knowledge from within behaviour, and

that by acting and interacting people can creatively develop knowledge of the world which may be usable in practice, particularly in situations of uncertainty (Corbin and Strauss, 2015). Pragmatism allows for a flexible philosophical position allowing knowledge to be fluid and indeterminate and define multiple perspectives (Bryant, 2009; Charmaz, 2014). and therefore pragmatists see truth as “relativistic and provisional” (Charmaz, 2014). Symbolic interactionism however, refers to the premise that human behaviour is based upon the meaning that individuals place on symbols (people and things), and how such meaning is interpreted and communicated through language and interaction (Blumer, 1969).

In addition to the pragmatic-symbolic interactionism of Strauss, Corbin has contemporary philosophical influences. She has been influenced by contemporary feminists, postmodernists, and constructivists, including Kathy Charmaz who is often identified with constructivist GT. This will have also influenced the methodology Strauss and Corbin developed (Corbin and Strauss, 2015). Corbin suggested that

‘there is not that much difference between some of the ideas presented in the assumptions based on pragmatism and interactionism and those that can be found in contemporary thought about how theory (a form of knowledge) is constructed through interaction’ (Corbin and Strauss, 2015, p24).

As Etherington (2004) suggested, it is important to find ways of working within a research study that fit with who the researcher is, which includes their values, philosophies for life, ontological and epistemological perspectives. This suggests that a researcher’s worldview may naturally coincide with particular methodology(s) and corresponding methods, and thereby influence their research choices. It is my belief that, similar to Merleau-Ponty and Heidegger, the world exists independently of our being conscious of its existence (Crotty, 1998). However, this does not mean that there is a ‘real’ reality as suggested by Glaser (1978) rather it becomes a world of meaning when we interact with it and make sense of it. In the words of Paulo Freire:

‘the concrete reality consists not only of concrete facts and (physical) things, but also includes the ways in which the people involved with these facts perceive them. Thus in the last analysis, for me, the concrete reality is the connection between subjectivity and objectivity, never objectivity isolated from subjectivity’.

(Freire, 1972; p30)

I am comfortable with the idea that elements of our understanding need to be empirical, and that objectivist and positivist ideals that require measurement may fit with this requirement. However, I am also of the opinion that there are elements within the world that do not lend themselves to objective scrutiny. Trying to construct contextual

understanding statistically is error prone and may adversely affect our understanding of the world. Charmaz (2014) posited that the treatment of theory in GT is divergent between post-positivist and interpretivist orientations, and she suggested it is possible to view them along a spectrum instead of right and wrong. This helps the researcher to locate where they stand in regard to theory.

5.4 Autoethnographic Approach- The Concept and Use of Self

The fact that I am researching my own thoughts and processes in practice locates the method used in the research on novel ground within osteopathy. It also places even greater emphasis on the intimate relationship between myself the researcher, and that being studied. Using personal narrative blurs the boundaries of self and other, constituting self as other and turning the ethnographic lens back onto ourselves as researchers (Pensoneau-Conway, 2011). This concrete 'communicative' engagement in the life-world is how praxis-oriented self comes to life in the everyday.

Studying oneself places the method within the auspices of autoethnography, a qualitative approach that is in its relative infancy. It has been defined by Uotinen (2011, p1308) as '*a research method in which the researcher's personal experiences form both the starting point and the central material of study*'. It can be used to describe the writer's personal experiences and place them within a social and cultural context, and it is distinct from autobiography because it concerns writing to further academic knowledge (Richards, 2008).

Auto-ethnographers-as-authors frame their accounts with personal reflexive views of the self. Their ethnographic data are situated within their personal experience and sense making. They themselves form part of the representational processes in which they are engaging and are part of the story they are telling.

(Atkinson, Coffey and Delamont, 2003, p62, cited by Anderson, 2006)

The discipline has developed it is thought, because of the rise of postmodern philosophy which at its foundations believes that there are many ways of knowing and inquiring and that no one way should be privileged. This lends support for the more subjective approaches and qualitative methods as a whole (Wall, 2006). There are nevertheless recognised issues with objectivity, data quality, legitimacy and ethics. However, Wall (2006) believes that it is possible to navigate these areas of potential bias to produce work of high quality and relevance, providing a window into practice life for greater professional understanding. This method allows us to study the social worlds and subcultures of which we are a part (Hayano, 1979). However, as Anderson (2006) observes, being the researcher member of a group, or in this instance a profession, does not mean that the members share a uniform set of beliefs, values and levels of

commitment. Therefore, the researcher can only have a partial vantage point for observation of the phenomenon under study.

The majority of research within the field of autoethnography has occurred within the social sciences, but it has been used for example within psychotherapy to explore the interface between culture and self (Etherington, 2004), to communicate illness experiences (Schneider, 2005), and to evaluate and inform spasticity nursing practice (Jarrett, 2009). The use of self within this study has been directed at the concept of osteopathic CR, with a view to understanding the influence of palpation, intuition, and metacognition within a single osteopath's subjective experiences. In addition, how the use of narrative and RP can inform and enhance the practitioner's CR. To that end it is at the extreme of the concept of insider research which challenges the researcher to be able to remain detached enough to engage critically with their own framing assumptions (Bridges, 2007).

The insider-outsider, or practitioner-researcher position, has been said to have both advantages and disadvantages (Jarvis, 1992; Brannick and Coghlan, 2007; Morse, 2010). Due to the nature of the study i.e. I was studying the 'lived experience' of myself, it required an 'emic' or 'insider' perspective which means that the researcher does not have a 'naïve' perspective, which is valued in ethnography (Morse, 2010). However, some argue that there is a need to allow the researcher to participate in the research project and integrate their experiences in order to develop inquiry (Clandinin and Connelly, 1994). This can occur within autoethnography in a manner more available than with other methods (Wall, 2006). The researcher's academic and clinical practice activities over a period of 20 years has enabled her to acquire and develop a robust knowledge, experience and understanding of osteopathy. She underwent undergraduate training, worked as a lecturer and examiner at The British School of Osteopathy, and has worked within her own clinic. In autoethnography, it is acknowledged that there is an inseparable link between the personal and the cultural so it is necessary to be an insider, but it is understood that there is a possibility that I may not question my assumptions enough. To lessen the effects of this there have been regular discussions with supervisors and peers, and the maintenance of a reflexive field diary to ensure the accurate interpretations of thoughts and findings. This approach contributed to the development of the thesis and ensured a higher trustworthiness and robustness of the findings and developing conceptual framework (Guba, 1981).

Analytic autoethnography differs from its close cousin evocative autoethnography because it seeks to generalise, describe and make relevant to a wider social structure its description of the phenomena under study (Anderson, 2006). Whereas evocative autoethnography aims to describe subjective emotional experiences that move the reader

to feel the emotion of the writer and thereby understand the context (Denzin, 1997). There exists a tension between the two disciplines and the evocative world sees the analytic discipline as using experience to exercise their heads, rather than immerse themselves to feel the encounter and thereby understand it personally (Ellis and Bochner, 2006).

5.4.1 Reflective Practice - Using Narrative

RP has been used within healthcare to research a practitioner's clinical praxis as a way to improving practice (Jarrett, 2009; Johns, 2009). It is often retrospective reflection-on-action, and provides a vehicle that allows us to learn from experiences both good and bad (Ghaye and Lillyman, 2010). The key concept that separates RP from simply thinking is the critical analysis of a situation which results in behaviour change (Scaife, 2010). It requires development of the qualities of mindfulness and awareness, to look inside the self and understand the way you are thinking and feeling (Johns, 2004). In order to transform the concept into the written form, it requires executing a narrative approach which has been developed within various disciplines (Clandinin and Connelly, 2000; Polkinhorne, 1988; Bateson, 1994). It has been suggested that story telling is what qualitative researchers do when arranging and analysing their research materials, creating order and constructing texts (Riessman, 1993). This statement was written as an argument for narrative to be included within the field of scholarly research when qualitative methods were fighting for inclusion, and there is still a sense of apology from authors using the narrative approach (Holt, 2003; Muncey, 2005). Some posit that there is a distinction between narrative and storytelling and that narrative is the result of analysis and inquiry into the story, which makes the concept quite narrow (Riley and Hawe, 2005). However, Clandinin and Connelly (2000) persuade that narrative:

'is the best way of representing and understanding experience ... narrative thinking is part of the phenomenon of narrative ... narrative is both the phenomenon and the method of social sciences.'

(Clandinin and Connelly, 2000 p 18).

It is possible to view every clinical encounter as a narrative form where the clinician and patient engage in the development of a plot or story (Mattingly, 1994). This project is exploring the researcher's professional osteopathic practice and the contribution of intuition, metacognitive processes and palpation to osteopathic CR. It is combining a narrative approach to RP broadly following current models, and including supervisory guidance to inform the narratives and account for multiple realities (Kolb, 1984; Gibbs, 1988; Johns, 2009).

'when we are able to communicate explicit knowledge of our total experiences we can allow our perspectives to be transformed by discussion being open to including others views that might extend, challenge or validate our own'

(Etherington, 2004, p29, cited Winter, Buck and Sobiechowska, 1996).

5.5 Trustworthiness

Many of the criticisms of qualitative inquiry are grounded in the scientific paradigm. It is subjective, not generalizable, words used are inevitably framed by our implicit concepts and what we consider writable and readable (Morse, 2010; Miles and Huberman, 1994). Inevitably there is argument amongst researchers within the qualitative paradigm about the validity of accepting the requirement of positivist academic rigour (Koch and Harrington, 1998; Altheide and Johnson, 1998; Leininger, 1994). There is also question as to whether autoethnography should be judged by traditional criteria because the narratives produced are not necessarily generalisable to the population (Holt, 2003; Garratt and Hodkinson, 1998). In addition, within naturalistic inquiry it is considered that the more rigour that is sought the less relevant are the results (Guba, 1981). The concept of rigour in qualitative inquiry is strongly debated (Sandelowski, 1986; Hope and Waterman, 2003), and there are those that require the same criteria as utilised for quantitative studies (Morse et al. 2002) and others that argue for different conditions of evaluation (Petty, Thomson and Stew, 2012a; Koch and Harrington, 1998). Truthfulness and objectivity are important within both quantitative and qualitative study, but they are judged differently in each (Creswell, 2009). It is important given the inherent and desirable subjectivity of qualitative methodology, that 'trustworthiness' is achieved which provides the credibility, transferability, dependability and confirmability required by naturalistic research (Guba, 1981)

Efforts to ensure credibility of the study were established by initially performing a pilot study to determine potential problems that might arise during the data gathering phase of the study. Persistent and thorough investigation of information on narrative inquiry and RP, and familiarisation with the data arising allowed issues to be addressed, and helped focus the study. Areas of issue and interest were discussed with peers ('peer debriefing') in order to develop the study further (Guba, 1981). At the reflective stage of the study, as the narratives developed, discussions with supervisors and peer groups ('member checks') were performed to develop the narratives and allow for the presence of 'multiple realities'. Transferability was ensured by detailed, or 'thick' description of the study, so that readers of the work can make discernments as to the possible transferability to another context based on the data and information presented, (Geertz, 1973). The study context and its relation to the current literature and philosophical position are described. There are also examples included which detail the analyses used and how they were

interpreted, these form part of the description of the study, allowing for 'trackable variance' (Guba, 1981). It is thought that not all aspects of the results will be transferable to others due to the presence of multiple realities that exist within member groups (Wall, 2006).

It is accepted that variations between people and subjects, and the passage of time, along with the dynamic nature of data analysis make it difficult if not impossible for a qualitative study to be replicated by others (Petty, Thomson and Stew, 2012b). However, it is important to demonstrate the dependability of the study, which has been addressed by providing a detailed description of the research performed and by demonstrating the decision making processes and reflexivity of the researcher. In addition, all phases of the study have been scrutinised by research supervisors, and whilst it is accepted that supervisors do not provide an impassive examination of the data, their experience in research methods and osteopathic CR add credibility to the study. Confirmability has been attended to by presenting a detailed and accurate description of the research study and utilising a field diary that has been used to make notes of relevant occurrences as they arose. The reader should thus be able to understand and evaluate the study and determine that the results do in fact derive from the data.

5.6 Research Design

During the instructional portion of the doctoral course it became clear that RP had the ability to expose a practitioner's thoughts at a deeply personal level, and identify routes for practical improvement that would improve professional capability and patient care (Ghaye and Lillyman, 2006). Using guided reflection during the tutored part of the professional doctorate allowed me to identify that the therapeutic relationship between myself and a patient could be enhanced by switching off clinical judgments and immersing myself in mindfulness, so that I was totally in the present moment with them in the clinical encounter. This may seem obvious to some, but a clinician can become so absorbed in technical rationality that it overpowers the therapeutic encounter (Neighbour, 1992). As I became aware that my thinking dominated the relationship I began using mindfulness techniques so that I could choose to switch off my judgement (Kornfield, 2008). If I could turn off my thoughts I wondered whether it would be possible to capture the thought processes as they arose, which is arguably a form of the reflection-in-action suggested by (Schön, 1983). He also posited the need for different epistemologies and the importance of research into phenomena such as uncertainty, complexity, instability, uniqueness, and value conflict using non-positivist models. He developed his reflection-in-action ideas to address the tacit knowledge that is inherent in the actions of everyday life, and he states *'that our knowing is in our action'* (Schön, 1983, p49). I wondered therefore, if it were possible to capture one's thoughts as a reflection-in-action and

whether this would reveal what we do and how we think on a moment-by-moment basis, and if possible to capture how much intuition, palpation and metacognition form a part of CR. Tacit understanding within professional practice is believed to lie hidden as a form of intuitive knowledge gained largely by experience, that is acted upon but cannot be explained by the practitioner (Mattingly and Hayes Fleming, 1994). The use of a narrative RP method would also allow the disclosure of tension between the way I currently work and my vision for practice (Johns, 2009).

Whilst investigating RP, I attended a mini conference involving a lecture on palpation research and the findings of a doctoral thesis (Esteves, 2011). It stimulated my interest in expert knowledge, understanding tacit knowledge, and the influence of palpation and metacognition within the clinical encounter. Palpation and intuition appeared to form a large part of an osteopath's traditional decision making process, but are complex constructs and remain difficult to interpret. Studies have generally looked at the reliability of palpation intra and inter-rater with little reproducibility demonstrated, for reviews see (Stochkendahl et al. 2006; Haneline and Young, 2009). There is also a small amount of research available in the qualitative paradigm which has addressed the meaning of touch to the osteopathic patient (Consedine, Standon and Niven, 2015).

There is little research into how manual therapists conceive their practice (Petty, Thomson and Stew, 2012a). They argued that practitioners require the broad use of many types of knowledge to underpin practice and these should be explicated, critically reviewed, and developed. Recently there has been an increase in the number of research articles published investigating the concept of CR in osteopathy (Thomson, Petty and Moore, 2014a; Roots, Niven and Moran, 2015), the role of palpation (Esteves and Spence, 2014; Browning, 2014), and CR education and assessment (Esteves, Bennison, and Thomson, 2013; Fryer, 2008; Lalonde, 2013; Moore et al. 2014; Stone, Boud and Hager, 2011). There is however no previous osteopathic research which has provided an in-depth moment-by-moment analysis of a practitioner's subjective experiences whilst in consultation with patients, and the effect of multisensory feedback mechanisms on their CR. I realise that this is a subjective study and involves only one osteopath, myself, therefore extrapolating the data is limited. However, the novel nature of the research design and the information it elicits provide a platform for further research into osteopathic CR.

5.7 Ethical Considerations

5.7.1 Ethical Approval

Ethical approval was granted by the British School of Osteopathy ethics committee because the research involved participation of patients seeking osteopathic healthcare. It

was revealing undertaking an application for ethical approval as gaining approval was not as straightforward as it initially appeared. It became clear that it was a process that needed understanding and commitment. The researcher needs to fully immerse themselves into the idea of ethics as though they are the person who is going to participate. At that point it becomes possible to understand what both the ethics committee requires of the applicant, and the participant needs from the researcher.

5.7.2 Ethical Values

The values made evident by entering the ethics approval process were inherent within me, and upheld throughout the data collection component and the entire project in order to ensure patients felt secure.

I was mindful that a patient may feel obliged to help and was careful that I worded my invite in a relaxed manner that allowed the person to decline if they wished. I emphasised that they must not feel under pressure to participate and, in addition to the consent form, made an opt-out form available in case they changed their mind when they left the clinic. Only one person was doubtful about participation because they didn't want to receive a compromised treatment. They agreed to participate but because of their concerns I felt the note taking was compromised and therefore have not used the data from that consultation.

5.7.3 Specific Ethical Considerations of an Autoethnographic Study

There are a number of considerations that are appropriate to consider when undertaking an autoethnographic study and when using it within case study based research. Although the recruitment of participants was relatively random as outlined in the next section 5.8.1, the choice of descriptive text to develop into a narrative was specifically selected. I have asked myself how I chose those cases and whether there was any specific bias involved, such as including patients who were unlikely to be offended by what I had written, or avoidance of cases that challenged my competence as a clinician. I was not conscious of making such directional choices, rather I selected the cases because of their complexity and those that highlighted areas for my professional development that might also enhance osteopathic professional knowledge. I was very aware when writing the narratives of ensuring the anonymity of the patient in the case, but I did not specifically select cases based on the personality of the person depicted. I was very interested in the relevance to osteopathic CR and professional development.

Adams (2008) wrote about the question of narrative privilege because not everybody has the opportunity, ability or motivation to write. He suggested that:

'this requires us, as authors, to acknowledge, to the best of our abilities, privileges we have when constructing a story such as a fine command of

grammar, a familiarity with the (academic) print medium (Medford, 2006; Smith, 1999), finding and filling a gap in the literature (Goodall, 2001), being able to create aesthetically appealing texts (Gingrich-Philbrook, 2005), and having the time, physical energy (Rich, 2001), and financial resources to write (Lorde, 1984), (Adams, 2008, p181).

Acknowledgement of narrative privilege reminds us that there are stories that may never be told, and voices that may never be heard. It also reminds to take care of those who are within our stories. Within that consideration it is possible to question presence of the voice of the patient within the narratives because it appears only a little. I am aware that I was not engaging the patient in a recollection of the clinical session, as often occurs when using interview strategies within a GT methodology. This meant that I potentially escaped textual debate with the people that I textually implicate (Adams, 2008). However, the study was not about the patient per se, rather their cases were used to allow me to investigate my thought processes. Although it would be interesting to understand the patient's perspective, it was not the focus of the study and to do so would make it unwieldy. The study is not directed at a reflexive relationship whereby there is a need to address the power relationship between the practitioner and patient (Etherington, 2007). Although without doubt this is an area of which all clinicians should be aware. Had the study been a solely autoethnographic account of my journey as an osteopathic practitioner working with a certain aspect of clinical interest, whereby the situation of the patient is of utmost importance, as in Jarrett's (2009) thesis or the RP publications of Johns (e.g. 2009). Then the ethical aspects inherent within reflexive relationships such as power, culture, gender and difference would be imperative (Etherington, 2007). I was careful to direct the focus toward my CR, and I believe it is not possible to identify the patients that were participating in the study within the notes, descriptive, and narrative texts because they are anonymous, and the focus is on the unfolding of my reasoning. Therefore, I believe that I was not being disrespectful or unfair to the patient, or that I was writing of something for which I did not have expertise (Dauphinee, 2010). I also took time to ensure that the patient understood the nature and direction of the study before they consented to participate. I confirmed that they understood that I would direct investigation at myself and keep their identity undisclosed. I ensured they knew they were at complete liberty to withdraw at any time if they wished, because the power in the relationship should not lie solely with me.

Also as a result of narrative privilege it is possible to overlook the vulnerability of the narrator, which is particularly pertinent within this study. Personal narrative is a revealing form of research which exposes the author directly (Ellis, 2007). It can be a positive and challenging encounter and one that can be uncomfortable at times, but it allows the researcher to see and address behaviour patterns (Chatham-Carpenter, 2010). However,

it also can be potentially personally damaging as Chatham-Carpenter (2010) highlighted when writing about living with anorexia. She found that it triggered the pull back toward anorexia as she wrote to inform others about living with the condition. I have not focused heavily on the 'auto' within autoethnography (Dashper, 2015) because I preferred to use reflection as a reflective practice. Nevertheless, my personal exposure regarding potential diagnostic shortcomings could create a lack of confidence, or a sense of embarrassment around my daily osteopathic practice. I was aware of discomfort at times, but I used this as a trigger to explore the concepts under investigation more carefully. I kept a reflexive field diary in which I noted my thoughts and experiences that were personal to me, which allowed me to explore the concepts that arose in more detail. It also could be argued that it provided transparency of dialogue between researcher and participant, which in this case was me (Etherington, 2007). I found that it was important to maintain focus on the 'end game' of the study and the desire to uncover the nature of osteopathic CR. Buddhist philosophies teach that an effective method of living with our emotional discomfort is to go inside the emotion and watch it without judgment (Kornfield, 2008). I have practised this teaching for a number of years, and have found that it allows us to understand and live with our demons whilst lessening the impact they have upon us. This was a beneficial position from which to conduct this personal exploration of my CR and professional knowledge. However, I am aware that I am intending writing an article for publication in an academic journal which will provide a more public forum for my work, and the potential for so called 'psychic violence' (Butler, 2005). This will require further consideration of this concept in order to avoid silencing myself (Clandinin and Connelly, 1994). I think it is possible if the benefits of writing are considered greater than the potential harm to the ego.

There is also the question of who will read the texts that I write and whether they will cause harm, or offence to the reader. This study is intended to provide greater understanding of the concept of osteopathic CR, and any criticism within the narratives is directed at myself. It is possible that others will find resonance in the concepts that arose for me. I hope that they will use any resonance as a catalyst to investigate their own CR strategies thereby providing greater understanding within the profession. It is possible that they will disagree with my findings, and I would hope that in doing so they may find it in themselves to debate areas of conflict to widen osteopathic perspective.

5.8 Participants

5.8.1 Recruitment

The study was carried out at my osteopathic clinic. I usually treat approximately twelve to fifteen patients a day depending on the length of the day. Consequently, every time allocation is usually filled, and patients are seen sequentially every thirty to forty-five

minutes' dependent on the treatment modality. Designated times of the day were allocated in the diary of one hour for a usual thirty-minute appointment, or seventy-five minutes for a usual forty-five-minute appointment. This gave an extra thirty minutes which was used for the patient reading the participant information sheet (PIS), signing the consent form, and for me to write up the descriptive text after the patient had gone.

Participant selection was random to prevent bias in selection, although it became clear as the project progressed that the participant profile was not as important as the complexity of the case. An increased complexity provided rich information and this could arise from a patient of any profile, it purely depended on the intricacy of their symptom picture. The intricacy could not be known until the patient entered the room and began their explanation during the treatment session. Occasionally a patient would book in for a repeat treatment in an allocated session, which would mean that they would appear twice in the data collecting. Each session however, was taken as a separate case and my thoughts related to what had appeared in front of me that day were noted. However, as with prior patients (rather than new ones) there is a known quantity that is implicit in the mind of the researcher. Previous information and symptom presentations cannot be erased. This adds natural richness to the new information arising and serves to support the diagnostic thought processes of the researcher, which if needed will form part of the notes and descriptive texts. The complexity of the case in front of me, combined with whether it stimulated a sense of wanting to explore an arising concept specifically related to osteopathic CR, were the criteria used to select a case to develop into a narrative. Three new patients and six prior patients were used to develop their cases into narratives and no repeat cases were used.

Discussions and criticism of GT has often been directed at the role of the researcher and the level of *a priori* knowledge that they may have. Glaser (1992) particularly advocates theoretical sensitivity, and not entering the research process with prior knowledge in order to prevent forcing the emerging theory. This is particularly directed at the timing of the literature review. However, Bryant (2009) suggested that it is not possible to forget, or put aside, previous knowledge and ideas in order to maintain neutrality. GT used in this study was not a purist methodology but a selection of GT methods, and the theory of interest, fundamentally, was identifying how an osteopathic practitioner undertakes CR in the presence of patients. The data collection occurred before any analysis was performed and prior knowledge of the patient would not have negatively impacted the study because the descriptive text and narratives essentially became historical data to be analysed. However, had this been a purist GT study the implication of prior knowledge of a patient would be more relevant. It would impact theoretical sampling, which is a process of data collection specific to GT and enables the researcher to follow the lead of the research

and direct on-going data collection to those areas that best serve the developing theory (Corbin and Strauss, 2015).

5.8.2 Profile

There was no specific profile that was needed for the study, it was more important to have complex cases to allow rich information to be produced. The complexity was provided by such cases that carried patients with unusual symptom pictures, multiple pain sites, the presence or suspected presence of red and yellow flags, the need to utilise multiple treatment models for example.

5.8.3 Avoidance of Coercion

Patients were either asked if they would like to participate when booking their treatment session over the phone, or in person when booking at the clinic, and a poster was hung in reception for further information. If they did not wish to participate they were offered a more appropriate time for their appointment at the clinic.

To further decrease the possibility that patients may feel coerced into participating while in the presence of the osteopath at the start of their treatment session, patients were offered the option of taking away the consent form and bringing it back to their next session, or taking it with a stamped addressed envelope and posting back if they were unlikely to be returning for treatment soon.

5.8.4 Inclusion and Exclusion Criteria

All members from the general public could be included within the study because I was researching my own thought processes. Within the treatment session the patient would not be aware of what I was thinking outside of the normal information that I would give in a consultation. Therefore, there was minimal risk of potential upset. However, children under the age of 18, and patients with known mental disability were not included to avoid any potential emotional disturbance.

5.8.5 Confidentiality

Before treatment took place, patients were informed of the steps taken to ensure they would remain anonymous, and the process for guaranteeing the notes taken were confidentially secure. This was all made available on the PIS, however most patients did not want to read it or take it with them, so I made certain I informed them verbally.

5.9 The Process of Data Collection

5.9.1 Reflection-In-Action Note Taking

Immediately the patient entered the room I would initially quieten my mind so that I was available to listen to my thoughts. Every time a thought entered my head I would note it down until I had a page or more of notes. The notes were made in short hand in my diary in order to maximise use of time, and in anticipation of the next thought arising. The number of notes taken would depend upon the length of the treatment session and the number of thoughts that arose. My note taking developed during the pilot study because I improved my speed of note taking as my thoughts arose. I was aware during the first two pilot studies that I was keeping more than one thought in my memory before writing them down. It was quite possible to achieve, but I stopped doing this after the second study because I thought it might alter arrival of subsequent thoughts.

If a patient were attending the practice as a new patient they were allotted a forty-five-minute treatment session as normal but I would add on a further thirty minutes to allow for the patient reading the PIS, and for me to write up my notes at the end of the treatment. If a patient were attending as a follow up to a previous appointment I would allow thirty minutes with a further thirty for the administration as described above. On two or three occasions patients found the concept of mindfulness difficult to conceive and would continue to talk to me as though I was treating them as usual. On those occasion I would not use the resultant notes to write into a descriptive text.

Fig. 5.2 An example of my short hand notes:

36 woman medical rep
Looks in gd health
Sits adducted, slouches
Looks flexible
Very bubbly, sense a level of stress, ?stress due to house
Breast cancer scare, got worse since?
Overlying tissue flexibility
Extension hurts spine L3/4 depression and pain to palpate, can it take manip?
Artic ok
Tight (R) gluts > (L), what caused this?

Not disc flexion ok

? H₂O/acidity?

Tissues feel boggy

Sacral rel with TL (L) hand flexing (R) extending

(L) SI restricted, Touched L3 pt talked about father

Pelvic bal, AD reduce wine and increase H₂O and F&V

It was suggested to me during a professional doctorate meeting with colleagues that I should consider videotaping the treatment sessions with my patients. I also considered a TA protocol which would require speaking out loud into a tape recorder during the consultations. However, although I realise that it would add another level of credibility to the study, I felt uncomfortable with the idea that a patient would be observed, it seemed too intrusive. I am also of the opinion that we have many thought processes that patient's do not need to know about. When formulating hypotheses, we may consider pathologies that although may be unlikely, awareness of which may cause fear avoidance behaviour which is considered a factor for development of chronicity (Waddell, 1998). Speaking into a tape recorder may provide statements that are unnecessary and potentially psychologically harmful. I chose to continue with the method of capturing my thoughts because the final data for analysis would be the narratives, which should produce interesting information regarding how I make sense of my experiences (Clandinin and Connelly, 1994). It also has a similar purpose to that of research interviews in the search for meaning within people's experiences, but providing a moment-by-moment understanding or window into my thoughts

5.9.2 Descriptive Text

At the end of the consultation when the patient had left the clinic, I would sit down immediately and write the 'descriptive text' whilst continually referring to the short hand notes to guide the 'descriptive text'. The notes needed to be written into a form that could be understood as a full text, but I didn't want to lose the precise nature of my thoughts. I closed the door immediately after the patient had left the room and sat with the notes as prompts to my memory. I allowed only thirty minutes for writing up, in this way the 'descriptive text' would closely reflect the actual events that occurred during the consultation, with no time for embellishment. At the end of the research project I had amassed forty-five descriptive texts. I was initially intending to generate one hundred cases with the intention of taking twenty to write as narratives, however, I found as I

wrote the narratives that the same information was arising along with similar themes from the data.

Fig. 5.3 The following is an example of the kind of information held within a descriptive text emanating from the example notes above:

When she returns I invite her in and take the case history. She is 36 years old, she has a sedentary job but looks in good health if a little overweight. She sits in the chair with her knees adducted and her feet pointing away from the midline. She looks flexible in her tissues. She is bubbly but I sense a level of stress underlying.

She says she has low back pain which goes between the lower lumbar and her waist, she has had it for 8 months and it started when they bought a house that needed gutting. There had been a lot of heavy work which she helped with but there was not one event that she remembers starting the pain. It is aggravated by sitting and lifting which makes me think discal. I wonder if there is any stress in her life, possibly due to the house. At this point I ask whether she is under investigation for

Having developed the 'descriptive text', which would generally be written directly into my diary, I then transferred it to the computer to be used to develop the narrative. Initially, and for quite some time into the project, I couldn't settle on a process by which to expand the descriptive texts into a narrative. I began by using the Johns (2009) MSR framework with six layers of dialogue for RP, but as I worked with the structure I found that certain stages directed me toward the affective aspect of my practice at the expense of the more pragmatic aspects. I returned to the literature to determine whether there was a more appropriate framework that would highlight practical areas for professional enrichment. I was interested in moving the reflections into areas that would benefit not only my personal practice, but address wider professional issues. As Clouder (2000) warns, reflection at the individual level promotes sound practice, but has the potential to limit focus and stifle professional development. I was intent upon keeping the research questions in mind as I questioned the descriptive text, so I metaphorically travelled back and forth between the narrative and 'descriptive texts', consulting the existing literature and wondering what method of questioning and writing would allow information of value to arise. I wrote an entry in my field diary:

This process is not straightforward for although the guided reflection has a good framework it appears too prescriptive and emotive for my work. I will look more deeply into other reflective frameworks and narrative writing

Field Diary Entry 25.05.13

5.9.3 Developing the Narratives

Having returned to the literature, I explored and evaluated other forms of autoethnographic writing and reflective methods from Kolb (1984), Boud, Keogh and Walker (1985), Gibbs (1988), Atkins and Murphy, (1993), Wall (2008) and Holt (2001). The RP models allowed a more fluid emancipatory style of writing, but possibly because I had become familiar with the questions suggested by the models of Carper (1978) and Johns (2009). Initially I began to write by asking myself questions of the 'descriptive text' such as 'what was I trying to achieve, and how did I feel about that' but rapidly found that the structure was restrictive because it required me to go through line by line which wasn't necessary. I found that if I read and re-read the 'descriptive text' with the various reflective models in mind, the content for narrative arose in its own unique way. As I worked with the narratives they began to expand and develop, and I began to access the existing literature as suggested by Johns (2009), to inform and deepen the insights that were arising. This was an important stage in the process because it developed my thinking and provided peer reviewed information to inform my own thoughts. At one stage I found myself becoming very theoretical and moving away from being a storyteller, which some think is not being true to qualitative research (Holt, 2003). It was at that point that I sent the narratives to a colleague who commented as such. Returning to the narratives, I removed all of my expounding theories and began to rewrite the stories to just include references where I felt they were required. As I moved through the study I was aware I was undergoing of a process of change that was occurring within me as a practitioner

Fig. 5.4 The following is an example of a narrative that has been developed from the descriptive text and notes shown in fig. 5.1 and 5.2

The initial picture I was getting was of part of her life which has biomechanical consequences from so much sitting but more general stresses from negotiating driving in UK traffic, which can be demanding. I got the impression she looked in pretty good health even if she was a little overweight as she sat in the chair in front of me with her knees together and her feet splayed. This is a posture I have seen with a recent patient, it looks uncomfortable to me possibly because I am an osteopath and odd postures I associate with discomfort long term. I was getting a sense that she was flexible in her tissues so perhaps her hips can happily adopt that posture. The initial picture I was getting was of part of her life which has biomechanical consequences from so much sitting but more general stresses from negotiating driving in UK traffic which can be demanding. I got the impression she looked in pretty good health even if she was a little overweight as she sat in the chair in front of me with her knees together and her feet splayed.

5.10 Levels of Reflexivity

Reflexivity within a study attempts to make explicit the researcher's viewpoints, hidden assumptions, and values that affect the interpretation of data (Charmaz, 2014). Also within a qualitative study, the nature of interpretation embodies a reflexive process as suggested by Denzin (1994, p500 and 501) *'the art of interpretation may be described as moving from the field to the text to the reader...a complex reflexive process*. Generally, the researcher creates a field text using field notes and documents from the field. This forms the basis of the research text, and includes notes and interpretations grounded on the field text. These then becomes a working interpretative document containing the researchers attempts to make sense out of what has been learned. Finally, the researcher produces a document for feedback from colleagues before producing the final public document which should take the reader to the centre of the experience that is described (Denzin, 1994; Geertz, 1973). The two explanations of reflexivity have been accounted for in this study by the reflexive interpretation process, and by maintaining a mind that was open, interested, and questioning along with a field diary in which I recorded things I had noticed during data collection and analysis. I remained reflexive within the field diary because I also recorded questions and assumptions that arose, and debated them within the diary and the narratives.

During the study I was aware of my tendency to have an objective stance toward the data probably due to my positivist background. I wrestled for some time with the concept of producing a solely autoethnographic piece as a research study, because I was not certain that it answered the research questions that I had posed. As time elapsed, and the data emerged, I changed my direction and decided that it was appropriate to perform an analysis using GT methods. Although not quantitative it fulfilled a need in me to produce an interpretation using a more structured process than provided by a solely autoethnographic approach. I recognise this is a value system that is strong within me. The analysis was therefore carried out with an awareness of this value system, but I also embraced and explored the need to be interpretive. I wanted to understand my thinking and assumptions, the possible pitfalls involved in data collection, and the type of information arising in terms of the research questions. I did not necessarily suspend my biases and beliefs because they are part of me (Koch and Harrington 1998), but I ensured I was aware of their presence and questioned their basis, rethinking them if I felt they were ungrounded or misguided. I also ensured the whole study was reflective and interpretive by asking the question 'what is going on' throughout, which is part of Gadamerian philosophy (Koch and Harrington 1998).

5.10.1 Notes

The three layers of data collected differ in the level of reflexivity that is present. The reflection-in-action note taking involved observing my thoughts and noting them down as they arose. I believe there little inherent conscious reflexivity within the notes themselves, for example; a thought such as 'looks in good health' includes only that conscious thought which was recorded. At the time of that thought I did not then examine and reflect upon it as there was no time, I simply noted the cognition. Schön (1983) discussed the concept of reflection-in-action as though there is a large element occurring during action. Under normal circumstances in a consultation one has time, albeit limited, to reflect and be reflexive during assessment and treatment of the patient. However, for this study the focus was on capturing the thoughts that were occurring moment-by-moment. Although in research there is an implicit assumption that we are studying something outside ourselves (Aull Davies, 2008) there is an insider-insider nature to this study. The subject matter that is being researched affords a deep intuitive connection and an embodied knowing emerging from an engaged experiential level (Gendlin, 2003). It is possible that, unlike propositional knowledge, it may not be feasible to capture the necessary tacit information for analysis.

At times I was aware that it was not possible to capture every single conscious thought, but the vast majority are portrayed. I was not measuring the number of thoughts, but assessing the nature of my cognitions, and this was considered acceptable for the study. The notes consisted of both objective and subjective thoughts which reflects the normal functioning of the human mind.

At this note taking stage there was a retrospective reflexivity applied during and after the pilot study, and during the main study. In my field diary I noted that I was curious about the nature of the notes that I was collecting. I had recognised a procedural nature to them at which I was surprised, and I sensed it was not how I believed I thought.

The notes I am taking are not necessarily predictable or repetitive but they seem procedural and I am not sure that they depict exactly what is happening cognitively. My mind seems to be doing more underneath the conscious thought.

Field Notes 8.5.13

The finding made me even more aware of my thoughts, and I came to the conclusion that this is what comes up from below as conscious thought, but actual awareness is vast. Felt meaning also functions within cognition and meaning is experienced.

'If meaning were only these "formal" and "objective" relationships, our speaking would be like the speech of a phonograph record. A phonograph record may "obey" all the rules of logic, syntax, and of objects about which it speaks, yet it

has no experience of the meanings it speaks. When we humans speak, think, or read, we experience meaning' (Gendlin, 1962, p44).

The notes seemed like they had all the logic and syntax but none of the experiencing at this point, which is why they appeared procedural. The experiencing was still inside me as an unvoiced encounter. However, it may also be possible to conclude that this was my experience of capturing my thoughts and another researcher may have a different encounter. In addition, if we ignore the experiencing aspect of a situation perhaps thoughts can be pared down to relative objectivity,

5.10.2 Descriptive Text

The second phase of data collection was producing a descriptive text that was loyal to the notes. Directly the patient left the practice I would sit with the notes and write a text that was descriptive of the happenings within the consultation. These would include my conscious and unconscious clarification of the incidents during the consultation. I tried to ensure that at this stage I described rather than interpreted the individual notes, for example the note; *'pain palpate R gluts/bursa not boggy'* would be expanded into *'I start to palpate and can reproduce the pain on palpation of the right gluteals and greater trochanteric bursa. It doesn't feel boggy though'*. As I was writing the description there was no apparent reflexive interpretation of the notes that would address my hidden assumptions or viewpoints that Charmaz (2014) suggested is necessary when being reflexive. However, on reflection I am aware that I have created an opinion on the bogginess of the bursa and that research on palpatory reproducibility has suggested that there is little intra or inter-rater reliability associated with palpation (Esteves, 2011). It is therefore possible, or likely, that another researcher may form a different opinion or have a different experience. The nature of the study is to look at how an osteopath makes perceptual diagnostic judgments and not the specific diagnosis arrived at. Therefore, these specific assumptions I made during note taking are not significant to the findings of the study. Reflexivity occurred at a level of remembering and experiencing what had occurred during the consultation in relation to the notes, but not related to any assumptions I had formed. My decision to stay loyal to the notes and describe the occurrences within the consultation, combined with the limited time allowed to write the descriptive text, kept reflexivity to a minimum at this stage.

5.10.3 Narratives

The descriptive texts then formed the basis of the narratives which were then expanded around the description. The narratives are where most of the purposeful reflexivity occurred. As I wrote and expanded the texts into narratives I asked questions of the descriptive text as suggested by (Johns, 2009). This was sometimes line by line, but

mostly taking the descriptive texts in sections or as a whole, asking what was I thinking, why did I respond with that thought, how could I have done this differently for example. I was interested in my internal and external responses, my relationship with the patients, my CR, myself as participant, and the study itself (Etherington, 2004).

As the narratives progressed I was cognisant of an increasing awareness of myself and my consciousness, which helped make introspection natural. I had read the criticisms of narrative inquiry and autoethnography as being navel gazing, and lacking in objectivity, (Dashper, 2015; Sparkes, 2002) and I was acutely aware of this condemnation. I continually tried to balance objectivity and subjectivity by involving supervisory feedback and engagement with the literature (Etherington, 2004; Johns, 2009). This helped to develop *'an intersubjective process of vibrant tension between oneself as a subject and as an object'* (Dowling, 2006, p9). The comments provided by my supervisors highlighted areas where my knowledge of the literature was lacking, particularly regarding the tendency for practitioners to demonstrate diagnostic bias. I also involved my doctoral colleagues whose input I found invaluable from a more personal stance, and I often asked them 'what would you have done differently if this was your patient'. When commenting on a narrative produced as a result of the pilot study, one of my colleagues highlighted that they knew me as a sensitive, caring practitioner, but that this aspect was not present in the narrative. When I reviewed the narrative in light of her comments I could see that I had written myself out of the chronicle, and that I still had some way to go to become an interpretive storyteller as portrayed by Denzin (1994). He discussed the need for the presence of understanding and mystery to uncover what is hidden and unclear. The comments from my colleague early in the study enticed me to look deeper at the meanings involved, so that I could describe and interpret the events as closely as possible whilst not losing rich descriptions (Geertz, 1973). I also wondered why I had focused so heavily on the biomechanical aspect of diagnosis. This was the start of a journey that unfolded into a realisation, that although I understood the BPS model and its impact on chronic pain, I did not use the knowledge effectively.

I found that I needed time to develop the narratives as suggested by Douglass and Moustakas (1985). Although each one was initially completed within an approximate two-week period in order to keep the study moving, I found that I returned to them at times as the study progressed in order to deepen them and allow tacit information held in the felt sense to arise (Gendlin, 2003). I was continually aware of the focus of the study and many of my questions were directed as such however, I found a constant reminder to vet the decisions I was making in relation to assumptions drawn and the efficacy of the study. I tried to remain reflexive in terms of looking back at the patient encounter and moving toward osteopathic practice that was transforming and desirable for me (Johns, 2009)

I am feeling embarrassment at this point because I think I missed doing a diagnostic test. There is a definite internal pressure from my ego to not expose my shortcomings, but if I am to learn and be able to allow potential readers to experience what I have experienced then it is important to explore the shortcomings.

Field Diary Entry 28.7.13

The resulting narratives became a mixture of a close description of what happened within the consultation, combined with my developing understanding and transformative journey.

5.11 Data Analysis– Grounded Theory Methods

The narratives which contained the descriptive texts were analysed using thematic analysis strategies of Strauss and Corbin (1990), Corbin and Strauss (2015), Braun and Clarke (2006) and Rogan et al. (1997). The reason for using thematic analysis is due to its proposed independence of theory and epistemology, which allows it to be applied across a range of theoretical and epistemological approaches, and making it compatible with constructionist paradigms (Braun and Clarke, 2006). The analysis is presented in a linear manner that belies its more structured randomness, moving backward and forward between levels of abstraction and concepts.

The major analytical stages in the analysis were as follows:

Open Coding – line by line coding and in-vivo codes

Memo writing

Axial Coding

Constant comparative method of analysis

5.11.1 Open Coding

Initially the narratives (data items) were read and re-read to gain an understanding of the concepts that were arising from them. Then segments of the data items (data extracts) were examined by line, paragraph, and phrase to discover and name the arising concepts. These were then written by the side of the data extracts with, where possible, the phrases used to most closely mirror the meanings in the data extracts and provide in-vivo codes. In reality due to the nature of the narratives in-vivo codes were rare but the codes that arose were still data driven. I attempted to remain constantly open to the unfolding of the data in order to allow the codes and concepts to emerge and not be forced (Braun and Clarke, 2006). As many potential codes and patterns as possible were

recorded next to the line or phrase to which it pertained in order to ensure no loss of context (Charmaz, 2014).

Fig. 5.5 An example of a section of coding applied to the narrative three as seen above in fig. 5.4

EXCERPT	CODES/PROPERTIES/DIMENSIONS
<i>The initial picture I was getting was of part of her life which has biomechanical consequences from so much sitting but more general stresses from negotiating driving in UK traffic which can be demanding. I got the impression she looked in pretty good health even if she was a little overweight as she sat in the chair in front of me with her knees together and her feet splayed. This is a posture I have seen with a recent patient</i>	Building a picture Biomechanical focus Biopsychosocial (BPS) Observation informs reasoning Intuitive pattern recognition

5.11.2 Memo Writing

Having identified codes, I then wanted to move away from the close focus of the codes to gain an understanding of the broad concept(s) that were arising from each data extract. This was achieved using the idea of memos to describe the concepts arising (Corbin and Strauss, 2015). I created a conceptual heading for each data extract to make the concepts more readily accessible and allow cross referencing to other categories. I attempted to remain conceptual and not descriptive at this stage in order to move from raw data to theory (Corbin and Strauss, 2015). Codes that had been identified at the previous stage were compared with the concepts that were arising from the memos to identify possible themes.

Fig. 5.6 An example of a memo that was used to understand the broad concepts arising from relevant section of the data.

MEMO 4

18 OCT 2015

CONCEPT: Tacit metacognition stimulates a biopsychosocial focus
EXCERPT <i>The initial picture I was getting was of part of her life which has biomechanical consequences from so much sitting but more general stresses from negotiating driving in UK traffic which can be demanding. I got the impression she looked in pretty good health even if she was a little overweight as she sat in the chair in front of me with her knees together and her feet splayed. This is a posture I have seen with a recent patient, it looks uncomfortable to me possibly because I am an osteopath and odd postures I associate with discomfort long term. I was getting a sense that she was</i>

flexible in her tissues so perhaps her hips can happily adopt that posture; I know mine can't. My mind was taking me down a biomechanical route because that posture is not a good one for the pelvis and hips. Within moments though I was sensing her stress, she had not mentioned anything and she appeared bubbly and bright, but there was something about this lady that was giving me a mixture of information. I was aware that my mind was racing just beneath the surface of consciousness but nothing was emerging as concrete thought at that moment. JE commented that I was demonstrating the presence of intuitive appraisal because I was sensing her stress. The fact that I could sense my mind racing below the surface also indicates an element of a more tacit metacognitive and analytical appraisal of my intuitive thoughts (Myers, 2002).

Notes on Memo

The practitioner is describing a period of cue acquisition where she is building a picture of the patient that is mostly focused on the biomechanical causes for her presentation. The picture is established by a combination of observation, intuitive pattern recognition and cue acquisition. The twists and turns of the case history questioning is clearly drawing elements to the surface in the patient that are initially hidden from view and the practitioner becomes tacitly aware of them as they arise and add a biopsychosocial focus. She is also aware that her mind is working below a level of consciousness that interaction with the literature has brought the recognition that they may be as tacit metacognition and analytic appraisal of thoughts.

5.11.3 Axial Coding

Having developed the memos and codes, which allowed overall themes or categories to emerge, the process of axial coding (Strauss and Corbin, 1990) was undertaken which allowed the identification of causal conditions, actions/interactions, and consequences. *Causal conditions* are the sub-categories that arise from the data extract against which an *action/interaction* pertaining to that sub-category can be elicited (also from the data extract). The *consequences* are the results that occur from the action/interaction occurring in the data extract. As an example the causal condition of '*visual imagery into embodied senses*' arose from an action/interaction where the patient sat opposite me during cue acquisition and as a consequence I could sense her tissues without touching her. This had a subtle tacit effect upon by CR as it unfolded during the consultation. During axial coding the categories and sub-categories began to take on a more constructed essence which allowed my interpretation to expand and develop.

Category 1: Developing a Sensory Construct

Context: Practitioner as observer looking on gaining visual imagery and sensory feedback informs reasoning		
Causal Conditions	Actions/interactions	Consequences
<i>Transfer visual imagery into embodied senses</i>	<p><i>Just observing the back doesn't give the sense of the person</i></p> <p><i>She sat in the chair in front of me with her knees together and her feet splayed</i></p> <p><i>Earlier when this patient had been sitting in front of me fully clothed I had a sense that her tissues were flexible</i></p> <p><i>I got the idea that she did not have enough muscular support</i></p>	<p><i>Really sense how they affect the person</i></p> <p><i>Sense how they affect the person from a biomechanical but also psychological point of view</i></p> <p><i>I was getting a sense that she was flexible in her tissues so perhaps her hips...</i></p> <p><i>I got that sense again when she was standing in front of me</i></p>

Fig. 5.7 Axial Coding

5.11.4 Constant Comparative Method

At each level of data analysis, the constant comparative method of Glaser and Strauss (1967) was used to establish analytic distinctions (Charmaz, 2014). This method of analysis is inductive, and deductive, and involves comparing data with data, data with category, category with category, and sub-category with sub-category, which in practice is a non-linear developing process (Charmaz 2014). Interchange between inductive and deductive reasoning occurs when the researcher inductively builds a category from the data then looks to deductively test or verify the category during further data analysis (Rogan et al. 1997). The method was used during all the stages of data analysis in order to challenge assumptions, or identify repressed data (Charmaz, 2014). Virtually all of the categories that emerged appeared in each of the narratives analysed which shows consistency of themes across the data.

5.12 Chapter Summary

The methodological location of this study has been detailed in this fifth chapter and it discusses the positioning of the study in the interpretive paradigm from a theoretical perspective. Ontologically the study is relativist with an interpretivist epistemology, and

this has been discussed in terms of their relationship to an ethnographic methodology. The chapter also addressed the philosophical position of the researcher in terms of her background and the professional location of osteopathy, and how that influenced the nature of the methods chosen. This chapter then documented the ethical considerations of an autoethnographic study, and the selection and management of participants. The methods used for data collection were discussed, which included a novel approach of moment-by-moment thought notation followed by development of the notes into a descriptive text loyal to the notes. The descriptive texts were then maintained within the subsequent narratives which were subject to RP methods of interpretation, and elaboration, with peer review and reference to the literature.

The elements of GT methods that were used to analyse the narrative texts were described, and examples of each of the stages of analysis are supplied in this chapter so that the reader can experience the trustworthiness of the study.

CHAPTER 6: FINDINGS

6.1 Introduction

This chapter begins by describing the analysis of the three levels of data; the notes, descriptive texts and the narratives. Examples are included so that the reader can follow the interpretations made. It then provides a list of the categories and sub-categories that arose as a result of GT methods of analysis. Each category is presented in context and, along with the sub-categories, is evaluated with quotations from the relevant narrative so that the reader can understand the interpretations made. The quotations used were sampled from across the case studies to provide depth to the analysis and interpretation.

6.2 Analysis of the Three Levels of Data

6.2.1 Notes

The reflection-in-action notes are a written record of a naturally occurring phenomena, as opposed to researcher provoked such as that generated via a focus group. In this case the notes are not completely independent of the researcher, but as suggested by Silverman (2000) no data is ever untouched by human hands. There are different ways of analysing this type of data. If one was interested in the linguistic content then one could use methods found in conversation analysis (CA), discourse analysis (DA) and narrative analysis (NA). NA is generally an interpretation of a story that has a plot (Alasuutari, 1995) which is not the case in this study. Generally, CA and DA treatments are directed at understanding the specific actions of the speaker in the text (Heritage, 1984). They are an analysis of what people do (Potter, 1997). There is an argument that this is exactly what this project is interested in. However, the texts produced for CA and DA are analysed for pauses as well as linguistic content. I decided that to produce data that was relevant for that type of analysis I would need to speak continually into a microphone whilst with the patient in order to provide a full and continuous text that could be transcribed verbatim. The difficulty of this has already been described in chapter five. Therefore, the story text has not been interpreted for specific linguistic content, but for more general influences, such as to demonstrate when thought happened in real time not just as a result of retrospective reflection.

The following example is from a case study in which a new patient had presented with a very acute flare up of chronic LBP, she was barely able to move. In this example I had moved past a number of pathology questions, to which I had received answers that indicated there were no apparent red flags, and I was looking for other confounding factors before moving on to the possibility of osteoporosis and a potential crush fracture. The questions I am asking demonstrate the direction of my thoughts and are useful as a support for understanding the descriptive text, and interpretation of the narrative. They

are also particularly revealing as an aid to demonstrate metacognitive strategies of FOR and JOL, for example:

Walking? Diet? Acidity? H2O dehydrated?

Early menopause? Bone density?

Notes 5: 12 and 13

In the above extract I have asked lots of questions of the patient, but the answers I get are making me ask more questions because I have not received answers that allow me to rest on a decision. I would argue it is a JOL because I have judged that I need more information from the patient. It could also be argued that it is a FOR because the information received does not create a feeling that what I have is providing the correct picture.

In this next example the patient has presented with LBP that has stimulated me to think that discal pain is a possibility:

Agg/rel, sitting, discal?

Notes 3:7

The answers the patient gave to the questions I asked created a FOR. It is suggested that this enabled a pattern recognition mode of cognition and prompted me to investigate the possibility further during the examination and treatment phases of the consultation.

6.2.2 Descriptive Texts

The notes form the basis of the descriptive texts, which in turn forms the foundation of the narratives. The descriptive texts appear in their entirety in the narrative text. The descriptive texts were not interpreted as a separate entity, apart from to show how I have enlarged and translated the notes into a more understandable form that describes the event. The final form bears resemblance to an interview transcript, as if I were an interviewee who had been asked questions about a patient consultation. The descriptive texts from the above note examples are as follows:

I ask, as well as getting up and sitting do you get pain on walking, and she says only at pace. I wonder about acidity related to diet, but she says she is intolerant to dairy/sugar/coffee/tea/yeast, and I think probably not but need to check alcohol and smoking...

Descriptive Text 5: 24

There has been a lot of heavy work which she helped with, but there was not one event that she remembers starting the pain. It is aggravated by sitting and lifting which makes me think discal.

Descriptive Text 3: 16

6.2.3 Narratives

Having said that there was no analysis of the descriptive texts it could be argued that an initial interpretation began when developing the narratives, when I would stand back from the text and consider the significant aspects to pay attention to, asking questions of the text as described in the methods section (Johns, 2009). I would also delve into the text and 'be' with it, focusing on the 'felt sense' in order to understand how I felt about the unfolding picture (Gendlin, 2003). The resultant narrative started to reveal broad concepts which were noted in my field diary, and interpreted further whilst involving the literature and supervisory input. An example of this process is as follows:

When I booked her in I noticed the name that gave me the feeling of cheerfulness. When she arrived with a smile I asked her to sit until I was ready and then I invited her in to the treatment room. She looked well and a young 68 and I mentioned this and she said she feels it and more and has done for the last year.

Descriptive Text 5

This encounter left me quite moved during and after the treatment session, and for some weeks to come whilst I was treating her. It has the ability to make me sit still and reflect with my senses as well as my thoughts. When I booked her in I noticed the name that gave me the feeling of cheerfulness. When she arrived with a smile I asked her to sit until I was ready and then I invited her in to the treatment room. She looked well and a young 68 and I mentioned this and she said she feels it and more and has done for the last year. She is a petite, gentle woman with a lovely smile that hides a deep well of grief and emotion beneath it. When she first came to the clinic she was in so much pain I didn't think I could possibly help her as she could barely move from the vertical without grabbing for something to hold onto. Some patients raise a question in my mind when this happens but this woman was in real pain and had been for some time. I am still not sure how she managed her daily life.

Narrative 5

I had sat with the description and allowed myself to become aware of my internal body and senses (Gendlin, 2003), to feel what this consultation meant to me. This particular consultation created strong feelings of sympathy for the patient at the time. I could easily feel them when I sat with the description, and getting in touch with them automatically generated questions in my mind relating to the way in which I handled this consultation.

I ask again why it has worsened and she says again that she doesn't know but starts to tell me that her son died in 2005. She starts to cry and her grief consumes her, I think poor women and feel unable to help except to empathise with myself in front of her.

Descriptive Text 5

I really wanted an answer to the question why had it worsened, so I asked again at this point and she repeated that she didn't know but then started to tell me that her son died in 2005. As she started to cry her grief consumed her and she sat

there in front of me crying, sitting upright, perfect posture, with tears pouring down her face and I felt genuine sympathy for her, she seemed to have become enormously stuck within her grief. I also wasn't sure how to show the sympathy and empathy I was feeling so I just sat there hoping that she could feel my empathy.

Narrative 5

I can still feel this consultation in my body and see it as though it is happening now. I was caught up in the patient's grief and emotion at the time and didn't examine how I could help her move forward. I don't think I know how to help with someone with such fundamental emotional trauma despite having read books, attended courses and lectures related to trauma mediated pain.

Field Diary Entry 9.11.13

This particular narrative stimulated me to ask questions of myself about how I should best approach patients who have clear psychosocial factors affecting their symptom presentation, 'how could I do things differently if I saw this again' (Gibbs, 1988; Kolb, 1984; Johns, 2009). The unwinding of this narrative began to make me realise that although I was aware of the BPS model of healthcare and took it into account when treating a patient, I did not actually help them deal with their emotions very often. I had no real structure for addressing this or a working process for referral. This I thought presented a haphazard approach and shocked me when I realised. I then developed the narrative further, with feedback from my supervisors and colleagues and with reference to the existing literature, which helped create these broad concepts. The narratives were then analysed using GT methods as explained in the methods section 5.4. This allowed the identification of similar, and some new, potential concepts in order to address the research questions. The following is the development of codes and overall memo writing that allowed me to try to understand the specific as well as broad concepts that were arising (Corbin and Strauss, 2015).

MEMO 3

19 OCT 2015

CONCEPT: Analytic reasoning and establishing a timeline important during complex cases

EXCERPT	CODES/PROPERTIES/DIMENSIONS
<p><i>She was displaying the presence of massive yellow flags but nobody had suggested psychotherapy and looking back at my notes that included me, I am sad to say. Since the death of her son a number of health issues had arisen and eventually her low back had begun to cause pain and dysfunction, a gentle decline into illness, (Selye, 1974). She had breast cancer followed by heart arrhythmia</i></p>	<p>BPS model Reflective practice informs Cue acquisition Adaptation model</p>

<p><i>which had resulted in a defibrillator being fitted followed by a stent. So many interventions in the last 8 years, as I mentioned this fact she looked shocked as though she has only just made the connection. She calls it a defibrillator but says it is like a pacemaker when I asked her. I asked when she had the stent fitted to get a timeline and she said October 2012. Did it coincide with the LBP I asked, yes she said funnily enough it did. I am not sure of the connection here but I am remembering a previous case where the patient had LBP that should have responded fairly rapidly to osteopathic treatment but didn't. An average number of treatments per patient is three but this gentleman had six and was only thirty percent better. On three separate occasions I reassessed his situation but could not find a more suspicious reason for his pain. There was no good reason to refer him because there were a lack of symptoms and I didn't think a doctor would agree to further tests. He recovered after eight treatments but I heard two months later that he had suffered a minor heart attack. The heart should not cause LBP as it normally refers pain to the chest, left arm and neck areas (Goodman & Snyder, 2000). It struck me at the time as too much of a coincidence but I couldn't explain the connection except perhaps that his body was not coping with the underlying heart illness and was giving him back symptoms.</i></p>	<p>Meta-analysis</p> <p>Establishing timeline</p> <p>Meta JOL/Analysis</p> <p>Reflection informs practice</p> <p>Meta-FOR/JOL</p> <p>Intuitive pattern recognition</p> <p>Meta-knowledge</p> <p>Uncertainty ->questioning knowledge</p> <p>Procedural CR</p> <p>Meta-knowledge</p> <p>Reflection informs practise</p> <p>Uncertainty ->questioning knowledge</p> <p>Adaptation model</p>
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Fig. 6.1 Example of coding analysis of a narrative

Notes on Memo

The case study is clearly a complex one with many non-biomechanical factors involved. The practitioner is recognising her inadequacy when dealing with psychosocial factors. The routine of the case history taking maintains the focus of the cue acquisition whilst the practitioner uses her experience to negotiate her way around the information that is arriving. As part of this routine she establishes a timeline to further focus the information and enhance her analytic reasoning. Reflective practice has clearly informed her practice during this process, and there is also evidence of her using an adaptation model as a lens through which to view the patient.

As can be seen the BPS model has appeared both as a broad concept and within the coding grid. The overall concept and memo writing also help to focus the meaning of the narratives. In order to produce the final categories and sub-categories from the coding

strategies used overall categories were developed that took into account codes, concepts and information produced from the memos. Each narrative was analysed by comparing incident against incident for similarities and differences. Conceptually similar incidents were put under the same conceptual label and category (Corbin and Strauss, 2015). Some of the codes that can be seen in the right hand section of fig. for example, BPS model and reflection informs practice, were produced when analysing other narratives and contributed to the final categories such as 'Reflection as a Conduit for Change – developing a BPS approach'.

The following is an example of one of the categories that arose from the analysis. The concept of RP as a conduit for change is very apparent and appeared in all the narratives:

- | |
|--|
| <p><u>Category 4 Reflection, Reflective Practice</u></p> <ul style="list-style-type: none"> • Reflective practice prompts recognition of one-dimensional patient management • Reflective practice helps identify areas for improving practise • Guided reflection informs and changes practise • Reflection informs practise and identifies potential for cognitive bias • Tentative collaborative reasoning developing informed by reflective practice • Guided reflection induces practitioner discomfort and instigates change • Reflective practice informs practise and highlights uncertainty that prompts knowledge inquiry • Reflective practice instigates change in practise • Reflective practice identifies the reason for awareness of affective state • Reflection informs and changes practise • Reflective practise informs and changes cue acquisition • Reflective practice informs practise • reflective practice changes cue acquisition • reflective practice deepens reasoning • Reflective practice process produces new insights • EBM and reflection supports practice |
|--|

Fig. 6.2 Development of the category of RP

The above process helped develop the category of RP. The final step to the analysis was the method of axial coding which allowed me to relate categories to subcategories (Strauss and Corbin, 1990). Although as Charmaz (2014) pointed out it has received both criticism and support, I found it useful to reassemble information from the analysis, finalise the major categories, and understand the relationship between the narratives and categories. I found that it brought the data back together into a coherent whole as originally suggested by (Strauss and Corbin, 1990). The following is an example of the axial coding for the category of 'RP' and sub-category of 'conduit for change':

Category 3: Reflective Practice

Context: Reflective practice informs reasoning and acts as a conduit for change		
Causal Conditions	Actions/interactions	Consequences
<i>Reflection as a conduit for change</i>	<i>As a result of the suggestion</i>	<i>The important thing is to know what strategies I would use to counteract</i>
	<i>I have also started to notice when I want to take a short cut</i>	<i>Now I am finding I countermand the override and perform additional tests</i>
	<i>A potential weakness was that it was centred on musculoskeletal conclusions</i>	<i>I have already started to identify the potential routine nature of the symptom picture and teach myself new questioning strategies</i>
	<i>It can't help the patient in this study unless she returns to my clinic for future treatment</i>	<i>But it will help me understand when to gently explore this with a patient and potentially refer for psychological help</i>
	<i>How could I be aware and available if I was caught up in my head?</i>	<i>Previous reflective study that my practice is best carried out with a quiet and non-judgmental mind</i>
	<i>Compliance is a very practitioner-led statement</i>	<i>I would like to move my practice toward the idea of collaborative decision making</i>
	<i>The link between psychosocial factors and chronic low back pain being important</i>	<i>I wonder is it acceptable to look at a patient in solely biomechanical terms</i>

Fig. 6.3 Example of axial coding for the category of RP

6.3 Emergent Categories and Sub-categories

As a result, there are seven main categories with several sub-categories arising from them:

Developing a sensory construct

- 'Building a picture'

- Mental imagery into embodied senses

- Analytical multisensory perception

- Multisensory perception informs patient care

- Palpation informs treatment decisions

Pattern Recognition

- Multisensory perception enables pattern recognition

- Analytic cognition enables pattern recognition

- Emotional intuition enables pattern recognition

Metacognitive Monitoring of Clinical Reasoning

- Monitoring and analysing

- Predicting

- Planning

 - Intervention

 - Rationale

- Evaluation and revision

Reflective Practice

- Creates awareness

- Retrospective reflection activates questioning

- Reflection as a conduit for change

 - Cognitive error and bias in CR

 - Developing a BPS approach

 - Moving toward collaborative reasoning

6.3.1 Developing A Sensory Construct

6.3.1.1 Building a Picture

Although it is possible to dissect the observation and palpatory skills of an osteopathic practitioner and make them discrete entities. In reality, they are likely to be used in combination. Early in a consultation discrete observation occurs where an osteopathic practitioner will observe the patient both formally and informally. The aim is to gather as

much information as possible to help with the hypothesis formation and ultimately diagnosis. However, it is thought that osteopaths literally diagnose with all their senses (Esteves and Spence, 2014), but how this occurs at perceptual level has not been investigated. This section demonstrates the use of both visual and palpatory senses that are used both discretely, and in combination to allow the practitioner to create a mental image of the patient. It is arguably impossible to palpate a patient without being aware of them visually, unless the eyes are closed. Which suggests that the perceptual information arriving from the senses is combined.

In this study both formal and informal observation occurs which describes times when I am intending to observe and others which are more tacitly occurring. The informal 'tacit' observation occurs from the moment the patient enters the clinic where I gain a sense of the demeanour of the person which could also suggest how resilient they are emotionally (Fourie et al. 2015). It allows me to build a picture or perception of them. This includes personal and social characteristics not simply anatomical and biomechanical information (Moran, 2010):

She came into the treatment room with a big smile, she had an open demeanour and I instantly liked her.

Narrative 3: 2: 1

When this gentleman arrived he looked a bit sheepish but then he often looks apologetic I am not sure why, but it seems like self-esteem issues as though he expects a cross response

Narrative 4: 1: 1

She is a petite, gentle woman with a lovely smile that hides a deep well of grief and emotion beneath it.

Narrative 5: 1: 10

I would suggest that the immediate observation may set the tone for the rest of the consultation, which raises the concept of bias in CR (Croskerry, 2002; Wellbery, 2011). This area has been investigated addressing various marginalised groups such as obese patients (Lee and Calamaro, 2012), and one that may warrant further investigation in osteopathy.

Informal observation then continues when the patient was sitting in front of me during cue acquisition, which combines visual and auditory feedback. The patient's posture can provide some interesting clues as to how they would normally sit, and the kinds of postural stresses they may be under. It is often the A-P spinal curves that are under most pressure, but in the next case it was the patient's hips that were of concern. I used the phrase 'the initial picture I was getting' as a result of verbal cues from the patient, which

suggests I am developing an image in my mind. The information was recorded in the notes and then recalled for the descriptive text, which suggests it was stored in LTM:

The initial picture I was getting was of part of her life which has biomechanical consequences from so much sitting but more general stresses from negotiating driving in UK traffic which can be demanding. I got the impression she looked in pretty good health even if she was a little overweight as she sat in the chair in front of me with her knees together and her feet splayed.

Narrative 3: 4: 1

This next extract corresponds to a new patient consultation, with a woman whose son died some years ago. She still retains deep grief that is very close to the surface of her emotions. The extract is in the descriptive text, and corresponds to the whole consultation, including treatment phases. It is not in the notes, because the patient was upset and it would have been uncaring to break off to make notes. The encounter was deeply retained in my memory as demonstrated in the narrative:

This encounter left me quite moved during and after the treatment session, and for some weeks to come whilst I was treating her. It has the ability to make me sit still and reflect with my senses as well as my thoughts.

Narrative 5: 1: 1

In this next extract, I am using combined auditory, palpatory, and formal visual perception whilst assessing the movement of the patient's pelvis during active examination. Auditory perception occurs because I will be gaining verbal feedback from the patient regarding pain levels. I concluded that the joints were moving similarly, which informed me that the patient's pelvis was sitting evenly in that plane, but also gave me an initial insight into whether either of the SI's are restricted. The palpatory feedback appears to be both direct and proprioceptive because I was receiving information from areas of the patient's body that were distant from my hands:

I went on to assess her body in action by asking her to walk on the spot whilst I felt the movement of SI's which I remembered were fairly equal in this position. This movement gives me a direct palpation of the pelvis but also a broad sense of the flexibility of the spine and any restriction of movement through the hips and legs as well as observing foot movement.

Narrative 1: 3: 4

This palpatory feedback occurs during the active standing examination, but also when the patient is lying down and I am assessing their body passively i.e., with no muscular input from the patient. In this section, I am examining and treating at the same time with the patient lying on her front. The palpatory feedback has both developed and, in this case, supported the visual information. This has been underpinned by propositional knowledge

from undergraduate education and experiential knowledge from previous patient encounters regarding a scoliosis:

I found that her thoracic spine was restricted at T3-6 and around her left ribs, this fitted with the outer scoliotic curve which often feels tight and unforgiving.

Narrative 1: 9: 1

The following extracts occur during a part of the consultation where I am treating the patient cranially. I have detected a strain pattern in the head using my palpation, which stimulates me to wonder whether it makes sense as far as the rest of the picture is concerned. I have not made a final decision because I use the words 'but could fit':

I moved from the TL to the temporals and waited until I felt a balance bilaterally through the body. The left side of her body was anterior (front) and superior (above) which I thought was an interesting pattern but could fit the picture I was seeing.

Narrative 1: 14: 16

The notes show that I was aware of what I was doing and the strain pattern that was occurring.

This final extract is from the reflective narrative only, and is my interpretation of how I use the technique of cranial osteopathy, in this case to assist my palpatory feedback in diagnosis:

This hand hold provides me with a 3D sense of the pelvis as I can hold the pelvic bowl between both hands and feel its tilt or torsion, and fluidity.

Narrative 2: 10: 7

6.3.1.2 Mental Imagery into Embodied Senses

At times during the narratives I use the word sense, as though I am absorbing the feel of the person's body. The following extract is formal observation where I am purposefully analysing the patient's anatomy during physical examination. I often observe from in front and behind the person because it gives me a better sense of the whole individual. It is worth noting that the first extract only appears in the narratives and not in the descriptive text, which suggests that it is a conscious recollection of my feelings:

I looked at her body from behind and the front. For me just observing the back doesn't give the sense of the person as looking at both front and back. There is often a softness anteriorly (front) that emphasises the twists and turns in the body and allows you the observer to really sense how they affect the person from a biomechanical but also psychological point of view.

Narrative 1: 2: 2

This formal analytic observation occurs in the next extract. I have gained the sense of the patient again whilst she had her clothes on, a sense which is supported when doing the standing examination:

Earlier when this patient had been sitting in front of me fully clothed I had a sense that her tissues were flexible, and I got that sense again when she was standing in front of me.

Narrative 3: 10: 1

I would argue that the 'sense' I am describing is an example of intuitive cognition occurring presumably as a result of years of observing and treating patients. It is an example of pattern recognition, or non-analytical form of diagnosis (Norman and Eva, 2010). Gaining a feel of different body types and building a library of sensations is commensurate with the concept of embodied cognition which posits that all cognitive processes are based on sensory, motor, and emotional processes, which are themselves grounded in body morphology and physiology (Glenberg, 2015).

My mind was taking me down a biomechanical route because that posture is not a good one for the pelvis and hips. Within moments though I was sensing her stress, she had not mentioned anything and she appeared bubbly and bright, but there was something about this lady that was giving me a mixture of information.

Narrative 3: 4: 12

In the next extract, the patient is lying on her side and I am passively examining and treating her low back. The palpatory feedback has prompted a sense of the patient's lifestyle in her tissues:

I thought that the tissues felt very boggy and unhealthy and it gave me a sense of her daily life and I wondered what in that life had caused this to become so acute.

Narrative 3: 11: 16

The notes do not show the corresponding questioning, but it appears retrospectively during the descriptive text. However, the reflection occurs within the following thirty minutes after the consultation and is a direct representation of the notes from the my LTM.

The following extract occurred during treatment of a patient whose son had died. I was treating cranially, which involves relatively long periods of time sitting with my hands on the patient's body. There is relatively little movement that occurs compared with structural treatment. This creates a situation where both the patient and myself interact on a more personal level because of the stillness. This often prompts disclosure from the patient, which it did here. It also allows me to gain a different sense of the patient than when I am actively moving their tissues. The cranial treatment also arguably allows me to palpate the patient's tissues at a deeper level than can be accessed with structural treatment.

There is little empirical evidence for this concept, but I can sense the greater depth and the embodiment of the perception. The narrative acknowledges this absorption of this patient's presentation in the final sentence:

As I am treating her pelvis she started to talk about her daughter in-law having remarried after her son died, she is clearly finding this hard to accept and starts to cry again. The tension started to build in her system and I actively thought the words allowing and compassion for her as if I could transfer acceptance to her through my will. The word allowing and compassion came to me whilst she was talking about this situation but I fall short of telling her what I am thinking, so I just speak to her body from within my mind. I don't know how much communication we can have with a person's energy but I felt that was the only place that I could direct my thoughts at that moment.

Narrative 5: 9: 3

6.3.1.3 Analytical Multisensory Perception

There are many instances in the analysis that suggest I was analysing as a result of visual and haptic feedback. The sense of the body would prompt a judgment, or an image that would help me develop a hypothesis. In this extract I can see the patient's profession described in her body. The extract only occurs in the narrative, which may indicate that only on reflection did I have time to recall the image that the patient unconsciously describes:

She is an architect by training but is very keen on making sure that she completely understands how her designs work practically and so she does some building. So sometimes she is sitting for hours and others is hammering nails. Her work is described in her body as she has an athletic body and posture but there are postural curves and strains that are obviously born of sitting for hours at a computer...

Narrative 7: 2: 1

The next extract suggests there are different ways of looking at patients. In the previous extract the patient is relatively young and I am aware she is active, but in this next passage the patient is retired and the description of her biomechanics more structural. The concept of bias has arisen in this study, and perhaps this is an example of our judgments dictating, or affecting our CR:

She came to see me last week with right sided pain in her thigh and around her lateral pelvis and I diagnosed her with what I thought was a trochanteric bursitis on the right probably as a result of biomechanical causes. She has an over pronated right foot which causes her to have an adducted femur on the same side causing the right knee to point relatively toward the midline. When she walks this will then put pressure on the medial aspect of the right knee which to this date luckily is asymptomatic

Narrative 8: 1: 7

This next series of extracts are from a later patient, and occur at different times during the narrative. The patient was undergoing an adverse event after a treatment I had given. I made a space for her in my diary during a tea break to try to help. Adverse events do not happen very often, but it is a stressful aspect of being an osteopath because our aim is to reduce pain not to increase it. The patient is clearly distressed when she arrives, this and the anatomical observation stimulates me into an analytic mode of reasoning:

When she arrived on the day she contacted me she was genuinely very tearful which is so unlike the lady I normally see who is always smiling and laughing. She also looked in shock, which concerned me.

Narrative 9: 3: 7

I noticed her eyes looked odd, the right one had a larger pupil which prompted me to assess the cranial nerves.

Narrative 9: 4: 2

When I shined a light into her eyes her pupillary response was odd bilaterally as the pupils didn't contract much, but it was bilateral so I thought that was probably acceptable. I wondered about her tumour but thought it couldn't be affecting the third cranial nerve from the position of the pituitary because hers is quite discrete.

Narrative 9: 4: 12

In the next extract, I am treating the patient and reflecting upon the sensory feedback that the patient's spine is giving me and from previous consultations. The patient has had some tests performed to establish the nature of a urinary tract infection and has found that she also has a long term kidney infection. I have noted before that the patient's lower thoracic spine feels unusual, which corresponds to the sympathetic neural connection to the kidney (Sammut and Searle-Barnes, 1998). It has prompted me to make diagnostic connections to the palpatory feedback I have been receiving. The corresponding notes also comment on the same palpatory feedback, as does the descriptive text:

I have often pondered over her lower thoracic spine when treating her previously. I have wondered why it should feel particularly bendy as though there is anomalous bony integrity...

Narrative 7: 4: 8

In the final extract of this section, I am treating the same patient and have discovered an area around the upper thoracic spine and lower cervical spine where the muscles are tight and sore. It has prompted me to question my findings in light of the information regarding the patient's kidney. I have not drawn any conclusions at this stage, I am simply questioning:

Having just been reminded of the relationship between the kidneys and the lower thoracic spine tenderness I wondered how much I needed to read into this tension I had just found...

Narrative 7: 5: 5

It appears that palpation, as suggested by Browning (2014), can be used very specifically to identify muscle tone, identify anatomical landmarks and individual anomalies, provide feedback for clinical tests, and generate information about range of joint movement. The following extract portrays a passive examination of the patient's hips with her lying on her back. The feedback that I am receiving from the examination is proprioceptive because my hands were not directly on the patient's hip at the time, I was receiving feedback via the movement into my hands. I was also palpating the skin of the patient, and had assessed the pelvis actively prior to this part of the examination. Therefore, that information is likely to have still been present and embodied. This would then combine to provide multisensory integration of the visuo-haptic feedback (Esteves, Geake and Spence, 2008). Explicit feedback and analysis is occurring because I am making statements about the patient's hips and muscle tone. The sensory feedback is not being used to form a specific diagnosis at this stage, but to build on information already gathered:

I asked her to lie on her back so that I could examine her hips which were flexible and I found that her muscle tone was not good.

Narrative 2: 7: 16

During the next extract the patient is lying on her side and I am examining and treating her lumbar spine and gluteal muscles. I am gathering information about the nature of the third lumbar vertebra which seems to be sitting more deeply than its corresponding neighbours. It also coincides with an area of soreness of which the patient makes me aware. The soreness is at the same point I found during active standing examination. This further deepens the multisensory integration of information, and creates a questioning about the state of the patient's tissues:

As I was examining I began to treat her by massaging the muscles to release above L3 and to move the fluids that were causing the bogginess around the spine. Treating as I examine helps me to receive more feedback from her body and as I am doing this I wondered whether the joints could take manipulation of any kind.

Narrative 3: 11: 1

6.3.1.4 Multisensory Perception Informs Patient Care

Competent osteopathic practice involves looking after patient's health and wellbeing, which by implication would include patient care during the consultation (GOsC, 2012). This is an iterative exercise in practise, because an attentive practitioner should be continually aware of changes in the patient's presentation, and adequately responsive to

those alterations (GOsC, 2012). Patient care does occur during the whole consultation, and especially during treatment, when it is potentially possible to cause physical hurt to the patient particularly if working with structural osteopathic techniques. Treatment is 'hands on' but in reality patient care occurs as a result of a combination of visual and haptic feedback which can be seen in the following extract:

I started by gently massaging the left LES and gluteal muscles and gently articulating her lumbar joints to stretch them and increase the joint space. I could sense her distrust that the movement would be okay so I reassured her by explaining what I was doing and wanting to achieve and I asked to tell me if anything hurt too much, this helped her to visibly relax and I was able to move her body around with some ease and not much pain.

Narrative 5: 8: 7

The extract also appears in the descriptive text, which suggests the situation was uppermost in my mind when writing up the case immediately after it had finished. It also suggests an awareness during the treatment that was automatic. However, the extract is not within the notes. I remember the thought arising and not having time to capture it because I could sense that the patient appeared fearful. I could not leave at that moment so did not write the note, but it left a strong impression in my mind and I wrote it immediately after the consultation:

The next extract shows conscious caring observation combining with my experiential and propositional knowledge base which in this case is directed biomechanically. During undergraduate education, practical examinations always had at least twenty-five percent of marks awarded for patient care. It has clearly had a long lasting and positive effect because the knowledge prompts me to act to relieve any possible positional pain that may be occurring. I was aware that the position the patient was in could be causing discomfort because of the stresses that may be occurring on the musculoskeletal system. The extract also appears in the notes and descriptive text and shows I am consciously aware of the patient at all points during the examination, and these situations have a directive impact:

I asked her to lie prone which looked awkward for her because I could see that her back was extended so I placed a pillow under her abdomen to elevate her back and take the pressure off the facet joints.

Narrative 1: 6: 17

The descriptive text lacks the rationale for the action which I had time to add during the narrative, but not during note taking or descriptive text. This arguably indicates the presence of tacit information affecting the action:

In this next section visual feedback is used to inform my CR in terms of aspects that might affect the patient either emotionally, or psychologically. Within the notes it is easy to see that I have remarked that the patient does not have standard curvature, but that phrase is not specifically used. The mental image of the patient in my mind from the consultation has clearly created a BPS judgment that is described in the descriptive text and narrative. I then describe the patient's spine during the descriptive text, but I do not elaborate on the possible impact this may have on the patient until the narrative:

I sense she is aware of the fact that she does not have standard curvature and that maybe this is an issue for her, but how she feels about this is not spoken about directly.

Narrative 1: 11: 1

6.3.1.5 Palpation Informs Treatment Decisions

In this section there are segments of narrative that suggest that I use my palpatory feedback to inform treatment decisions. The information also appeared in the notes and descriptive text. These are mostly in the form of decisions to treat another area, or conclude the treatment for that day. Palpatory feedback that occurs whilst performing cranial techniques provides a sensation that the patient's mechanism is balanced and non-reactive. I often use it at the end of a structural treatment to ensure that I have made sufficient change to the patient's tissues in order to stimulate healing. There are no corresponding notes to this effect because when treating cranially it is difficult to break away from the treatment because it requires a level of stillness:

I thought was an interesting pattern but could fit the picture I was seeing. I waited for the resolution of this pattern and decided to finish the treatment at this point.

Narrative 1: 14: 17

In the next narrative I am treating the patient's sacrum cranially with my right hand, with the left hand on the lower thoracic and upper lumbar spine. I have noticed that the two areas are moving away from each other, and I used my palpation to inform me when the two areas were back to moving in synchrony. My experience informs me that this is important to achieve:

My left hand I put on her thoraco-lumbar junction which was going into flexion whilst the sacrum was travelling into extension. I waited for the mechanism to cycle between the L/S and T/L a few times before it settled into the same rhythm and direction.

Narrative 3: 16: 3

In the next example I have examined and assessed the patient supine, and prone, and decided to perform a specific manipulation to the side of the pelvis I thought was most restricted. The sensation created a questioning and analysis before the decision:

I trusted my palpatory examination findings and performed a leg tug to the right SI in the supine position and felt a change.

Narrative 7: 6: 30

Taken together there are a number of concepts demonstrated in this section that describe the *'developing a sensory construct'*. The overarching theme is, that I am using my combined senses to build a picture, creating a mental image of the person that becomes embodied. Initially at the beginning of the consultation, it appears that I use an informal 'tacit' style of observation, where I get a general feeling for the patient through body language. This is arguably an intuitive type of observation that brings to the surface conscious thought. I would also suggest this tends to set a tone for the consultation which if unaware could lead to cognitive bias. During the informal and formal observation, and palpatory stages, the image is embodied as an enhanced sensory form within me. This helps me to gain a sense of the person. Visual and palpatory perception generates a specific analytical response and questioning where I work to gain an understanding of the person in their surroundings, create a clinical understanding of the signs and symptoms, and deduce the patient's 'normal' and, therefore, areas of dysfunction. The perceptual information is supported by propositional and experiential knowledge. Palpation appears to be both direct and proprioceptive, and in these extracts it has been specifically concerned about body health and creating diagnostic connections. This is the form of possible underlying pathologies, or intuitive feedback about patient health and lifestyle. The explicit information that it provides is related to muscle tone, joint and bone health and range of movement. It is also suggestive that cranial palpation is used not only as a treatment but as further diagnostic support for previous visuo-haptic findings. It also provides JOLs that inform my treatment decisions about when to move on to treat another area, or whether the treatment is at an appropriate point to finish. Structural palpation informs my treatment decisions by giving specific feedback about joint restrictions and tissue health. This allows decisions to be made regarding modes of treatment and patient management. Palpatory feedback is iterative and I use it to test my hypotheses, but I do not finalise a diagnosis at any stage of the process and remain open to feedback. Finally, in this category combined visuo-haptic feedback informs patient care to ensure patient comfort and safety.

6.3.2 Pattern Recognition

CR is considered an important process in healthcare and central to clinical practice (Higgs and Jones, 2008). Due to the inherently tacit nature of cognition it has proven difficult to map the processes that occur during CR (Schuwirth, 2009). Current theories of CR favour dual process theory (DPT) as a likely scenario for cognitive processing

(Norman et al. 2007). The theory depicts slower analytical T² and rapid non-analytical T¹ cognitive processes. PR exists within the rapid non-analytic area and is thought to be the major aspect of cognition related to expertise (Schmidt and Boshuizen, 1993).

Each and every clinical encounter engages an array of differing cognitive events within the PR mode of reasoning (Charlin et al. 2007). When patients present with a familiar complaint the practitioner rapidly draws relevant information from WM about those symptoms, and develops a hypothesis or hypotheses. The relevant knowledge that is retrieved is organised into a problem representation termed 'illness scripts' (Feltovich and Barrows, 1984), which is the solvers internal model of the problem. These 'illness scripts' consist of signs and symptoms, patient characteristics, and practitioner's knowledge of the problem and underlying processes (Boshuizen and Schmidt, 1992). The clinician is able to introduce the analytic mode of reasoning at any time to test out their theories, or they can remain intuitive throughout the consultation. It is thought by some that trying to eradicate intuitive thought produces inferior decisions, and we should start with intuition followed by analysis (Klein, 2003).

6.3.2.1 Multisensory Perception Enables Pattern Recognition

Within this study it was found that aspects of multisensory feedback activated the use of PR at various stages throughout the CR process. The first extract is occurring once I have finished assessing the patient standing and supine and have decided to treat the her on her front. Visually, I am aware that the position the patient is lying in looks uncomfortable for her. Many people are able to lie on their front with no problem but there was something about the way the patient was lying that activated a recognition in my mind:

I then made a decision to assess and treat her on her front and I asked her to lie prone which looked awkward for her because I could see that her back was extended...

Narrative 1: 6: 15

This next extract occurs early in a consultation, during the cue acquisition phase. I am gaining a sense of the patient and asking questions about her presentation, and I note that she is quite serious. PR occurs as I become aware that she is sitting with her knees adducted, I have seen this many times before and it is, biomechanically, a difficult position for the pelvis:

I was semi-consciously assessing her posture as she sat in front of me with her knees adducted and feet internally rotated, not good for pelvic pain I thought but she seemed to be very comfortable in that position. I say semi-conscious because I was asking questions which would take a lot of my attention but I was aware of how she sat and I wondered whether she had any perception of it being an awkward position.

Narrative 2: 3: 1

This next extract is from the same patient, but I am now assessing the her during an active examination. I have asked the patient to squat because she has pelvic pain, so I am trying to provoke the symptoms. The squat elicits nothing, so I move to asking her to stand on one leg. This was an automatic intuitive request. This movement induced anterior thigh and pubis pain which prompted me to consider the hip joint. When I moved on to the passive examination I found that the hip was very flexible. It prompted recall of a pattern recognition memory of thyroid related to hyper-flexibility:

...she struggled to stand on one leg as it caused pubic pain and anterior thigh pain which was interesting to me and started me thinking about the efficacy of her hip joints and musculature.

Narrative 2: 7: 13

The following examples occur when I am using palpation as a mode of treatment and assessment, after I have assessed the patient actively and passively. Earlier in the consultation I noticed that the patient's left pelvic bone looked internally rotated. I wondered about the cause, which was probably T², analytic processing. However, later on I found the patient's back muscles close to the spine were tight in a specific area. This related to the insertion points of the muscle I thought of earlier. The thought was rapid and activated by palpatory feedback:

I started to treat her by working through the LES which were tight next to L1-3 near the spine and it prompted me again to make another mental note to look at psoas on that left side.

Narrative 1: 6: 26

In the following extract I am treating the patient using cranial osteopathic techniques, which arguably places me in an intuitive space relying on my unique perception and memory of sensations. Close noticing as keen discrimination and judgment are key capabilities for visual domains in medicine (Bleakley et al. 2003). It could be argued that this is the case for osteopathy in both the visual and tactile domains. During this segment I have picked up a strain pattern, and sensation, that has enabled me to retrieve information from LTM. This allows me to understand the tissue complexity and make a decision regarding treatment prognosis:

I could feel her sacrum extending and side-bending left into a strain pattern and her low back felt unyielding as though I was going to have to work quite hard to get it moving.

Narrative 5: 9: 1

6.3.2.2 Analytic Cognition Enables Pattern Recognition

The findings in this study to this point suggest that PR does not occur discretely, but is activated by auditory, visual, and palpatory feedback mechanisms. It is also noticeable

that although I am thinking analytically it can enable a moment of more intuitive rapid cognition. The following is an extract where the patient has returned the following week after a treatment but has not improved as had hoped. This activated further analytic cue acquisition and examination in an attempt to determine whether I had decided on the wrong diagnosis. During this intense analytical interval there is also evidence of intuitive PR arising when I do not find what I expect, given the potential diagnosis:

The bursa didn't feel boggy though which I have found it often does if it is inflamed. It is possible that it is a gluteal tendonitis rather than a bursitis because they can present similarly...

Narrative 8: 5: 16

I wondered about pain in rectus femoris because I occasionally find that the TFL, glutei and rectus femoris are linked within the dysfunction.

Narrative 8: 8: 18

These are thoughts that came to mind during the encounter and were not deliberated upon as I would if I were asked to provide a differential diagnosis.

During cue acquisition of a new patient case history, the patient is responding to questions about her complaint and I moved into an analytical phase trying to determine what could be causing the problem. An answer the patient provided made me intuitively jump to a possible hypothesis:

I wanted to know what situations would make the pain worse and better and she told me that it was aggravated by sitting and lifting which made me immediately consider a discal problem.

Narrative 3: 5: 11

6.3.2.3 Emotional Intuition Enables Pattern Recognition

In the world of diagnosis, the patterns correspond to probable causes that may be the reason for the presentation. It is thought however, that we spend ninety percent or more of our time in the intuitive non-analytical mode of thinking (Klein, 2003). The cognitive system is more complex than the two channel DPT suggests (Evans, 2008), and there is opinion that favours dual processing in terms of the cognitive-experiential self-theory (CEST). This integrates the cognitive and the psychodynamic unconscious by assuming the existence of two parallel interacting modes of information processing, a rational system and an emotionally driven experiential system (Epstein, 1994). The model allows for the effect thinking has on our emotions, and the idea that our interpretation of the world creates our emotional state.

There is evidence for the presence of unconscious cognition which could be argued to be activating an emotionally based interpretation. This is not rationally bound, but activates in me a response and decision to act in particular way. This is demonstrated by the reaction I had to the patient having a scoliosis. I made a decision not to discuss the curvature with the patient in case it creates an issue where there may not be one. This is a reflective narrative and it does not appear in the notes. However, I remember the emotion associated with the situation, and I know I ignored it. De Neys, Moyens, and Vansteenwegen (2010) suggest that we are aware of our heuristic responses, and our decision to ignore them.

I sense she is aware of the fact that she does not have standard curvature and that maybe this is an issue for her, but how she feels about this is not spoken about directly.

Narrative 1: 11: 1

The next extract did occur in the notes, descriptive text, and narrative and was during treatment of a new patient who has a complex biopsychosocial (BPS) presentation. The patient is undergoing tests for breast cancer, is finding it difficult conceive a baby, and her father has died. During the treatment I intuitively do not move my hands whilst the patient is disclosing emotional information. The disclosure has created an emotional sense in the me which has activated an experiential PR of previous encounters:

When she stopped talking I moved to put my hands on both sides of her pelvis and waited until the movement balances. It appears that I didn't offer any response to the death of her father but waited for her to finish her explanation before moving my hands to an area that I had become aware of. I know I didn't move until she had finished because I wanted to show support...

Narrative 3: 18: 1

During cue acquisition in the consultation with the same patient, I have come to understand that the patient has been trying for children for some time. I remember the intuitive thought arising that I should wait until later in the conversation to ask how long the couple have been trying to conceive. It is another emotional situation which arguably activates a PR to tread carefully:

I think it was the way she said trying that made me think about waiting until later in the treatment session to ask the question 'how long.'

Narrative 3: 7: 6

Taken together the above findings in this section suggest that pattern recognition does not occur discretely, but is enabled by multisensory feedback mechanisms. Auditory from patient testimony, visual, palpatory, and emotional, the latter although not strictly a sense would be occurring in an embodied cognition. It appears to occur during all aspects of the clinical encounter and not just during diagnosis. There is evidence to suggest that

informal and formal observation both activate PR, as does the pain response from a patient which prompts me to move on rapidly to consider other areas that may be involved. The cognitions appear to be occurring rapidly and intuitively, which fits with the T¹ non-analytic thought processes of the DPT. It is possible that T² processes are also underway simultaneously, but it is not possible to determine from this study. They appear to follow very closely behind. It is thought that once an intuitive thought arises the brain then either does, or does not move into analytic mode depending on the problem that requires solving (Thompson, Prowse Turner, and Pennycook, 2011). Given that there is relative uncertainty and an unknown diagnosis it seems reasonable to advocate that T² analytic reasoning occurs at some point after the intuitive input.

6.3.3 Metacognitive Monitoring of Clinical Reasoning

This section encompasses the category of 'metacognition' in which I discovered that my CR broadly followed the model of Pesut and Herman (1992) that was devised for nursing. I monitor and analyse throughout the consultation and plan my strategies in terms of intervention, treatment rationale, and management of the patient. I predict a diagnosis, although not always overtly, and I also tend to keep an open mind whilst doing so. Finally, I evaluate and on occasion need to revise my ideas.

Metacognitive supervision of our thinking is particularly important in CR because situations are inherently complex and uncertain. As information arises during cue acquisition, examination and treatment it promotes different internal reactions within the clinician. It is heavily dependent on the level of domain knowledge the clinician holds. There are occasions where the imparted information might promote a level of concern that the patient is perhaps presenting with an undiagnosed pathology. Generally, it creates an inquisitiveness and prompts an analysis of the situation.

Within cognitive psychology it has been proposed that the T¹ intuitive mode gives rise to two processes: understanding of the content of a judgment or decision, and the feeling of rightness (FOR) of the decision (Thompson and Morsanyi, 2012). In this study there is evidence of the use of metacognitive ME strategies, such as JOL which is a judgment strategy that we use when trying to determine if we have enough information to form a conclusion (Nelson and Narens, 1996). A feeling of rightness (FOR) is a metacognitive judgment that often accompanies an intuitive answer and gives the problem solver a sense of whether answer may be correct (Thompson, Prowse Turner, and Pennycook, 2011). These were occurring at every stage of the consultation.

6.3.3.1 Monitoring and Analysing

The metacognitive skills of monitoring and analysing are used at all stages of the consultation. The aim of which is to gather as much information about the person, their

symptoms and signs, predisposing and maintaining factors, and timelines. This information then allows the practitioner to understand the patient and their presentation, so that they can decide on a diagnosis and management strategy specific for that patient. Metacognition and problem solving ability are important aspects in the development of expertise (Chartier, 2001), and along with cognition and emotion are thought to have an effect upon the quality of decision making (Dunphy et al. 2010). The findings suggest that metacognitive monitoring and analysis continually occur as the information is gathered during cue acquisition, observation, clinical examination, palpatory feedback, and throughout treatment. The following extracts occur during the cue acquisition stage of the consultations, when I was asking questions of the patient to elicit enough information to start developing hypotheses. I would argue that deciding to finish one stage of the consultation and move on to the next is considered a metacognitive JOL.

In this extract, I am thinking about osteoporotic possibilities because the patient is slender, her slightly advanced age, and the nature of the symptoms. I have asked a question about diet and received an answer that has prompted a decision to check other possible factors. I am monitoring the information, analysing it for content, and thinking on the spot. When I do not receive enough information I ask more questions. This is a metacognitive JOL that occurs as I decide if I have enough information to make the decision. It is also possible that it is a FOR because the information does not create a feeling that it is correct:

I wondered about acidity related to diet because that could cause calcium to be released from bone (Nicoll & McLaren- Howard, 2014). However, she told me that she is intolerant to dairy, sugar, coffee, tea and yeast and I think probably not, but need to check alcohol and smoking...

Narrative 5: 5: 8

In the next extract I have asked a question and the answer has activated a pattern recognition. I am monitoring and analysing and then move on to ask a follow up question about the daily pattern of pain. The information I received then helped to guide my hypothesis. This is a FOR and JOL because I am trying to determine whether there is enough information to diagnose a discal problem. Also, recognition of a discal picture stimulates a FOR that the diagnosis may be correct. The information also appears in the notes and descriptive text which indicates that it happened in real time:

I wanted to know what situations would make the pain worse and better and she told me that it was aggravated by sitting and lifting which made me immediately consider a discal problem. The daily pattern of more pain in the morning than later in the day also pointed to that possibility.

Narrative 3: 5: 11

In the next extract, I am taking the patient through an active examination in which I observe their body and movements. This provides both pain information as well as an analysis of normal and adventitious movements. Any clinical examinations that are needed to test the hypotheses are also done at this stage. The information arising is being monitored and analysed cognitively. The encounter has activated a JOL and FOR, because the information that is returning from the examination is not what I expected, and also not helping to determine the relevance of my hypothesis, so I need to look further:

I took her through the active examination but very little pain was reproduced which alerted me to look further. It was important to me to reproduce those symptoms...

Narrative 2: 7: 7

The next extract is a JOL and FOR because I have a tentative diagnosis which requires further information and testing. The information returning from the clinical examination is a little ambiguous which suggests I am aware that the information is not yet correct:

I could induce the arm symptoms by asking him to side bend and rotate his neck to the right side and then bend it backward a little. This to me was implicating the lower part of the neck and potentially suggesting nerve impingement of the right C7 nerve...I asked him to sit and checked Adson's test and it produced the pins and needles both when I extended the arm and side bent the neck to the right. This for me was implicating the nerve and because there was no change in the pulse it wasn't a true positive. I felt that thoracic outlet could also be a working diagnosis.

Narrative 6: 5: 16

When the practitioner believes they have sufficient feedback from observation and the active examination they will generally move on to examine the patient passively. This entails moving the patient's limbs and body in order to assess the efficacy of their muscles and joints, and potentially provoke pain. It enables the practitioner to test their hypothesis and findings to that point.

As described above during cue acquisition, it is also likely that deciding to finish the active examination and move onto passive assessment is considered a metacognitive JOL. The judgment may be consciously or unconsciously judged:

I moved on from the active examination to examine her passively and I asked her to lie on her back...

Narrative 1: 6: 1

During the passive examination, palpating the patient's tissues gives me sensory feedback which I use to create a mental image informed by an understanding of biomechanics. The picture then informs my understanding of the patient and their body which in this case is a long standing attendee of the clinic. The sensory feedback is creating an awareness that the information I am receiving is not standard for this patient.

The metacognitive strategy is an important aspect of CR in order to avoid using osteopathic evaluation in an uncritical manner:

I could feel tension in her thoracic spine which felt slightly side bent right which I thought was unusual for her.

Narrative 7: 3: 2

I looked at her pelvis but couldn't see the reason there so I put my hands on her shoulders and they started to move left which I hadn't expected.

Narrative 7: 3: 7

In the following extract I am beginning treatment of the patient and gaining sensory feedback. This activates my biomechanical knowledge consciously to examine an area of the body that might be contributing to the presentation. The information I am receiving is prompting me to look further and is a JOL. However, the FOR is also informing me that I do not have the answer yet:

I started to treat her by working through the LES which were tight next to L1-3 near the spine and it prompted me again to make another mental note to look at psoas on that left side.

Narrative 1: 6: 26

6.3.3.2 Predicting

The meta-level strategy of predicting is the tactic of inferring the diagnosis from all the information that the practitioner has garnered (Pesut and Herman, 1992). It also includes the probability that the information is related to the diagnosis. This generally occurs once cue acquisition and active and passive examinations are complete, as is suggested by the following extract:

I had settled on the diagnosis of C7 nerve root irritation with thoracic outlet dysfunction and moved on to treatment.

Narrative 6: 7: 1

However, I continue to analyse the sensory information collected whilst I am treating the patient because of the inherent uncertainty that is present in healthcare and one can never be completely sure of a diagnosis. Predicting, therefore, is not a fixed construct and continues to evolve whilst the patient is being treated and recovering their symptoms:

I decide to treat him cranially because I want to see if I can find anything else to help with the picture I am building and also because I am not yet certain, but recognise that perhaps I never will be.

Narrative 6: 7: 3

In this next section I have not made a diagnosis yet and am still going through cue acquisition. However, I am analysing and predicting the likelihood of osteoporosis being

present in the patient in front of me. There is a FOR because I am alert to the presence of a pathology that may change my approach. The answers that I am receiving have helped gently change my focus from a diagnosis that may not be completely accurate:

Although she is a slight woman and 68 years of age she has been very active during her life and most of her pain was when sitting and not weight bearing which made me relax a little regarding osteoporosis but not discount it completely.

Narrative 5: 5: 4

The following extract originates from the case history of a new patient whose presentation was complex, and included previous organic pathologies and many psychosocial factors. Situations like this automatically create an awareness that the presentation could easily be a recurrence of the pathology, or that it is certainly multi-layered. There are also instances, such as the one described, where there are no answers to the questions that are being posed except the guidance from different belief systems. Here I am deciding whether the information the patient is giving is relevant to the hypotheses I am developing:

She went on to say that her breast cancer, pacemaker and low back pain are all left sided and I wondered what that was saying? There are people who like to explain pain in terms of sides and areas of the body as related to belief systems and emotional states that a person may have (Hay, 1988). I am not certain whether there is a connection and it is certainly not the way I have been taught.

Narrative 5: 4: 12

6.3.3.3 Planning

The meta-strategy of planning, according to Pesut and Herman (1992), involves the determination of the patient outcome and identification of the appropriate intervention. In the case of an osteopath, this would probably relate to treatment and management of the patient, and their presenting condition. The findings from this study suggest such that planning can be broken down into two sections; intervention, or treatment, and; a rationale for treatment.

Planning-Intervention

Intervention for a patient involves physical treatment using a variety of osteopathic and manual therapy techniques. A lot of the therapeutic techniques are performed using the osteopath's hands which provide sensory feedback. I have a conscious awareness of what my hands are sensing which often activates an analysis of what to do next in terms of treatment. The planning is not necessarily sitting down and actively planning the exact treatment and management routine, but a fluid and evolving strategy that is based on palpatory feedback:

I could feel the SI flare laterally and then settle. I then moved to put one hand on each side of the pelvis to sense whether it had stopped flaring on the left which it had. This hand hold provides me with a 3D sense of the pelvis as I can hold the pelvic bowl between both hands and feel its tilt or torsion, and fluidity. I could feel from this position that it was restricted down into the left anterior pelvis, so I sat and waited for things to change

Narrative 2: 10: 4

During this next extract I am articulating the patient's left pelvic bone, taking it into posterior rotation in the supine position in an attempt to free the left SI joint that is restricted. I was aware that the technique was not achieving the tissue change that I hoped for because the patient was quite flexible through her hips. This could be considered to be a FOR, because the feedback is stimulating a feeling that something is not right. I decided to move the patient to another position where I could be more effective. I was also planning the treatment in order to remove the restrictions that I had felt:

I didn't think the technique I was using felt effective so I moved her position to where she was on her side

Narrative 1: 12: 4

The following segment shows metacognition occurring in order to manage a patient outcome. The patient has a tendency to come for treatment too often and I believe his reliance on treatment could be a factor that could promote chronicity (Pincus, 2006). I negotiated with him to wait for longer if he is able, before returning for treatment. This has been an evolving plan because the patient comes in for maintenance treatment and does not need a short term answer. The understanding of the patient and his need for treatment has evolved alongside his management:

He expects to get a little sore after a treatment before the pain settles down but then if he gets pain again say three or four days later he will ring immediately for an appointment. I had explained that the body will try to resolve the pain itself and it is good to let it do that if it can, so I asked him to wait at least four weeks before coming to see me again.

Narrative 4: 2: 2

Planning-Rationale

During my osteopathic education the need to rationalise thinking and treatment in order to be an effective osteopath was strongly instilled in me. It is a powerful metacognitive strategy which enhances treatment, outcome effectiveness, and patient care. It also is an advocate for metacognitive training because I find it virtually impossible to just treat a patient without justifying the reason to myself. This also includes a justification of what anatomically I am treating and why, and is often supported by evidence from

propositional knowledge or the literature. This is observable during some of the treatment phases of the case studies:

The outer curve of a scoliosis is already over stretched and although I usually do a little to that area to address some restriction and painful tissues I usually work to open up the other side of the curve which becomes compressed. In this situation I have obviously decided that freeing the thoracic joints was enough, I feel that it is possible to overwork a compromised area and make the patient too sore but also risk de-compensating the scoliosis.

Narrative 1: 9: 5

The following segment occurs after I noticed that the patient had very protracted shoulders. I wondered whether they were due to post-natal changes or computer use. I was considering the biomechanical impact on certain parts of the anatomy, and what I could do in order to make necessary changes to the patient's tissues:

I went on to treat the patient initially with massage and manipulation of the LES and gluteals to reduce the soreness and help free the lumbar and sacro-iliac joints. The lower thoracic spine was restricted and I treated it with articulation in order to improve its function, reduce the impact on the lumbar spine and effect the diaphragm attachments which potentially could help the protracted shoulders via anterior fascial connections.

Narrative 2: 9: 1

In this extract, the patient that has arrived at the clinic is very acute, and hence in a lot of pain. There is virtually no direction she can move into, which can make treatment challenging because there is a need to move the patient in order to stretch muscles and articulate joints. I was deciding upon the treatment modality and demonstrate a strong rationale for my choice:

I went on to think about whether to treat her cranially or structurally and decided that the tissues needed to move and stretch and to give her the confidence that she can move into different positions.

Narrative 5: 8: 1

6.3.3.4 Evaluation and Revision

The meta-strategy of evaluation occurs when the practitioner evaluates where an intervention is taking the patient's condition. Evaluations can result in positive, neutral, or negative situations because a condition could be improving, moving toward improving, not changing, or deteriorating (Pesut and Herman, 1992). This meta-strategy is often combined with the strategy of revising because a clinician would probably move on to decide whether to continue, change the treatment, or refer to another healthcare professional. This can potentially occur after the treatment or subsequent treatments, or even during the intervention as shown here:

She felt very flexible and I noted that I didn't think the technique I was using felt effective so I moved her position to where she was on her side.

Narrative 1: 12: 3

The following extract shows an evaluation that occurred at the end of a treatment session the previous week. I was treating the patient cranially and decided that I was not able to resolve all the strain I could feel. I requested that the patient return for another treatment, which she subsequently did, and some of the strain was still there:

I moved to the head and immediately find the unresolved compression I felt last week which is why I requested her to return.

Narrative 8: 12: 3

The following extract is an example where I am aware that the symptom picture of the patient has not changed. This alerts me to the possibility that I have the wrong diagnosis, and I decide to reassess the patient with the potential of revising my previous decision. The narrative indicates verbally that I am considering revising my diagnosis whilst the descriptive text implicitly suggests that I am throughout the examination:

Although it is a little early to change a diagnosis after treating a patient for just one session, I like to see some alteration in the symptom picture even if it is only twenty percent. It tells me I am moving in the right direction and that the diagnosis is quite likely to be correct. When nothing has changed I have learnt over the years that it is as well to reassess early just in case I have missed something rather than wait and see.

Narrative 8: 5: 1

This next extract arose during clinical examination of a migraine patient who had presented after possibly having a reaction to a previous treatment. The patient comes for maintenance treatment a few times a year to keep migraines under control. She has a small benign pituitary tumour that is monitored yearly by a neurosurgeon. Her reaction was quite severe and after I had settled her symptoms she returned for a follow up appointment. I noticed that her eyes looked asymmetrical in size and the pupils looked unusual. This observation and her reaction to treatment alerted me. I examined the patient to find the cause. This is a metacognitive revision of the patient's presentation to determine whether she was safe to continue treating, or needed referral to her neurosurgeon:

I asked her to sit down and I checked her cranial nerves which all appeared to be okay. When I shined a light into her eyes her pupillary response was odd bilaterally as the pupils didn't contract much, but it was bilateral so I thought that was probably acceptable. I wondered about her tumour...

Narrative 9: 4: 10

Taken together this section has been concerned with the presence metacognitive strategies that occur during encounters with patients. They have broadly followed the

model of Pesut and Herman, (1992) of monitoring, analysing, predicting, planning, evaluating, and revising that they suggest describes the CR strategies of nurses. There were also examples JOL and FOR throughout the consultations. JOLs, in particular, occurred during treatment when the practitioner senses the need to move to a new area to treat. The fact that the cases used in this study are discrete and are not following the course of treatment with the patient, there are aspects such as evaluation and revising that are limited because they could occur at a subsequent appointment and not appear here. However, there was presence of metacognitive strategies in action as a reflection-in-action (Schön, 1983). It was also not unusual to find each strategy occurring at more than one phase of the consultation.

6.3.4 Reflective Practice

The initial part of this section opens with RP and my interpretation of the way that the process creates an awareness of one's thoughts and habitual procedures during osteopathic practice. It then moves on to demonstrate how retrospective reflection provides the clinician with a means to question their practice and develop it, whilst being reinforced and deepened by evidence from the literature. Next, I believe retrospective reflection has provided a powerful conduit for change in my practice and these can be divided into three main areas that have been accentuated by the process: 1) identification of the potential for cognitive bias; 2) development of a BPS approach to practice; 3) a vision to move toward collaborative reasoning. Finally, the chapter concludes by describing how the RP process and its links with the literature have the ability to inform a clinician's reasoning process.

6.3.4.1 Creates Awareness

RP within this study has been used to inform and develop my work with a view to moving toward enhanced practice. I am interested in the effects that reflection can have on practice life, decision making, and patient care, and how subjective experiences can inform osteopathic practice in general. One of the reasons for undertaking a study incorporating RP was to attempt to illuminate what it is that I do, rather than what I say I do (Bolton, 2009). As Bolton suggests, it is easier to say what we believe we do as an espoused theory rather than what is real. Our tacit knowing and intuition also makes an important contribution to the interpretations and decisions we make about our practice (Etherington, 2004). Reflective writing is thought to allow us to investigate what we do not know (Bolton, 2009).

The evidence from this study suggests that, the very act of performing a detailed reflection provides the clinician with a greater sense of awareness of these, and other actions that occur during practice. These actions may well have been previously

conscious, but I was perhaps unaware or was not mindful toward them. The process of RP via retrospective reflection has allowed access to that cognitive state as a reflection-in-action (Schön, 1983):

Since writing this reflection I have also started to notice when I want to take a short cut, my mind does remind me that perhaps I want to examine the abdomen, cranial nerves or perform another clinical exam. I also notice when my mind then overrides that suggestion...

Narrative 2: 6: 1

In this particular case, I have become very aware that my mind can disregard an intuitive suggestion to perform further tests. This could be a fairly crucial part of developing a diagnosis and allows cross referencing with information that has already been gained during the consultation. It supports the suggestion that RP

and learning from one's experience is critical in developing and maintaining competence across a practice lifetime (Mann, Gordon and Macleod, 2009).

Awareness is also important generally within a consultation in order for a practitioner to be emotionally and physically available to the patient. Although working as an osteopath within private practice is a fairly singular occupation, there are now many more multidisciplinary clinics and collaborations across healthcare disciplines that can blur the relationship. There are also many other personal factors that can constrain an osteopath's ability to be present for the patient (Johns, 2004). It is important for a clinician to be mindful of this as a potential issue in order to heighten awareness when perhaps their mind-set on that day is unclear. In this extract I am describing a situation in which I was aware of a momentary frame of mind, and therefore was able to take the time to calm my thoughts in order to be present to the patient:

As a result of the mild upset at the start of this consultation my mind was turning over unnecessary and unconstructive thoughts. I invited her in when she returned, and because I was aware of the disturbance to my emotions I took a breath and a drink of water whilst she entered the room and I allowed my mind to become still...How could I be aware and available if I was caught up in my head? I found from previous a reflective study that my practice is best carried out with a quiet and non-judgmental mind

Narrative 3: 1: 1

We move in and out of varying levels of awareness when we are with patients, listening to them, to ourselves, gaining palpatory feedback and observing them in space, to name but a few. To be mindful of this fact is important in order to provide consistent, effective caring and psychological flexibility, which should help practitioner well-being (Roche, Haar and Luthans, 2014).

6.3.4.2 Retrospective Reflection Activates Questioning

The reflective process has provided a platform and broad structure in which I can question myself, my beliefs, and approach to patients. It allows one to question anything that may be taken for granted (Bolton, 2009) and here has provided a method for unearthing previously undiscovered habits.

The CR process involves the clinician gaining information from the patient about their presentation. This includes verbal, observational, palpatory information, and feedback provided by the examination. The practitioner then pulls all the information together and develops a theory, diagnosis and plan for treatment. The verbal information occurs all the way through the consultation, but particularly during cue acquisition at the beginning of the appointment. Initial cues provide an indication of the issue at hand, but I then usually probe further to find information to support, or disprove my working theory (Thomson, Petty, and Moore, 2014a). However, in the next extract I notice that I have not followed up on an initial conversation with the patient. It has caused me to question more deeply in the narrative why that might be:

I seemed to be happy to accept her testimony for some reason. I am not happy with this type of reasoning, it is not how I was trained, but there must have been a reason why I stopped there that is not obvious from the notes I took. Perhaps I was under pressure of time, but I think I would have noted the stress of that. Perhaps I naively allowed myself to be drawn by her simplistic statement of her health and her young age, or I quickly designated the case to simplistic biomechanics

Narrative 1: 1: 17

The questioning has elicited a number of possible reasons for the reliance on intuitive cognition, which it is hoped would be learnt from and taken forward to future cases in order to avoid similar potential errors of reasoning. This next extract occurs eight case studies later and I noticed whilst reflecting that I did not maintain a broad enough base for my hypotheses during CR. Unlike the last extract I asked further questions and have considered the unlikely possibility of a lung pathology. The questions have come back as clear. However, I notice that I did not test his lungs to make certain, but moved on to consider other possibilities perhaps earlier than I should. It has made me question and want to investigate my complete approach to diagnosis.

Looking back at my notes, I am not sure why I did not carry on considering the presence of red flags, but I accepted his testimony when he said he had no shortness of breath and did not have a cough...What was it about this case that made me certain I was dealing with a musculoskeletal condition perhaps it was because he was so animated and did not stop talking and laughing making it difficult for me to maintain my focus, or is this something in my daily practice that I need to change?

Narrative 6: 8: 1

The above excerpt occurred some eight case studies later. They are two very different case studies, one being relatively simplistic with the patient arriving for a maintenance treatment, and the second a more complex and very hectic case. It is possible that I had learnt the need to broaden the cue acquisition aspect of CR, but did not apply this to the examination stage. The other aspect to note from the cases is the fact they are both follow on consultations with patients that have previously been treated for other problems. In this situation the complete case history does not need to be undertaken again but a shortened version is employed.

6.3.4.3 Reflection as a Conduit for Change

Cognitive Error and Bias in CR

Some of the cyclical models of reflection and RP have a finish point that creates an action. Kolb (1984) described this as 'active experimentation' and Gibbs (1988) an 'action plan'. The intention is to induce learning and transformation within the person reflecting, although it is believed that RP is exploratory and not oriented toward a predetermined end, it does tend to create change (Scaife, 2010). The reflective nature of the method used in this study has enabled me to find the tension between my current praxis and vision of ideal practice (Johns, 2009). The development of the narratives allows issues for reflection to emerge from the text.

The following section of the chapter highlights areas of practice where there appeared to be actions that either door might create clinical error and/or cognitive bias. One of the recognised problems associated with CR is the possibility of practitioner error in diagnosis. This has been investigated mostly within medicine (Graber et al. 2005; Kuhn, 2002; Croskerry, 2002; Elstein, 1999). It is in its infancy in osteopathy, with initial investigations being made into the possibility of adopting script concordance testing (SCT) at undergraduate level (Esteves, Bennison, and Thomson, 2013). The idea of SCT has been discussed within medicine to assess CR in conditions of uncertainty (Charlin et al. 2007). They would be utilised in osteopathy, if found efficacious, to improve undergraduates CR and professional expertise (Esteves, Bennison and Thomson, 2013). It is thought that, although diagnostic errors are statistically small they mostly arise due to faulty cognitive process on behalf of the clinician (Norman and Eva, 2010).

This specific incident happened early in the study and it shocked me. I had always thought that I addressed psychosocial factors during CR but I came face to face with a situation in which I took no notice of anything except the biomechanical aspects of the patient's presentation:

For some reason I didn't follow that statement any further except to explain the relationship between the hormone relaxin that is released at times within the menstrual cycle and ligament laxity that can cause LB aching (Wreje et al. 1995). I apparently didn't explore any alternatives with her at that stage. I would normally investigate when the back hurt, what had she been doing, any changes in her lifestyle, bowel and bladder function, and anything abnormal like intermenstrual bleeding, and other questions that would be guided by the answers I received. I seemed to be happy to accept her testimony for some reason...

Narrative 1: 1: 3

In the following example that occurred sometime later my thoughts remained broader during the differential diagnosis. A differential diagnosis includes all the possible diagnoses that the patient could be suffering from. The list is then focused down and tests performed to exclude, or include them. The differential diagnosis in this next extract was more inclusive, but I noticed on reflection that I had still had not investigated a particular line of inquiry. There is an argument that one only need test for diagnoses that are appropriate to the information given by the patient. However, due to the uncertainty of these symptoms I believe it could be considered an error. I think I would have felt an abnormality if there were one present, but I did not include the possible diagnosis in my list of hypotheses:

When I palpated around his neck and shoulders and checked Adson's test, I would have felt any supraclavicular abnormalities, but it concerns me now that I did not maintain the possibility in my list of hypotheses. I should have auscultated and percussed the lungs and checked the lymph system. What was it about this case that made me certain I was dealing with a neuromusculoskeletal condition, perhaps it was because he was so animated and did not stop talking and laughing making it difficult for me to maintain my focus, or is this something in my daily practice that I need to change?

Narrative 6: 8: 6

This extract occurred much later in the study, and there was definitely a transformation occurring in my thinking and practice. There were still areas for improvement, but RP was creating the situation to allow change to happen.

It has been suggested that osteopathic practitioners use intuitive PR and analytic HDR during diagnosis (Thomson, Petty and Moore, 2014a; Roots, Niven and Moran, 2015), where knowledge is organised into 'illness scripts' within LTM for rapid access (Schmidt and Rikers, 2007). It has also been suggested that like medicine there exists within osteopathy a link between the development of expertise and the process of knowledge re-organisation and script formation (Esteves, Bennison and Thomson, 2013; Esteves, 2011). It is thought that ninety percent of our thinking is spent in the intuitive mode, and we make some of our most important decisions intuitively (Klein, 2003). As Esteves (2015) suggests, this has wide reaching implications for a profession who rely on their senses to enhance their clinical diagnosis and reasoning. It has the potential to produce

cognitive and affective biases, because those perceived patterns of tissue dysfunction push us into the intuitive mode of reasoning.

It is also probable that we develop practice routines that enhance the speed of our reasoning because osteopathic consultations are relatively short and the practitioner needs to be focused to move through them effectively. Aspects of these routines have the potential to become relatively unconscious, similar to driving a car, and when combined with PR there is a potential for cognitive error. The following reflective narratives combined with supervisory feedback have identified possible areas where this has or may have occurred:

As far as I was concerned this was a fairly straight forward consultation that seemed to go according to plan. I had invited the patient to sit down and I sat opposite and lowered my chair and started to ask her name, address and various other details. When I got to the part about symptoms she told me it was left side anterior hip pain and some pubic pain. She was very easy to follow because her story did not jump about from one area to another which can happen. She also seemed in good health and not in acute pain. The patient gave an uncomplicated account of her symptom picture, there were no apparent red flags that would suggest the presence of serious organic pathology, or glaring yellow flags (psychosocial predictors of chronicity) and it appeared very musculoskeletal...My supervisor JE suggested that it may be I was over relying on pattern recognition and intuition

Narrative 2: 1: 1

The case was moving rapidly through cue acquisition and I was using visual feedback to make perceptual diagnostic judgments about the patient. I was engaging some analytic strategies because I noted the absence of organic pathology, but generally the case was developing intuitively.

Heuristics are short cuts that our brains take in order to speed up cognition, they are normal actions but can give rise to bias if a person is unaware of the potential (Gilovic, Griffin, and Kahneman, 2002). It is thought that one of the principle reasons for diagnostic errors is the presence of bias (Croskerry, Singhal, and Mamede, 2013). The potential for possible bias was identified as a result of discussions with my supervisor:

She came into the treatment room with a big smile, she had an open demeanour and I instantly liked her. I offered her a seat and explained that I needed to ask a number of questions whilst taking a case history so that I could understand why she had consulted me. JE commented at this point that I should be aware of the possible presence of bias in my approach to this patient because 'I instantly liked her' I might be inducing the 'halo effect' a concept first introduced by Edward Thorndike (1920) to describe how humans prescribe general attributes to a person depending on how they feel about them...

Narrative 3: 2: 1

The presence of supervision here jolts me out my normal habit and brings another viewpoint into the situation. This makes me address the possibility that my cognition, at

this point in this case, has the potential to be flawed. This adds strength to the suggestion that we learn more via structured reflection than we do if left to our own devices to reflect on our work (Ibiapina et al. 2014). However, this has not been tested within osteopathy.

The reflective process has also encouraged me to contemplate the situation with reference to the literature. As a result of being more informed I am then aware, during a subsequent case study, of my use of language, which further alerts me to the possibility of bias within my CR:

I couldn't get her into the right positions to test many of her joints and muscles because the pain was too severe for her to do the movements but somehow I knew what was wrong. Since starting the reflective process for this project I am now very aware of the danger of this kind of statement and it alerts me to the possibility of bias, (Dror, 2011).

Narrative 5: 7: 4

Although I am aware of the potential for bias it is not a comfortable situation to find myself in. Reflecting inwardly and exposing potential shortcomings has the ability to cause uncomfortable feelings, the fear of appearing incompetent, or opening oneself up to scrutiny (Scaife, 2010):

She is an easy person to like which makes me instantly aware of the 'halo effect' that my supervisor highlighted during one of my other cases. The realisation creates discomfort within me because it seems as though I may have got something wrong.

Narrative 7: 1: 11

Even though there appear to have been moments of discomfort within the RP process, there are few if any mentions of this. Instead there appears to be an embracing of RP and an enthusiasm for developing practice. In the next passage I use the word 'glad' that I am aware of issues and can take positive action. The following passage is a reflective piece where I am considering the impact that liking, or not liking, the patient can have on my reasoning. I am aware of how I feel about the patient, and that I need to take the possible presence of bias and the affective state into consideration when with them. It is thought that moral reasoning may decrease with time in practice, and can cause clinicians to consider the patient as a problem instead of a person (Patenaude, Niyonsenga, and Fafard, 2003):

Liking a patient definitely has an effect on how I feel when I am treating them. It makes it easier to treat them because there are no uncomfortable pauses and the sense of ease appears reciprocal... Sometimes there is simply a mismatch and it is possible to get a sense of that by just sitting in their space. I feel glad that I am alert to this potential stumbling block, I don't think it will change the way I feel about the person standing in front of me, but at least I can be aware when making decisions so that I can judge the impact of my emotions on the decision.

Narrative 7: 1: 21

Whilst writing one reflective narrative, I identified a section from a descriptive text that is suggestive of 'premature closure' of the diagnostic process. This is a form of cognitive bias that can occur in CR where a clinician comes to a diagnosis early and stops analysing the situation (Croskerry, 2005). The extract describes a situation where tacit cognition is not overridden by metacognitive supervision, and I continue to move along the intuitive path without becoming more analytic. There also seems to be a mismatch between what I absorb visually and from an embodied sense, and how this is acted upon in practice:

Whilst writing this narrative it strikes me that I appear to have come to the conclusion that it is the lower cervical spine that is at fault but I haven't given my reasoning apart from the mechanical perspective. I am disappointed in myself that I appear to have only used intuitive pattern recognition...I know that she appears fit and healthy and there are no signs of a cough, she is a non-smoker, doesn't wheeze. It is possible to see when people have lung issues in the way that they breathe, the tension in their thoracic spine, musculature and ribs, the way they hold their thoracic cage. This I know, and is with me when I am assessing patients...

Narrative 7: 5: 12

The presence or absence of clinical signs are thought to provide an important part of CR, and the osteopathic regulator requires osteopaths to record both positive and negative findings (GOsC, 2012). This was not the case when I qualified, and I recognise the need to be more explicit as a way to sharpen my diagnostic focus. This next two extracts indicate that the RP process is creating a transformation. I have resolved to find ways in which I can introduce de-biasing strategies to ensure I do not focus down too soon in my reasoning:

I think I need to find ways to stimulate my analytical thinking in situations that appear straightforward, to not rely on intuitive thought and find something to alert me to complete the picture before deciding. I wonder whether my thinking is too osteopathic and biomechanical, or whether thirty minute follow up treatment sessions are too short. Many osteopaths use thirty minutes so it must be possible, perhaps I am trying to achieve too much in each session. It is an area that I am going to address and find a way of allowing my intuitive thought processes to occur whilst situating strategies for analytical safeguards.

Narrative 7: 5: 24

I think that I must change the follow up case history form that I use and alter the questioning that I implement at the start of each consultation. The structure I have for a new patient is good because although I still have to think of the questions to ask, it more naturally prompts me to develop the questioning along varied lines. I also have longer in the consultation for questions and treatment. This is not the case for a continuing patient, there is less time and the continuation sheet is blank which allows for an element of error if I am developing the consultation solely intuitively.

Developing a Biopsychosocial Approach

Osteopaths treat neuromusculoskeletal and somatic dysfunction which naturally creates a motivational state and defines a way of perceiving the world (Balcetis and Dunning, 2006). In recent years there has been a discussion about where osteopathic principles, belief systems, and practice may position us within the changing vista of models of healthcare (Thomson, 2013; Penney, 2013). The BPS model of healthcare was originally endorsed by the WHO in 2000 some twenty years after it was first posited by Engel (1977; 1980) and it has gradually become the preeminent scientific model central to the understanding of pain in general, and musculoskeletal pain in particular (Penney, 2013). It is taught in the OELs now, but when I qualified in 2000 the biomedical model was still dominant. RP in this study has highlighted that my practice routine was encompassing a strong biomechanical focus even though I am aware of BPS and the influence of psychosocial factors on pain (Lucas, 2005):

...she sat in the chair in front of me with her knees together and her feet splayed. This is a posture I have seen with a recent patient, it looks uncomfortable to me possibly because I am an osteopath and odd postures I associate with discomfort long term

Narrative 3: 4: 5

This aspect also suggested to me that her pain was likely to be musculoskeletal because of the positional nature of the discomfort. When she moved into particular positions she got the pain, but she could relieve it by moving out the offending position

Narrative 2: 4: 4

Neither of these interpretations are wrong, but taken in isolation with no further hypotheses or clinical tests has the potential to produce error. These extracts suggest that I was moving rapidly from an observation to a tentative conclusion of a biomechanical nature. In the case study corresponding to the second extract I did broaden my outlook, but there is an automaticity that has been practised and developed into my practice routine. It is demonstrated in this descriptive text and notes that correspond to one of the above narratives. It demonstrates that we use our osteopathic values often in implicit ways to guide our behaviour (Tyreman, 2008):

This next extract suggests that my focus is starting to change, and my focus at times on biomechanics can cloud my ability to think more broadly:

Still I can't help feel a little disappointed in myself at not including an element of exploration of psychosocial possibilities...I am always mindful of the possible presence of yellow flags. The link between psychosocial factors and chronic low

back pain being important I wonder is it acceptable to look at a patient in solely biomechanical terms...

Narrative 1: 5: 1

I am mindful that my management of the patient in this case is falling short of my vision of ideal practice. There is a tension between the way I currently manage patients and how I would like to be. I recognise that I have the knowledge to do things differently and am not sure why I do not. The next extract describes a period of reflection where I am starting to develop an idea to improve my approach. It is when I am confronted with a situation in which it may be helpful to understand the psychology of the patient. I believe that I am too quickly moving away from the patient emotionally, or not engaging with them in the best way:

I admit to feeling more than a little untrained when considering the possibility of helping a patient investigate their inner demons, even though I have more than a little interest in this area and have used some of the techniques on myself. Maybe there is a need to develop an additional questioning style to allow me to help the patient share their inner thoughts and emotions. Although there are some practitioners that patients just seem to open up to, I wonder whether they have a different type of empathy to me. Perhaps it is not in my nature and I don't exude the right kind of vibes. I am empathic but I can move past this to focus on what needs to be done. Perhaps I need to dwell longer in the empathic space with another.

Narrative 1: 8: 1

There was no training at undergraduate level on how to interact with patients in situations where there may need to be greater psychological support, or to help the person unpack emotions in order to help with their pain. It is a specialist area that I have investigated at post-graduate level, but I think if handled badly it is rife with potential to induce poor treatment outcomes in patients (Nijs et al. 2013). It makes me reticent to use what I have learnt. This is clear from the reflective process which has allowed me to identify this area and begin to develop it whilst monitoring progress. In the next extract there is a tentative demonstration that I have started to develop the transformative ideas of 'dwelling in the empathic space' with the patient:

As she started to cry her grief consumed her and she sat there in front of me crying, sitting upright, perfect posture, with tears pouring down her face and I felt genuine sympathy for her, she seemed to have become enormously stuck within her grief. I also wasn't sure how to show the sympathy and empathy I was feeling so I just sat there hoping that she could feel my understanding...I just looked at her fully and stayed with her whilst she was in tears and gradually they abated

Narrative 5: 2: 14

During a postgraduate training session on Somatic Experiencing (SE) it was suggested that when a person is experiencing emotional discomfort that we should not move toward them in order to alleviate their distress (Nathan, 2010). Knowing and doing are

completely different things, as are doing and witnessing yourself doing. Practice life moves quickly and we intuitively move through our working day, mostly without having time to think for longer than a minute about how we have just performed within a consultation. Witnessing yourself doing is a powerful stimulus for change and reflection can connect the personal to the cultural (Ellis and Bochner, 2000). The following are two extracts, both from narrative three. The first extract occurs I then move away to address the literature and combine the teachings into the narrative. These two extracts demonstrate how reflection combined with referencing the literature is a potent transformational force. By witnessing my practice, I came face to face with myself, and as a result am gradually understanding how I may manage patients who require more complex BPS intervention:

I wasn't sure what to say when she remarked that her weight was disgusting, I am never certain what a patient would like to hear, what would make them feel less self-conscious. Except perhaps to remind them that I see many patients and not to be concerned. I suppose it could be unpacked by asking them why they feel that way and not adding any value judgment...

Narrative 3: 9: 1

Pincus (2006) suggests that there are areas of psychology that are appropriate for osteopathic practitioners to intervene and some that aren't...she suggests that if pain is coupled with self-loathing and guilt this is more aligned to clinical depression and the person should be referred to a psychologist. I am glad that I know this now, it can't help the patient in this study unless she returns to my clinic for future treatment, but it will help me understand when to gently explore this with a patient and potentially refer for psychological help. It strikes me that it would be pertinent for osteopaths to be trained to identify these potential areas for referral, and I personally would welcome such education.

Narrative 3: 9: 7

This next extract reinforces the gradual change that is occurring. The patient in this extract is completely different and occurs some four consultations later but before I had completed the reflective narratives. In this study learning is occurring whilst writing the narrative. Having noted the presence of psychosocial factors I recognised that the patient's mental distress may need more appropriate support than I can provide. It has been suggested for some years that humans undergo a freeze state when they are faced with a traumatic situation (Levine, 1997). This freeze state is believed to be associated with post-traumatic stress disorder (PTSD) (Marx et al. 2008). More recent research has arisen that links this freeze state called Tonic Immobility (TI) with survivors' guilt (Bovin et al. 2014). Although it has not been explored with the patient it is possible that it is present because she outlived her child. Even if survivors' guilt is not present there will be complexity of emotions which can lead to negative psychiatric outcomes (Keese, Currier, and Neimeyer, 2008). Although the patient is not displaying signs of self-loathing

there may be survivors' guilt, but certainly significant grief which are factors that would benefit from mental health counselling:

She was displaying the presence of massive yellow flags but nobody had suggested psychotherapy and looking back at my notes that included me, I am sad to say. Since the death of her son a number of health issues had arisen and eventually her low back had begun to cause pain and dysfunction, a gentle decline into illness, (Selye, 1974).

Narrative 5: 3: 1

The above examples indicate that I have started to develop another way of looking at patients who present with psychosocial factors. It is early days in the transformation but there is an active change. I have started to develop my questioning of this type of patient, and others who appear to be purely presenting with musculoskeletal symptoms. I realise that although I understood the impact of psychosocial factors on pain, I did very little about managing them with the patient apart from informing the patient that they have a bearing. I am also more aware of the type of presentation that may require referral for psychological help, although this will need ongoing training.

Moving toward Collaborative Reasoning

This is the third subcategory for reflection as a conduit for change. In recent years there has been a move toward patient-centred care within medicine, and the concept of shared decision making (Thomson, Petty and Moore, 2013). However, there remains no clarity about what constitutes SDM (Makoul and Clayman, 2006). The general objective is the move toward jointly explored decisions, an understanding of the patient's values, and the clinician adopting an advisory role toward the patient's goals and decisions (Edwards and Elwyn, 2009). Within physiotherapy a similar concept has been suggested called collaborative reasoning. It is considered to be an advanced skill that results in the practitioner and patient setting goals together and nurturing a collaborative approach (Edwards et al. 2004b).

Osteopathy is thought by members of the profession to be more aligned to patient-centred care (Moran, 2013). Roots, Niven and Moran, (2015) believed they found evidence of collaborative reasoning amongst osteopaths during a study on CR. However, a practitioner's approach will to some extent depend upon their own value and belief system as well as that of the profession (Trede and Higgs, 2008). The presence of collaborative reasoning in osteopathy in the New Zealand study may be due to their strong BPS approach. It is yet to be established that it occurs in the UK. In this study the practitioner currently appears to use a combination of practitioner-led and patient-centred reasoning styles, but nothing that is truly collaborative.

Early in the study it became clear that the practice routine that I have adopted appears to drive my practitioner-led intervention. When I demonstrate a biomechanical focus it appears to be when the cultivated practice routine has become relatively unconscious. This routine is also demonstrated in the way that I sometimes interact with my patients:

I moved on from the active examination to examine her passively and I asked her to lie on her back and looked at her leg length and innominate position.

Narrative 1: 6: 1

It is difficult to be completely conclusive with this extract because it could be interpreted in different ways, but there is no mention of the patient in this, I appear to be going through a well-established practitioner-led routine. This also is apparent in the next extract when I ask the patient to remove some of their clothing in order to be able to examine them. There is little discussion apparent, as though I expect it will be fine:

I then asked her to change to her underwear and I left the room.

Narrative 1: 2: 1

The next extract shows me making decisions about finishing treatment without any apparent reference to how the patient is feeling, and whether they feel it is a good time to finish. I also appear to treat him a little like a child by telling him he has done well:

I reported to him that everything felt good and that it was a good place to finish. I reassured him that he has done really well to leave treatment for four weeks...

Narrative 4: 6: 9

I made a request that the patient is expected to comply with, there is no mention of a discussion, or note of the reply that the patient made. When I returned to the room I moved on with being procedural and 'doing to' rather than 'being there for' the patient (Johns, 2009). According to Edwards et al. (2004b), within the concept of collaborative reasoning the style of practitioner-led reasoning is acceptable, even necessary at times. Providing the practitioner has discussed the direction of the treatment session and received understanding and consent from the patient.

The next part of this section shows evidence that I am incorporating some of the ideas of Edwards et al. (2004b). It demonstrates a more patient-centred approach, with a suggestion that I am trying to move toward collaboration but not quite achieving it. In this next extract I am engaging in the stories that the patient has to tell. I ask the patient about an event in her life that may have impacted her pelvis, and be causing the palpatory feedback that I am feeling. It is an example of narrative reasoning because it includes elements of the patient's story, and is thought to individualise the approach to the patient's needs (Smith, Higgs, and Ellis, 2007):

I continued to analyse as I was palpating and I wondered why the left side was not moving. I wasn't sure why this girl's pelvis had ended up where it was so I asked her if her babies sat awkwardly, she said not really but the first one was quite a large 9lb and the labour was lengthy. The births were normal but she tore badly.

Narrative 2: 10: 15

There is no progression of that discussion though which suggests that I was not engaged with the patient in a collaborative manner, but using their narrative as part of my analysis and planning. The information did not yield any extraordinary material, perhaps if it had the communication may have become more patient-centred.

This next extract suggests that I am picking up on information that is being elicited, perhaps unconsciously, by the patient. The sensing of the patient's stress could be interpreted as allowing the case to develop more narratively, and changes the nature of the encounter along a more interactive route, focused on patient comfort and security:

My mind was taking me down a biomechanical route because that posture is not a good one for the pelvis and hips. Within moments though I was sensing her stress, she had not mentioned anything and she appeared bubbly and bright, but there was something about this lady that was giving me a mixture of information.

Narrative 3: 4: 12

The next extract is from the same patient who is demonstrating the level of stress. At a later time during cue acquisition I discover that she has been trying to have children for some time. My response was instinctive probably from years of experience, but demonstrates a patient-centred approach:

...we went on to discuss her menstruation she said that she and her husband are trying for children...I think it was the way she said trying that made me think about waiting until later in the treatment session to ask the question 'how long.

Narrative 3: 7: 2

What is unclear in the next extract is whether it is the emotive nature of this case, or my increased awareness that I can be practitioner-led, that has changed the way I ask the patient to undress to their underwear. I believe it is my increased awareness as a result of earlier cases and the reflective process:

Having completed all the questioning, I asked her if she was okay to undress to her underwear, she said it was fine so I left the room to allow her to change.

Narrative 3: 8: 1

A little later during the same case study, I am interacting with the patient to ensure that there is consent for the procedure I need to perform. It is arguably partly practitioner-led reasoning and partly patient-centred. I am intent on patient comfort, but need to use certain techniques in order to achieve my treatment goal:

I explained what I wanted to do and she was happy for me to go ahead so I put her into a gentle wind up position and asked her what it felt like to make sure I wasn't causing any unnecessary pain.

Narrative 3: 12: 6

In the following extract, the patient has presented in a very acute state and does not feel she can move very far from centre in any direction. I had not been able to undertake a full examination because of the patient's pain levels. The extract shows me contemplating whether to treat the patient with structural, or cranial osteopathy. I decided on structural in order to gently teach the patient that it is possible to move and thereby provide a level of cognitive reassurance, which it has been suggested is useful in reducing patient concerns (Pincus, Holt, and Vogel, 2013):

...decided that the tissues needed to move and stretch and to give her the confidence that she can move into different positions...I could sense her distrust that the movement would be okay so I reassured her by explaining what I was doing and wanting to achieve and I asked to tell me if anything hurt too much, this helped her to visibly relax and I was able to move her body around with some ease and not much pain.

Narrative 5: 8: 2

In the next extract, from a later consultation, the patient had presented with a complex set of symptoms. I examined him and performed a number of clinical tests, but I wanted to use cranial treatment to see if anything further would arise that might prove or disprove my hypothesis. I made a point of informing and discussing the idea with the patient because I wanted to know that he was happy with my suggestion and to tell me if he was expecting a different style of treatment. This is an indication I am actively trying to collaborate with the patient's and take their wishes in to account even though I am directing the treatment:

Before I started I discussed treating him cranially with him explaining that I wanted to see what other restrictions there may be and he was fine.

Narrative 6: 7: 15

A similar thing occurs in during a later consultation with a patient that presented the previous week with what I believed was a trochanteric bursitis. I discussed my proposed treatment option and tried to be inclusive by taking the patient into account. It falls short of being collaborative because it does not discuss options and ask for the patient's decision:

I discuss ultrasound to the bursa with her

Narrative 8: 6: 1

This final extract is a totally reflective piece so did not occur during the consultation with the patient. It demonstrates my belief system and the fact that I am aware that the

patient's values, belief system, and cultural context should be uppermost in the decision making process. However, this was not demonstrated during the project, and in actuality there is some way to go before I become completely collaborative:

Although I think that it is my duty to explain possible obstacles to wellness it conflicts with my more moderate belief system. She has a right to decide how she wants to live and a responsibility for her own health.

Narrative 3: 14: 24

Taken together, the above section demonstrates the fact that RP helps to highlight areas of practice that I would like to change. There is a subtle, but palpable change in the way the I now view my role in the CR process. Over the course of the study I have become aware of cognitive bias and have determined to become more patient-centred. There is a tentative internal move toward the concept of collaborative reasoning and the BPS model that has occurred naturally as a result of microscopically examining my work. It is the strength of RP that has highlighted the habits that have become entrenched, and allowed me to view those behaviours in relation to how I would like to practice (Johns, 2004). The process of RP allows deep introspection and evaluation with the intention of encouraging change to occur within the reflecting individual. The action of consultation with supervisors and peers, and the existing literature, deepens the reflective process (Johns, 2009).

6.4 Chapter Summary

The findings provide an understanding of the interpretation of the different categories and sub-categories that have emerged as a result of analysis of the narratives. The first category of 'developing a sensory construct' illustrates the perceptual diagnostic skills of an osteopath both as discrete and combined entities. It includes the sub-categories 'building a picture'; 'mental imagery into embodied senses'; 'analytical multisensory perception'; and 'palpation informs treatment decisions'. Taken together the overall interpretation that emerged from this category was the idea that I use my combined senses to build a picture, or create a mental image of the person that is also embodied. The image is then tested using multisensory feedback which activates analytic cognition. Visuo-haptic perception also activates JOLs and informs treatment decisions. At no point did I finalise a diagnosis during the case studies but remained open to feedback.

The second category is 'PR' which is considered an important process central to CR. It contains the sub-categories of 'multisensory perception enables PR'; 'analytic cognition enables PR'; and 'emotional intuition enables PR'. The overall interpretation that emerged from this category is that PR is enabled by multisensory perception and appears to occur during all phases of the clinical encounter, not just during diagnosis. It was not possible to

determine whether T¹ and T² processes occur simultaneously, but they appear to happen very close together.

The third category that emerged from this study is that of 'metacognitive monitoring of CR', and includes the sub-categories of 'monitoring and analysing'; 'predicting'; 'planning-intervention and planning-rationale'; and 'evaluation and revision'. This MS strategy initially suggested by Flavell (1979) broadly corresponds to the metacognitive framework originally suggested for nursing by Pesut and Herman (1992). There was evidence in these sub-categories of MK and ME, the latter of which occurred in the form of JOLs and FORs. Combined it provides a framework by which I supervised my thinking during CR, the effect of which was to make various treatment and management decisions regarding the patient in front of me. It also allowed me to be aware of when I was overriding a decision.

The final category that emerged from this study is that of RP and included the sub-categories 'creates awareness'; retrospective reflection activates questioning'; reflection as a conduit for change' which had further sub-categories of 'cognitive error and bias in CR'; 'developing a BPS approach'; and 'moving toward collaborative reasoning'. The category demonstrates that RP creates a supervision of thinking by retrospective reflection that enhances moment-by-moment metacognition. The process, involving peer review and supervisory feedback, allowed me to identify areas within my practice for professional development.

Chapter 7: Discussion

7.1 Introduction

This thesis explored the concept of CR in osteopathic medicine using RP as the method to narrate my work as an osteopathic practitioner. It explores the development of perceptual diagnostic judgments, the role of metacognition, cognitive processing, and multisensory perception in osteopathic CR. In discussing the findings of the study, links to the existing literature are made that are associated with CR in medicine and musculoskeletal medicine, perceptual cognitive judgments, reflection and RP in a healthcare arena. I will argue that the findings of this study have implications for osteopathic education and future research. During the discussion, there is an assumed resonance between the results arising from a single practitioner and the general osteopathic community, and the results are interpreted accordingly.

The discussion that follows considers the understandings and insights that arose from the findings, taking into account the original research questions. It is informed by the initial literature review, which continued during the study and is described in chapters' two to four.

The findings from this study resolve the research questions as follows:

How are perceptual diagnostic judgments made?

Perceptual diagnostic judgments appear to be multisensory and begin as soon as the patient comes into contact with the practitioner, which can be the moment they enter the clinic. I found that I developed a sensory construct by initially 'building a picture' of the patient which began with visual and auditory feedback, followed by discrete and combined visual and palpatory senses. Arguably, informal visual sensory information is absorbed into my body as an embodied sense which allowed a sense of the person prior to formal observation or palpation. This multisensory information enabled both analytic and non-analytic modes of reasoning, and there appeared to be movement back and forward between the two. Cranial palpation was used not only to treat patients, but also to support or negate previous haptic and visual findings, and to inform treatment decisions. Generally, immediate conclusions were not formed, but data was gathered in order to inform 'building a picture'.

Is there a relationship between palpation and intuition in the clinical decision making process?

It was not possible from the findings to support the capture of intuitive cognition because it appeared too rapid to acquire, although there was a moment during the study when I was aware of my thoughts racing below the surface of consciousness. However, I would argue it is possible to infer the presence of intuition in the form of PR, the occurrence of which is demonstrated in this and other osteopathic studies (Thomson et al. 2014a; Roots et al. 2015). In this study, PR appears to be enabled multi-sensorially by auditory, visual and palpatory feedback, which in turn informs treatment decisions and analytic reasoning.

Can intuitive judgments be captured? If so, what is the role of metacognition in the development and maintenance of the practitioner's clinical competence?

As discussed above, intuitive judgments in this study were found to be too rapid to capture using the methods employed. However, I would argue it is possible to infer the presence of FOR and JOL. These are intuitive metacognitions, which are likely to be based on experience, and occur in the background driving the thought processes during CR. Particularly present was FOR, which is a feeling that information arriving is correct but is not consciously considered. It is however, acted upon with further analysis and questioning. It was also found that metacognition in osteopathic practice broadly followed a model posited by Pesut and Herman (1992) involving monitoring, analysing, predicting, planning, evaluating and revising. This combination of metacognitive strategies is important in the maintenance of clinical competence, particularly if the practitioner maintains awareness of their own knowledge gaps via regular reflection.

What aspect of the researcher's daily clinical encounters and osteopathic practice inform and increase the researcher's professional knowledge?

The findings from the RP element of the study suggest that it has an important contribution to make toward osteopathic clinical competence and professional practice. It informs and deepens professional practice creating an awareness of practice life, moment-by-moment decision making and patient care. Heightening the practitioner's awareness allowed reflection to act as a conduit for changing habitual and unconscious practice. In this study, it specifically allowed the identification of moments that may have the potential for cognitive error and diagnostic bias. It also identified the tendency for the practitioner to resort to a biomedical model of healthcare that had been habitually trained during undergraduate study. The practitioner acknowledged the importance of the newer BPS model, but did not routinely integrate methods into practice to address psychosocial

aspects. This tendency coincides with the identification of a gap in osteopathic knowledge of practitioners who were educated more than fifteen years ago (Draper-Rodi et al. 2015).

The discussion is separated into four main sections:

- a) perceptual diagnostic judgments
- b) the relationship between visuo-haptic perception and intuition
- c) capturing intuitive judgments and the role of metacognition
- d) reflective practice: informing professional knowledge, and the need for a reflective practice model of osteopathy.

7.2 Perceptual Diagnostic Judgments

Perceptual feedback arises from the senses and specifically this study has focused on vision and haptics, with auditory perception being assumed due to interaction with the patient. It has been suggested that osteopaths diagnose using multiple sensory modalities (Esteves, 2015), and the findings suggest that this begins the moment a patient enters the clinic. The findings also suggest that osteopaths utilise a combination of discrete visual and haptic perception, and combined visuo-haptic perception dependent on the stage of the consultation. Visual and haptic perception that explicitly link into the question how are perceptual diagnostic judgments made? is represented in the section '*developing a sensory construct*'. This has five sub-categories, a) building a picture; b) converting mental imagery into embodied senses; c) analytic multisensory perception; d) multisensory perception informs patient care; and e) palpation informs treatment decisions.

Visual and haptic perception were also found to enable intuitive i.e. a PR mode of reasoning that is thought to be used by expert clinicians as a result of the establishment of 'illness scripts' that are built up due to experience (Boshuizen and Schmidt, 2008). They also activate analytic judgments, which have also been implicated in clinical decision-making (Elstein, Shulman and Sprafka, 1978) and Elstein (2009).

7.2.1 Developing a Sensory Construct

7.2.1.1 'Building a Picture'

Patients usually present with a range of musculoskeletal and non-musculoskeletal symptoms. The osteopath is required to evaluate the presenting complaint with the aim of deciding whether osteopathy is appropriate for the patient, what the condition is, and how best to treat and manage the problem. At the stage that the presenting complaint is considered safe and appropriate to treat, the osteopathic clinician is intent on diagnosing

somatic dysfunction within the patient (McClune, 2007). Vision is used at all stages of the consultation, and haptic skills during examination and treatment stages. When combined, they provide information from cue acquisition through active then passive examination, and on to treatment.

'Building a picture' describes how I use formal and informal visual feedback, and information gained via haptics within the clinical encounter. Formal skills in this study are described as conscious structured observation, where I am actively and consciously attempting to elicit visual information from examining the patient. In contrast, informal skills appear to occur tacitly, for example, when engaged in conversation with the patient and I do not consciously activate my observation. The findings show I often gain a sense of the demeanour of the person early in the consultation, which may indicate how resilient they are emotionally (Fourie 2015). It allows me to build a picture, or perception, which includes personal and social characteristics not simply anatomical and biomechanical information (Moran, 2013). The information gained by this type of emotional intelligence is gained from years of life experience and working as an osteopath. These are skills we use for example, to read another person's body language, use of language, judge their actions, and understand the other person's and our own emotions (Gard and Lundvik Gyllensten, 2000). This type of information goes beyond what they say verbally. Health problems in the developed world are complex and multifactorial and stress is a persistent part of life in these countries (McEwan, 2005). Understanding the person potentially allows us to address the patient's presentation in a way that is not only directed at biomechanical factors (Moran, 2013).

Palpation is used in both a direct and proprioceptive manner (haptics), and like vision is informed by propositional and experiential knowledge. Separately, and in combination with the visual sense, the multisensory information that was received created questioning and enabled both analytic and intuitive cognitive processing. I also formed judgments from the perceptual feedback. It is thought that perception and cognition are intimately connected, with perceptual information guiding our decisions (Tacca, 2011), and our knowledge influencing the way we perceive (Brewer and Lambert, 2001). The knowledge in this situation would probably be mainly experiential from years of treating and analysing patients, and from life experience with reading and judging body language, but supported by propositional knowledge. At times, it was possible to see that the tacit information that was absorbed activated an analytic and/or intuitive mode of thinking, because it was noted and I started to think about which tests would be appropriate. At other times, the analysis was retrospective. The retrospective nature does not necessarily mean that the cognitive processing only occurred after the event. It is possible that decision making was occurring but was not available to be captured. Roots et al. (2015)

suggested that there was evidence of implicit cognitive processes occurring in observed subjects during CR. They deduced the implicit nature of the cognitions because the participants did not verbalise the event, but an action was performed nevertheless. In this study, cognitive processing has been specifically aimed at body health, creating diagnostic connections in the form of possible underlying pathologies, and intuitive feedback about patient health and lifestyle. The explicit information that it provides is related to muscle tone, joint and bone health and range of movement, which agrees with McClune (2007), and Browning (2014). Findings also suggest that I use cranial palpation as a method for supporting, or negating, previous haptic and visual findings. It also enabled judgments that informed treatment decisions regarding when to move on to treat another area, and whether the treatment is at an appropriate point to finish. Structural palpation also informed my treatment decisions by giving specific feedback about joint restrictions and tissue health, and allowing decisions to be made regarding modes of treatment and patient management. Palpatory feedback was iterative and I used it to test my hypotheses.

Formal observation, when I was actively assessing the patient's anatomy and biomechanics, and haptics, were used to answer a question that I had in my mind about the patient presentation e.g. if the patient had thigh pain then I would be looking and palpating to see how the patient's leg position may be effecting this, or if the patient's symptoms might be being caused by their lack of abdominal tone. At no time did I draw an immediate conclusion from what I saw, it appeared to be an information gathering exercise that allowed me to continue to 'build a picture' of the patient's presentation. This is similar to the findings of Roots et al. (2015), who suggested that the osteopathic participants in their study dynamically altered their thinking based on new information received.

It is likely that this multisensory feedback is stored in my LTM as is suggested occurs with all information, (e.g. Ericsson and Kintsch 1995), and retrieved immediately after the consultation whilst writing the descriptive text. At times it activated a thought that was captured in the notes, and at other times the information only appears in the descriptive text and narratives. Interestingly, general personal and social depictions of the patients which impart a general sense of the person usually only appeared in the descriptive texts and/or narratives. It is as though we gather this information, mostly tacitly, to be stored as non-declarative or perceptual memory in the LTM and to be retrieved at some time in the future (Ericsson and Polson, 1988). In this case when writing the descriptive texts. The scene has been perceived visually and has entered late vision because it has been identified and recognised using input from an interaction between WM and LTM. This indicates that higher order cognitive centres have intervened to provide top-down

processing, and a 3D sketch has been formed (Raftopolous, 2011). What we perceive however, is always subject to attentional bias (Vergauwe et al. 2014), which involves selection of an item via bottom-up information processing between WM and LTM. This recovers the meaning of the input and relates it to the current goals (Raftopolous, 2011). Therefore, what is recorded will be closely related to the profession one finds oneself in, the motivations of the practitioner within that profession, and in this case the aims of the study.

I would like to emphasise that these are tentative suggestions as retrospective reflection is naturally open to the possibility of recall bias (McDonald, 2013), and no study has been performed to assess the accuracy of my recall. It has been shown that TA tasks with relatively short response latencies of less than 10 seconds provide the highest validity of recall of protocol descriptions. This became more difficult and less accurate in experiments assessing a participant's ability to describe their actions (Ericsson and Simon, 1993). In this study however, I was making notes of my thoughts, which is a different and arguably less onerous task. Additionally, the descriptive texts, which were written within a thirty-minute window immediately after the patient had left the clinic room, were written with direct reference to the notes as a memo-by-memo account of my thoughts. I would argue there is a similarity of findings, regarding cognitive processing, to other qualitative osteopathic studies investigating CR and DM which utilised recall via interview and observation (Thomson et al. 2014a; Roots et al. 2015). This suggests the methods used in this study are valid and similar to the transcripts from interview and observational studies. However, further research as to accuracy would be needed if this tentative suggestion were to be taken further. Mental imagery however, is considered to represent one of the highest levels of situational awareness which corresponds to an expert's capacity to perceive, understand and predict the environment around them (Endsley, 2005). It is thought that training in mental imagery techniques has the ability to maintain a high level of professional expertise in experts, and allow students to develop more rapidly which would improve their standard at qualification (Jarodzka, Jaarsma, and Boshuizen, 2015).

This study suggests that having gathered verbal and tacit visual information prior to examination, the osteopathic clinician then examines the patient and gathers further formal visual and haptic sensory information. This does not mean that the clinician is fixed on a diagnostic pathway that haptic feedback then corroborates. In fact, I found that I maintained an open mind and rarely made final conclusions. I simply developed the picture I was seeing and gradually focused the information down to a likely hypothesis. This study has investigated single consultations, but it is normal for an osteopathic clinician to see a patient more than once, perhaps several times. The information

gathered each time as a result of multisensory feedback is used to gradually focus to a diagnosis, although the clinician normally has a working hypothesis. This study has investigated the role of visuo-haptic feedback in osteopathic CR, and has arguably established that signals from multisensory modalities are capable of stimulating analytic and intuitive modes of cognition in the practitioner. The visual and haptic information arising could be argued to be promoting both a top-down and bottom-up form of processing because it is, simultaneously at times, stimulating both descending and ascending neurological pathways in the clinician's body, the combination of which underpin the processes of sensation and perception (Blake and Sekular, 2006).

7.2.2 Mental Imagery into Embodied Senses

There is a possibility that the concept next described is peculiar to me, but it would be interesting to see if it creates a resonance in other practitioners. When I was attending a course a number of years ago, we were asked to stand and observe a colleague in order to establish, without touching them, where we thought the stresses and strains on their body may be palpable. Every osteopath in the room was able to assess their colleague in this way to some extent or another, so it unlikely that this is peculiar to only me. I found during this research study that when looking at the person I could almost feel the sensation of their tissues within my own body. Interestingly, Raftopolous (2011) posited that mental imagery does not involve information returning from the senses as perception would that results from visual feedback. The sensation of the person's tissues in my body suggests to me a form of mental imagery that is born of experiential visuo-haptic feedback that is stored in my LTM. The mental image of their tissues usually proved correct when I palpated them, whether I thought they would feel flexible or rigid. I would like to stress that I was not trying to feel their body from a distance, it was tacit information arriving that gave me this sense of them. It is thought that our cognition may be embodied, i.e. bodily experiences and thoughts along with our behaviours are controlled by our perception, which is a direct result of the neural processing of feedback from all our senses (Glenberg, 2015). It is a phenomenological view of mind-body unity which allows a dynamical interaction of the brain, body and environment (Esteves, 2015). It is thought that visual processing creates a process of emotion and the subsequent chemical and electrochemical activation of various neural sites such as the hypothalamus and brain stem. These biological changes create a change in the representation of the body landscape within the cortex. This alteration then stimulates second order structures, for example, the cingulate cortices and thalamus via the release of neuromodulators. This then has an effect upon the body state within the viscera, and contraction of striated muscle, causing us to acquire the feeling of a feeling (Damasio, 1999). An osteopath's sensory feedback is multifaceted and involves the haptic sense, which is unusual in that it

involves us sensing ourselves as we sense others, potentially causing a lack of differentiation between the perceiver and the perceived (Ratcliffe, 2013; Øberg et al. 2015). This sensing of the internal environment of our body (interoception) via palpation, or the memory of it in our LTM, when combined with the internal emotional activation provided by vision, perhaps provides the conditions for the embodied sensations I am aware of when I look at another.

CR in osteopathy requires a practitioner to diagnose somatic dysfunction within the patient, which addresses altered biomechanical processes within the body. In addition to analytical and non-analytical reasoning skills they rely heavily on perceiving the patient's body with their sensorimotor system including, vision, haptic (tactile and proprioceptive palpation) auditory, vestibular and interoceptive systems (Esteves, 2015). The CR aspect, distinct from diagnosis, requires the practitioner to engage with the patient in a multidimensional space not least of which takes into account the patient's narrative (Edwards et al. 2004b; Higgs and Jones, 2008). Within this interaction the patient-practitioner alliance is distinctly important in order to produce a positive outcome for the patient (Darlow et al. 2013). The body is the centre of experience for both parties, and the practitioner is required to understand how that sense of 'self' occurs for the patient, as well as understanding them as a biological being. It is the interaction between the two parties, including the way that the practitioner handles the patient physically, that could be said produces an embodied interaction (Øberg et al. 2015). The combination of embodied cognition in diagnosis with embodied-enactive CR posited by Øberg and colleagues, provides an overt sensory experience for the practitioner. This I would argue, helps create the *largely tacit, highly imagistic and deeply phenomenological mode of thinking*, which Mattingly (1991, p979) used to describe CR. I am a relatively experienced osteopathic clinician with sixteen years post qualification proficiency. The information that has been laid down in the form of sensory feedback and 'illness scripts' is incalculable, but difficult to deny. This study does not provide unequivocal empirical evidence for the presence of mental imagery developing embodied senses. However, it is conceivable to extrapolate the idea of neural plasticity, and posit the enlargement of modal and cross modal systems within the brain that develop as a result of persistent sensory feedback from the daily work of an osteopath, similar to expert Mah-Jong players (Saito et al. 2006).

Perception is thought by some to be action oriented and this shapes cognitive processes (Noë, 2004). Considering this argument, it is therefore possible that I am not sensing embodiment at all, simply the sum of the merit of my thinking. As a result, my mind may be purely anticipating an impending sensory event (Mahon, 2015). In this case it would be palpating the patient's tissues to assist diagnosis. It is posited that we can have

independence of thought from perception and that the format of concepts can be distinct from sensorimotor input, a fact that would negate embodied theory (Mahon, 2015). If we 'still' ourselves and quieten our minds can we perceive without action, or cognition? It seems that we can without action, but I am not certain it can be without a level of cognition. We can still perceive form and colour and as a result thoughts seem to cross the mind even if we do not engage with them. Rather than one or the other, which appears to be where Mahon (2015), and Glenberg (2015) wish to take the argument, it seems possible that we can have differing levels of embodiment, and perhaps it does not need to be complete but would allow for the different functional theories (Meteyard et al. 2007). Perhaps it is too early to wish for equivocality, and a theory of embodied cognition should be embraced whereby the body is part of a diverse selection of simulation mechanisms sharing a common representation system that supports cognitive activities (Barsalou, 2008). Mahon does however suggest that there is more research to perform before we can unequivocally state that cognition is embodied.

7.2.3 Multisensory Perception - Analytic Cognition and Pattern Recognition

During this process of evaluating somatic dysfunction, it has been suggested that osteopathic clinicians use a combination of non-analytic pattern recognition and analytic HDR (Thomson et al. 2014a; Roots et al. 2015), although intuition is not a comfortable phenomenon for medicine because it is impossible to objectively analyse. It resides in the unconscious mind and unfolds rapidly, which makes it very challenging for neuroscientists to deconstruct (Dhaliwal, 2010). It nevertheless resonates that there are broadly two methods by which we make decisions and capture our experiences (Hogarth, 2010). As pointed to by Thompson (2009), a challenge for DPT of reasoning is to understand when intuitive answers reached on the basis of T¹ processing are kept or discarded in favour of analytic T² processing. PR is often described as the practitioner bringing forward information from previous cases in order to make a diagnosis. During this study, there was evidence of explicit T¹ processing resulting in a single hypothesis happening at times during the consultations. This was activated during cue acquisition, examination and treatment. As an example, a patient mentioned LBP between the vertebrae in the lower lumbar area that was aggravated by sitting and lifting. It had started when she and her partner were renovating a house, and I immediately thought of an intervertebral disc problem. However, generally in this study there was evidence that rather than these being disconnected processes there was a movement backward and forward between PR and a more analytical style of reasoning, so that they were acting as a continuum as suggested by Croskerry (2009).

In the same case study, after I hypothesised an intervertebral disc problem by PR during the cue acquisition phase of the consultation. When it came to palpatory examination I was aware of a depression over the L3 vertebra which the patient reported was sore. The feeling of the vertebral segment and the patient's feedback prompted me to analyse further to establish the dimensions of the sore area. It is arguable that this is also activating PR at the same time as analysis. I have seen many times that somatic dysfunction in the lower lumbar joints affects the surrounding musculature around the lumbar erector spinae and gluteal muscles. As a result, I was probably using this experiential information to explore further. During an observation study Roots et al. (2015) reported a similar phenomenon when they time-stamped practitioner's comments when assessing the CR strategies of three osteopaths throughout pre-observation, cue acquisition, and physical examination stages of a patient consultations. It was a retrospective observational study that required the participant osteopaths to comment on a video of themselves during the patient consultation, which inherently creates issues for establishing intuitive thought. However, they believed they observed PR occurring on occasions at the same timing as both light and moderate HDR. However, as a result of the method used it was not possible to see whether there was an interaction between T¹ and T² processes, or whether as one stopped the other was initiated. There is an argument regarding the presence of single or dual pathways for cognition which would make simultaneous or sequential processes viable, or not (Sinclair, 2010)). Thompson and Morsanyi (2012) suggest, that subtle emotions occur at the same time as positive intuitive judgments which give the reasoner a sense of correctness, or FOR, of the answer. They posited the development of a fluency heuristic, which is an affective state that helps to integrate the experiential components of insight (Topolinski and Reber, 2010). FORs were in evidence during this study and have been discussed in the section on metacognition. They occurred during intuitive hypothesis generation, and it could be seen that I then asked for further information to improve my level of confidence in my hypothesis. I also would argue that I experienced a negative FOR when I was given information by the patient that sounded unlikely, or perhaps misinterpreted by them. I do not think it is possible to posit on the sequencing of T¹ and T² processing, simply that they both occur dynamically throughout the consultations.

It could be argued, that the use of combined PR and analytic thought seen in this study corresponds to a recognition-primed decision model suggested by Klein (2003). This model allows for the interaction of intuitive and analytic modes of cognition. In a situation where the decision maker has experienced a similar situation, they see cues. In this example it is the area of pain, aggravating and relieving factors, potential causal factors that allow the recognition of an intervertebral disc problem as the recognised pattern. This activates action or illness scripts, which the mind then actively evaluates using mental

simulation and mental models. The consequence of the mental simulation provides methods for affecting the presenting complaint in the form of treatment and management plans.

As an additional note, haptic feedback directly aided me in deciding on treatment approaches during the consultation. Explicit treatment decisions were mostly in the form of judgments to treat another area or conclude the treatment for that day. Haptic feedback during cranial techniques was used as an important tool, providing feedback that the patient's mechanism was balanced and non-reactive. During structural treatment, palpation was used to ensure there was sufficient change to the patient's tissues in order to stimulate healing.

7.2.4 Palpation within CR

In addition to providing sensory feedback that helped to stimulate intuitive and analytic modes of cognition, palpation also affected CR more broadly. It provided the patient with a catalyst, helping them to disclose difficult emotional information. During haptic palpation of two patients, I found that touching an area of a patient's body during treatment stimulated the patient to discuss significant emotional concerns. In both extracts it occurred during cranial treatment which could be argued is a more intimate form of treatment because the practitioner appears to barely move and is holding parts of the patient's body. Structural treatment is more dynamic and the patient is being moved about, which does not necessarily give the stillness and space for deep discussion. There are other ways of knowing that posit a connection between the area of the body that the practitioner is touching and emotions that are held in the patient's body, which prompts the disclosure (Levine, 2010). This kind of knowledge is only partially known and difficult to investigate, but it is relatively uncharted and potentially innovative (Sturmborg and Martin, 2008). It may never be fully discovered unless someone values the information, or paradigm change that may occur on its discovery. However, a more objective probability is that touch provides a reassurance to the patient and enables them to feel safe enough to disclose information (Nathan, 1999). The presence of touch during treatment is clearly important for the patient as well as the osteopath. It is important for the osteopathic profession to understand how our processes work from the viewpoint of the practitioner. It is equally important to understand the impact of treatment and the experience of the patient, which is a potential direction for future research.

As an interim summary, the findings in this section suggest that osteopaths use a combination of discrete visual and haptic perception and combined visuo-haptic discernment in combination with auditory feedback, which provides multisensory

information. It was found that we use observation informally and tacitly at the beginning, and then add more formal visualisation during the examination phases of the consultation. There is evidence to suggest that we create a mental image of the patient, separately and in combination with haptic feedback, which is also stored as an embodied sense. Multisensory information received was also found to activate intuitive PR and analytic HDR modes of reasoning. The two modes of reasoning have been identified in previous osteopathic research, but this study adds to the evidence because it identifies the perceptual information that creates the activation.

Haptic information also explicitly informed treatment by providing information on the level of balance of the patient's tissues during cranial treatment. It also provided the conditions in which some patients felt comfortable disclosing information that might be impacting their symptom picture and pain.

7.3 On Capturing Intuitive Judgments and the Role of Metacognition

7.3.1 Capturing Intuitive Judgments

This study has been interested in exploring osteopathic CR and how osteopathic clinician's make perceptual diagnostic judgments from a process and micro-process viewpoint. This encompasses an awareness of cognitive and higher cognitive processes that may occur during CR. The DPT has become a widely accepted theory that describes the way that humans undertake CR and decision making (Evans, 2008). As part of DPT, T¹ involves intuitive thought processes that are believed to be rapid, unconscious and automatic requiring little if any effort to reach judgments (Ambady, 2010; Hogarth, 2010). Due to their rapid unconscious nature they are thought impossible to capture and objectively analyse (Hogarth, 2010). This is demonstrated by the fact that definitions of intuition have been lacking in their descriptive ability, other than to explain what it is not, and this leaves us with a 'fuzzy' construct (Epstein, 2010, p296). It is believed to be available only to the experienced clinician, and therefore open to the suggestion that it is '*nothing more than recognition*' (Simon, 1992, p195).

Whether it has been possible to capture intuitive thought processes during this study is debatable, however the results imply the presence of intuitive cognitions at a perceptual level. The notes that were taken during the consultations were intended to provide an insight into my cognitions. I believe they did that to an extent, because it is possible to plot a path through each case study to see where my thoughts were being directed, simply by looking at the notes. However, I am the practitioner who took the notes and wrote them into a description directly after the consultation, and I can still feel and see

them in my mind's eye happening on the day, even though many of them were recorded over a year ago. The experiences are stored in my LTM, but you the reader only have my word to that effect. It is suggested that kinaesthetic and tactile forms of mental imagery may enable expert osteopaths to access mental representations of normal and altered structure and function from their LTM during CR (Esteves, 2011). Although there is little if any empirical evidence, osteopaths over the years have postulated the use of mental imagery during diagnosis (Frymann, 1963; Mitchell, 1976 cited in Esteves, 2011; DiGiovanna, 2005). It has recently been postulated that orthopaedic surgeons maintain elaborate 'mental images'. This allows them high levels of situational awareness to perceive, understand, and predict the uncertain and complex environment around them (Ibrahim et al. 2015; Jarodzka, Jaarsma and Boshuizen, 2015). Surgery is a visuo-haptic capability, so perhaps it is not such a stretch of the imagination to consider that years of using visuo-haptic feedback mechanisms can provide osteopaths with similar capacities.

The notes that were taken during consultations in this study were likely to be prompted by conscious thought with the intuitive processes occurring in the background, prompted by perceptive feedback from multiple sensory mechanisms. This is probably why the notes appear quite procedural in nature because they describe what I was doing with thoughts arising as a result of what I was witnessing, rather than the colourful sensory imagery that I have stored in my LTM. However, I would argue that it is possible to infer intuitive processes by looking at the notes because I suggest you can see that I am witnessing the arrival of patterns into my conscious. I would suggest that I am a relative expert after sixteen years as a qualified osteopath, so I will have knowledge represented in my LTM which is recalled as an integrated whole rather than individual items (Boshuizen and Schmidt, 1993). As an example, in the first consultation that was used as a reflective narrative, the notes indicated that I had noticed the muscle quadratus lumborum was tight on the left side of the patient's body, and the right pelvic bone looked internally rotated. This stimulated the thought '*where is the tightness*'? There is a need to rely on me to tell you what I was thinking, which allows me to construct the understanding and interpretation. It is allowable in this qualitative interpretative study, but may not be sufficient to satisfy the empiricists. What we know is that this study is assessing a practitioner's clinical and diagnostic reasoning. It is therefore reasonable to assume, that asking a question about tight tissues is a question that is directed at developing the diagnosis of the patient standing in front of me. It is also probably safe to state that it implies there is visual feedback from her tissues that made me think something in her body is tight. I would also argue, that because of my training and experience assessing patients using my understanding of normal and altered body function, tissue quality, and joint mobility, it is possible for me to identify these aspects visually and sensorially. As an osteopath I have significant biomedical, anatomical and biomechanical propositional

knowledge and, according to Boshuizen and Schmidt (1993), my experience then encapsulates all the information learnt into usable wholes. I would also suggest, because I can still feel the experience of the patient I treated in my mind and body, the perceived information is embodied within me as further encapsulated knowledge. Musicians are capable of detecting small anomalies in sensory input which suggests that humans have this capacity if they have been trained, and have become practised in a particular motor and sensory activity (Sherwin and Sajda, 2013). Osteopaths spend hours receiving and perceiving multisensory information, which sets us in similar surroundings to musicians. I would argue that observing the patient's body and seeing altered anatomy activated my LTM, which is full of encapsulated packets of information including from the sensory realm. This stimulated the retrieval of relevant information that allowed me to recognise that I would find tight tissues somewhere around the right side of the patient's pelvis. If time had allowed during the consultation, I would have been able to tell you that I was running through my anatomical knowledge and encapsulated sensations relevant to that area to decide which muscles might be the cause. It was not an anatomical list but single ideas that arose, and at a later stage in the consultation I identify the psoas muscle as the anatomy at which my thoughts were directed.

In terms of DPT, T¹ as well as being rapid, automatic, parallel, heuristic-based, relatively independent of computational power, and mostly domain-specific, is a concept that refers not to one system but a set of subsystems. They are thought to operate with autonomy, responding to their own triggering stimuli and are not under the control of T² processing (de Castro Bellini-Leite, 2013). The triggering system has been postulated to be ballistic and once triggered develops into a cascade of events that move to completion (Evans, 2003). I experienced what could be described as this ballistic effect during two cases in particular. One was a case where the information I was receiving from the patient told me two different things; superficially the patient appeared happy and relatively uncomplicated, but fairly quickly into cue acquisition I noted that she was very bubbly but I sensed a level of stress underlying. I expanded a little on this in the descriptive text, but when I wrote the narrative I remembered the experience with more depth and imagery *'within moments though I was sensing her stress, she had not mentioned anything and she appeared bubbly and bright, but there was something about this lady that was giving me a mixture of information. I was aware that my mind was racing just beneath the surface of consciousness, but nothing was emerging as concrete thought at that moment'*. It was a vivid experience that I did not have time to explain during the consultation or the thirty minutes following. However, when I had time to reflect on the body sensations that had been triggered, I interpreted the perceptions as my mind racing just beneath the surface of consciousness. This is clearly arguable as plain fantasy, reflective bias (Wall, 2006), or the way in which I interact with the world shaping my

representation of concepts (Hauk and Tschentscher, 2013). However, there was something present that I lodged in my LTM that perhaps could be described as a cascade event.

7.3.2 The Role of Metacognition

We use both non-analytical and analytical methods of cognitive processing during osteopathic CR and diagnosis and it is suggested that humans spend over ninety-five percent of their time in non-analytic mode (Klein, 2003). How we use the higher cognitive processes to supervise our cognition is therefore important to avoid cognitive bias and ensure clinical safety (Koriat, 2007; Croskerry, 2009). This study has explored the use of metacognitive processes during CR in order to identify ways to enhance osteopathic CR at both undergraduate and postgraduate levels. It is shown that we use implicit and explicit MK skills in the form of intra and interpersonal differences, and self-knowledge. It is also demonstrated that we use MS that broadly subscribe to the model of Pesut and Herman (1992) that describes the metacognitive framework used in nursing. Finally, there is evidence to suggest that most, if not all my metacognitive experiences, were accompanied by ME in the form of FOR and JOL.

7.3.2.1 Meta-Knowledge

An osteopathic clinician needs to communicate effectively with their patients, requiring them to have well-developed interpersonal skills which will allow them to read the patient's body language and hidden meanings (GOsC, 2012). It is an essential skill requirement without which patient-centred care and CR would be virtually impossible. It was demonstrated both implicitly and explicitly at various times during the case studies in the way I created a judgment of the patient within moments of meeting them, and then responded to the innate needs of the patient during the consultation. This is likely to be implicit meta-knowledge (MK) because it is mostly not consciously considered. There are a number of studies that have demonstrated that relatively accurate judgments can be made by accessing very thin slices of behaviour, and this can be via multiple channels e.g. visual, auditory, and verbal, or a combination (Ambady, 2010). By its very nature metacognition suggests a conscious process by which we monitor our thoughts and activities. However, it is thought by some, that once learnt metacognitive activities can be less consciously and more automatically occurring in the background (Reder, 1996). Sometimes the understanding is explicit and occurs as a critical thought and is self-correcting, and at others is uncritical and simply occurs (Kuhn, 2002). Whether metacognition can be unconscious is open to debate, but our beliefs about the cognitive

nature of other people, including intra and interpersonal differences, are posited to be a part of MK (Flavell, 1979).

As the project progressed there appeared to be a subtle change in the way I viewed my thinking. Supervisory and peer feedback helped to develop a self-knowledge of variables that affected my cognition, such as the presence of heuristics and potential bias to diagnostic accuracy both of which are concepts that I had not previously encountered. I became aware of the way I described the patient in front of me and how that could cause bias in CR. A previous RP essay created an awareness of how my personal judgments may affect my cognition and the interaction with the patient consulting me. This could be described as MK because it is a self-knowledge of the way that variables affect my cognition (Zohar and Barzilai, 2013), the variable in this instance being my personal judgments. I found that making rapid personal judgments and not staying present to the person could create a failure to understand them correctly, if at all (Flavell, 1979). I now find that being aware of the person but not engaging with a conscious thought process at the initial stage of meeting them allows me to develop my understanding of them intuitively. I remind myself as I am beginning the consultation to stay present and non-judgmental, and I am mindful to stay with that process which could be described as a reflection-in-action (Schön, 1983).

Knowledge of tasks and strategies are the other two subcategories of MK identified by Flavell, Miller and Miller (2002). There is a need for the osteopathic clinician to be able to gauge whether the information they have at their disposal is sufficient to manage the task that is presenting to them. They also need to understand the strategies to adopt, for a particular patient presentation, to best achieve the result that is required (Flavell, 1979). Osteopaths utilise a combination of PR and HDR when establishing a diagnosis during CR (Thomson et al. 2014a; Roots et al. 2015), and it is also thought that experienced practitioners operate mainly in the intuitive mode (Esteves, 2015). That said, it is important to be aware of when to move into an analytical mode to avoid misinterpretation of symptoms and signs. There are times during the study when I noticed I had not probed deeply enough when gathering information during cue acquisition, but I was generally aware of what strategies I needed to use for each consultation. I would suggest that this is an example of what Reder (1996) describes as automatic metacognition, because the strategies had been practised for a number of years to allow them to be implicit. This could also be described as situational awareness, which is thought to be exhibited by experts allowing them to perceive, understand, and predict the environment around them. Novices, in comparison, tend to become overloaded by the amount and complexity of information arriving and struggle to prioritise the data (Jarodzka, Jaarsma and Boshuizen, 2015). During a complex case I used a combination of PR during identification of

symptoms or signs that warranted that approach, but then switched into a more analytic process if the symptom picture became more complex or uncertain (Sackett et al. 1991). It is as though these two processes were occurring concurrently as suggested by Epstein et al. (1996). However, I do not think this study demonstrates the simultaneous nature of T¹ and T². It is possible to argue for the presence of dynamic transitioning which was also observed during the research studies of Thomson et al. (2014a), and Roots et al. (2015).

I was also aware at times of maintaining an analytic approach during a complex case presentation. As an example, a gentleman consulted me complaining of apparent nerve symptoms into his arm which appeared to be caused partly by his neck, and partly as a result of tension in the muscles around the thoracic outlet, a presentation that should be able to be helped by osteopathic treatment. The presentation was complicated by the fact that he had already consulted a colleague of mine and there had been no change in the symptom picture. This alerted me to the possibility that the nature of the complaint may be recalcitrant, or the diagnosis was incorrect. I was very aware of the need to be analytic in my approach to him in order to as firmly as possible establish the correct diagnosis, which would then direct my treatment. It is thought that MK is no different from other knowledge that is stored in LTM. It may be activated by a deliberate search for a particular piece of information or strategy, or implicitly as a result of triggering retrieval cues. Whichever method is employed, it is thought to alter the course of a cognitive enterprise without necessarily entering consciousness (Flavell, Miller and Miller, 2002).

7.3.2.2 Meta-Skills (MS)

MS is generally described as involving monitoring, evaluating, planning, and self-regulation (Flavell, Miller and Miller, 2002; Schraw and Moshman, 1995). They are used within CR because a clinician needs to maintain awareness of their interpretation of the patient's situation and condition in comparison to the actual outcome.

There was a large section of the findings that indicated that osteopaths use MS significantly during CR. These broadly follow the model suggested by Pesut and Herman (1992), which was based on the ideas of Kitchener (1983), Brown (1978), and Carnevali, (1984), and was designed to describe the metacognitive framework supporting CR in nursing. The distinction between the ideas of Flavell, Miller and Miller (2002) and the model of Pesut and Herman (1992) is the focused nature of the latter's model to CR, and the emphasis on the MS aspect of metacognition. As has been suggested previously, osteopaths use analytic and non-analytic strategies for diagnosis within a CR framework. I would suggest that the metacognitive framework of Pesut and Herman (1992) surrounds the dual processes used for diagnosis. It is a framework of cognitive monitoring in which

we use aspects of the MS of monitoring, analysing, predicting, planning, evaluating and revising.

Monitoring and Analysing

Monitoring and analysing occurred during every aspect of the consultation because data collection does not stop even when I am treating the patient. An unexpected finding for me is that I do not come to a hurried conclusion, but employ a working diagnosis. I then continually gather information about the patient's illness beliefs, behaviours, symptom picture, examination signs, and via treatment, that might give an indication as to the management strategy needed and final diagnosis. This is different to the findings of Pesut and Herman (1992) who suggested that nurses finish monitoring and analysing at the end of cue acquisition. However, they were specifically proposing a model with which to teach novice practitioners, and it is possible that due to inexperience novices do not develop the depth of CR strategy that an expert would be expected to have (Jarodzka, Jaarsma and Boshuizen, 2015). In an educational situation, students would also be required to collect data and form a differential diagnosis that would need to be discussed with a clinical tutor before moving toward a treatment programme. Another difference between CR in osteopathy and nursing is that the former is inherently uncertain, because in the UK we do not use specific medical tests in order to diagnose our patients. This means we can never really know the final diagnosis even when the patient has recovered. In support of Roots et al. (2015), I would argue that we maintain a relatively open judgment that focuses toward a working diagnosis, but remains open to modification if information becomes available to alter our conclusions. This uncertainty creates what could be considered to be a definitive, or perhaps overarching metacognitive strategy, that enables the practitioner to constantly monitor their progress and direct their CR strategy more effectively.

Predicting

We also use the MS strategy of predicting, as suggested by Pesut and Herman (1992), when predicting diagnostic hypotheses from the symptom picture and aetiology. It is the act of inferring from the information that is elicited from, and provided by the patient. They suggested that experienced clinicians ask themselves many probing questions during this process, for example: *what problem/aetiology can be predicted from the cue clusters? Can I predict whether the problem is a consequence of the aetiology? How does this prediction for this problem compare with past experiences?* (p153). I would suggest that these are mostly tacit questions that occur rapidly during the complete consultation. There is evidence here in this study of asking myself questions about whether a particular

joint would be stable enough for manipulation, or whether the structural presentation of the patient can be changed by osteopathic treatment, or what has caused the tight gluteal muscles I am palpating, for example. However, because experienced clinicians are unlikely to stop the consultation after cue acquisition and discuss their findings with another clinician, the questions they ask themselves at this stage are likely to be occurring automatically in the cognitive background (Flavell, 1979). The questions I have asked myself would additionally suggest that we also utilise the strategy of predicting when planning a treatment approach.

Planning

Planning is directed at the treatment, or interventions that the clinician decides are appropriate for the patient and their presentation. Intervention, and treatment rationale were two main sub-categories that I used during the planning stage. Rationale was an important part of the process of deciding how to treat the patient based on sound principles. It is a metacognitive strategy that was taught at undergraduate level and it has not diminished over time. Clinic tutors would ask the student exactly what were the principles behind deciding to articulate that particular joint, or part of the body, or why make the decision to soft tissue that muscle. We were expected to be able to answer easily and relatively immediately with sound theory. Pesut and Herman (1992) describe this as logical planning because it is based on sound practice experience, research, or evidence.

It is noticeable from the notes that I did not sit down and write out a treatment plan for each patient directed by the hypothesis, but tacitly developed my ideas from past experience of similar cases, or a rationale. For example, a lady presented with trochanteric bursitis; her leg on the symptomatic side was slightly adducted and her foot pronated. All of these findings would be expected to exacerbate the injury and potentially help cause the problem. My aim with treatment was to release the adductors, reduce the soreness in the thigh and gluteal muscles, give her exercises to strengthen the gluteal muscles and core, ask her to ice the bursa, and to ensure she wore her orthotics to reduce the over pronation in her foot. Some of this could be seen in the notes and other aspects were developed over the course of the treatment, which Zohar and Barzilai (2013) describe as strategy sequencing.

Evaluating and Revising

The MS of evaluation occur when the practitioner evaluates where an intervention is taking the patient's condition. I used evaluation and revision when treating a patient if I

did not think the particular technique was effective or producing the intended result. It was also used when a patient returned with an unchanged symptom picture. This supports the claims of Pesut and Herman (1992), that evaluations can result in positive, neutral or negative situations because a condition could be improving, moving toward improving, not changing, or deteriorating. This MS was often combined with the strategy of revising because I would probably move on to decide whether to continue, change the treatment, or refer to another healthcare professional. This can potentially occur after the treatment or subsequent treatments, or even during the intervention.

In addition, when I treated dysfunctions that I found on the day, there was a conscious awareness of what I was palpating with my hands. This prompted an evaluation of what to do next particularly when treating cranially. This corroborates the claims of Esteves and Spence (2014) and the findings of Roots et al. (2015), that palpation plays a key role in the CR processes of osteopaths.

7.3.2.3 Meta-Experiences (ME)

There were a number of examples of ME that occurred during this study, they were spread throughout the whole consultation and occurred simultaneously with the strategies of MK and MS. JOLs (Nelson and Narens, 1996) were demonstrated, mostly, at times when concluding a part of the CR process before moving to the next phase. A JOL is how humans determine whether they are studying sufficiently and/or correctly (Dunlosky and Nelson, 1992; Nelson, 1996). As an example, deciding whether there was enough information during cue acquisition so that I could move on to the examination phase of the consultation, or deciding to finish treatment for the day because the patient's body felt balanced. The former example only became obvious to me when analysing the data against metacognitive strategies, which suggests that it has become an automatic stratagem and not something consciously thought about. This corroborates the suggestions that ME can be conscious and analytic, or unconscious and non-analytic (Flavell, Miller and Miller, 2002).

FOR also occurs during the consultations and is demonstrated when I get a sense of whether the information I have been given by the patient is correct, or subject to misinterpretation. It also occurs when trying to decide whether the hypothesis is correct, or when the expected feedback from an examination is ambiguous or unclear. Thompson and Morsanyi (2012) suggest that T^1 processes give rise to two ME outputs: the content of a judgment or decision, and the FOR of that decision. This is demonstrated in an interesting interplay of all the metacognitive outputs mentioned in this ME section. During a consultation I received information from the patient which enabled a non-analytical T^1

PR and I immediately thought of a discal picture. The information was then judged with a JOL that I needed more information in order to expand my understanding of the symptom picture before coming to a conclusion. When I received more information it felt right to initially conclude that the discal picture may be correct (FOR). It should be mentioned that metacognition is not perfect and FOR is thought to be related to the ease of decision making, or fluency of the answer arriving to awareness, rather than the correctness of the solution (e.g. Benjamin, Bjork and Schwartz, 1998; Koriat, 2007). However, the fluency heuristic is suggested to be a valid clue to difficulty (Koriat, 2007) and learnt by experiencing particular items frequently (Hertwig et al. 2008). It is also suggested to be a usable and accurate form of memory retrieval (Thompson and Morsanyi, 2009).

There were times when I was aware that the information required in order to come to a diagnosis was difficult to bring forward from LTM. This was often as a result of a consultation being complex and time constrained. Metacognitive awareness was needed in order to listen clearly and focus so that I could analyse the information provided by the patient. I was also aware of when to use analytic strategies and not rely on intuition. This was demonstrated when forming a differential diagnosis for an apparent nerve root problem. Early in the study there were examples of when I was too focused on a biomechanical diagnosis and did not consider alternatives however, the recognition of when this could happen became clearer as the study progressed. This indicates the inherent metamorphosing nature of RP, in itself a metacognitive activity (Ely, Graber and Croskerry, 2011), but also the influence of training in metacognitive strategies (Trowbridge, 2008).

7.4 Interim Summary

The findings suggest that perceptual diagnostic judgments are multisensory and begin as soon as the patient comes into contact with the practitioner, which can be the moment they enter the clinic. I found that I developed a sensory construct by initially 'building a picture' of the patient which began with visual and auditory feedback, followed by discrete and combined visual and palpatory senses. Arguably, informal visual sensory information is absorbed into my body as an embodied sense, which allowed a sense of the person prior to formal observation, or palpation. This multisensory information activated both analytic and non-analytic modes of reasoning, and there appeared to be movement back and forward between the two. Cranial palpation was also used not only to treat patients but to support or negate previous haptic and visual findings, and to inform treatment decisions. Generally immediate conclusions were not formed, but data was gathered in order to inform 'building a picture'.

There is tentative evidence that intuitive thought processes are occurring during CR in this study. It is mostly by inference from the situations that have occurred because it seems impossible to actually capture those cognitions with the method I have employed, indeed, it may be impossible with any method. However, I would argue that there is a dynamic transitioning between non-analytic T¹ and analytic T² processes occurring throughout the consultations. It appears that CR is monitored using the metacognitive strategies of MK, MS, and ME that were initially identified by Flavell, and his colleagues (1979; 2002). There is ample evidence of the ME strategies of JOL and FOR outputs that allow the osteopath to make judgments on the efficacy of information arising, and when sufficient data has been gathered. These ME outputs appear directly linked to T¹ processing as suggested by Thompson and Morsanyi, (2012).

7.5 Reflective Practice: Informing Professional Knowledge

RP in this study was used for two reasons, to investigate its use in informing, developing and transforming osteopathic practice, and as a way of capturing my thought processes and developing the notes and descriptive texts into a narrative which could be analysed line by line. Two main categories resulted from the thematic analysis:

- a) Reflection creates awareness,
- b) Reflection as a conduit for change.
 - Cognitive error and bias in CR
 - Developing a BPS approach
 - Moving toward Collaborative reasoning

Reflection creating awareness, I would argue, cannot be underestimated. The need to be aware of your thoughts and actions, whilst maintaining an informed status via regular interaction with healthcare literature, is important for maintaining professional competency. The second category arose as a result of reflection-on-action and generated two specific areas in my practice that require my focus to allow transformation. However, on reviewing the healthcare literature it could be seen that the concern regarding diagnostic error is beginning to receive attention in the osteopathic texts (Esteves, 2015; Esteves and Spence, 2014; Spadaccini and Esteves, 2014). Interestingly, there are two particular themes within the section on changing CR styles that have been prominent in the osteopathic literature and are interconnected, that of the need to move further toward the BPS model of healthcare and patient-centred reasoning. These themes emerged from the study and were not in my mind before it began.

7.5.1 Awareness

One of the research questions associated with this study is what aspect of my daily clinical encounters and osteopathic practice inform and increase my professional knowledge? A suggestion that has arisen directly from undertaking this study is that informing and increasing professional knowledge can only arise as a result of the practitioner being informed and aware. A statement that at first glance seems slightly irrational because surely we should expect that daily clinical encounters regularly teach us something. This is only true if you have your eyes and senses open and you are actively being informed by the medical literature. It is possible to move through daily practice automatically, ninety-five percent of the time operating in intuitive mode (Klein, 2003), forgetting to question. If an anomalous case presents to you perhaps your eyes open for a while, until that patient gets better and stops attending, but did you learn everything there was to learn, or simply utilise your experiential knowledge and apply it? *To learn effectively from one's experiences is critical in developing and maintaining clinical competence throughout a practice lifetime* (Mann, Gordon and MacLeod, 2009, p596). In the UK as primary contact practitioners, osteopaths have an obligation to ensure they reflect regularly in order for their knowledge to remain relevant (Spadaccini and Esteves, 2014). It is thought that if someone has a high degree of procedural knowledge they use their skills more automatically and sequence strategies more effectively (Schraw and Moshman, 1995). However, the opposite can also be true that we potentially can induce error by not paying enough attention (Pezzolesi et al. 2013), or by being uninformed. The question for every osteopathic clinician must be whether they are still being effective, and not simply careless and potentially open to bias (Evans, 2010).

I found whilst doing this study that RP allowed me to look closely at my practice and examine it as if with a magnifying glass. It enabled me to identify how I actually practice, rather than how I think I practice (Bolton, 2009), broadened my views and presented a powerful conduit for change. This is in-line with ideas that have been posited by many authors over the years particularly in the fields of nursing, physiotherapy and occupational therapy, that reflection and RP informs practice challenges assumptions, widens perspectives, and creates change (e.g. Atkins and Murphy, 1993; Johns, 2009; Branigan and Moores, 2009; Clouder, 2000). There is no research addressing RP in osteopathy that I could find, and I was interested to see first-hand how it could inform my practice and perhaps create a resonance with others in the profession. It has created an awareness of how I am practicing, and that awareness has allowed me to realise when I am maintaining a state of 'being with' and 'for' a patient rather than 'doing to' (Johns, 2004). It could be argued that the process of taking notice of my thoughts in this study has also helped to foster that state of awareness (Pezzolesi et al. 2013). This awareness

and mindfulness will help foster the right environment for practitioner psychological flexibility, which should enhance patient care and help practitioner well-being (Roche, Haar and Luthans, 2014). I would suggest that it is in the interest of individual osteopaths, the osteopathic profession, and our patients, that practitioners become cognisant of mindfulness techniques in order to foster a state of awareness of our CR. Kabat Zinn (1982) is recognised as the first to introduce mindfulness to the healthcare environment as a stress reduction programme (Mars and Abbey, 2010). He defines mindfulness as *the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment* (Kabat-Zinn, 2003, p145, cited by Jankowski and Holas, 2014). It is likely that it is this moment by moment paying attention on purpose that has helped me access the types of cognitive processing that I would argue are in evidence in this study. It has also allowed me to identify topics for transformation and areas that inform my practice. Jankowski and Holas (2014) proposed that mindfulness induces a meta-meta level of metacognition that is accessed when a person starts to monitor their basic consciousness. The presence of more than one meta-level of metacognition was also suggested by Nelson and Narens (1996) who are recognised for their work on meta-memory states particularly JOLs.

Awareness has also allowed me to realise when during my practice I access the state of reflection-in-action. This was first posited by Schön (1983) and could be described as a mode of metacognitive thought that professionals use as they problem solve during their daily pragmatic encounters to allow them to think what they are doing whilst they are doing it. I found evidence of reflection-in-action often when there was an element of uncertainty in the patient's presentation. This may be stimulated by information from cue acquisition, visual or palpatory feedback and created a questioning in my mind which developed into a reflective phase. This corroborates the findings of Mamede, Schmidt and Penaforte (2008), who found that reflective analysis of complex cases was associated with the generation of more accurate hypotheses. Whilst not replicating the type of RP used in this study, nevertheless, when only the final diagnosis was considered RP led to greater diagnostic accuracy in solving complex cases whereas it did not affect the diagnosis of simple cases. As well as confirming the need for RP in CR, their study also suggests that the use of non-analytical PR is a valid tool in CR of non-complex cases, which is presumably why our cognitive architecture has developed it.

However, it was also interesting to discover in situations which were more routine, an element of relying on heuristics would occur and my mind would override a thought that I should perform more clinical tests. De Neys (2013) suggests that we possibly are aware when we may be relying on heuristics and a diversion from logical thinking will affect autonomic arousal, response times, and subjective response confidence. This

corresponds to the suggestions that metacognitive fluency is an affective experience that makes us aware when a situation is correct (Thompson, 2009). It also suggests that biases are therefore caused by the failure of override rather than detection (Pennycook, Fugelsang and Koehler, 2012). There is a concern in the literature that reliance on non-analytic mechanisms for DM will result in errors in judgment which could potentially influence the care given to the patient (Atkins and Murphy, 1993). It would be interesting to determine in such a situation, whether the override was warranted because I was invoking T¹ processes as a result of metacognitive fluency (Topolinski and Reber, 2010), or whether I was simply being lazy. It would also be interesting to know whether metacognitive fluency, which is considered a valid heuristic (Koriat, 2007), does transfer to conditions of naturalistic CR from situations of relative laboratory simplicity. A discussion on cognitive bias occurs in the following section.

7.5.2 A Conduit for Change

7.5.2.1 Potential for Cognitive Bias

During retrospective reflection I used phrases such as ‘instantly liked her’ or ‘she is an easy person to like’, which prompted an introduction from my supervisor to the concept of cognitive bias. It could be speculated, that the informal immediate observation discussed earlier may set the tone for the rest of the consultation, which feeds into the idea of bias in CR (Croskerry, 2002; Wellbery, 2011). It is an interesting observation and one that has been investigated addressing various marginalised groups, such as obese patients (Lee and Calamaro, 2012), and may warrant further investigation in osteopathy both from a CR standpoint and bias against patients.

The fact that I was not cognisant of the concept tends to agree with the suggestion that most clinicians are only vaguely aware, if at all, of the notion of heuristics and bias (Croskerry, 2002). I found that two particular heuristics were identifiable within my practice, the ‘halo effect’ and premature closure. It is worth noting that I was not specifically looking for the kind of bias that might be present, so this is not an exhaustive list and there may be more that I use. It is suggested that there are many, and some are more frequently encountered in CR and DM, for example, availability, anchoring, representativeness heuristics, and over one hundred cognitive biases, including premature closure and confirmation bias amongst others (Lucchiari and Pravettoni, 2012).

The halo effect is a heuristic that is thought to occur because we confer either positive or negative attributes to the person we are perceiving. These attributes are then conferred for every action they undertake, so if we like someone then potentially that can bias our reasoning of them (Kahneman, 2011). It is possible that we do not look hard enough for a

solution because they are deemed 'too upbeat to possibly be suffering from that condition'. I did not look in depth into the specific examples in this study so it is not clear whether the 'halo effect' actually caused bias in this study. However, in evidence is premature closure which is a bias that results in the failure to consider alternative hypotheses (Shah and Oppenheimer, 2008). This happened early in the study during cases that were apparently simplistic, and it was clear I relied on PR. As the study unfolded I spent more time developing hypotheses and checking them even though my intuition suggested my initial diagnosis was correct. There is ambiguity in the literature regarding the evidence for heuristics actually causing errors because they are thought to be valid methods for reducing the effort associated with tasks (Shah and Oppenheimer, 2008). Indeed, Simon (1990) described them as '*methods for arriving at satisfactory solutions with modest amounts of computation*' (p11). However, it appears that with the advent of the DPT where cognitions are categorised as intuitive T¹ and analytic T² (Kahneman and Frederick, 2002; Stanovich, 2009) the intuitive element has been identified as potentially causing error (Croskerry, Singhal and Mamede, 2013a). Medical error is a phenomenon that can be identified and quantified due to the presence of autopsy (Shojania et al. 2003). Osteopathic treatment generally does not result in death, so our rate of CR and diagnostic error is not known. However, as I would imagine, patient satisfaction and safety is uppermost in most, if not all, osteopath's minds, and is a requirement of the osteopathic regulator in the UK (GOsC, 2012). It would be appropriate to develop an understanding of if, and how, cognitive biases are effecting our DM processes and CR. Cognitive de-biasing strategies are available to clinicians to allow them to identify and correct any particular habits they use (Trowbridge, 2008; Croskerry, Singhal and Mamede, 2013b). The reflective element of this study using supervision, peer review, and reference to the literature, had clearly demonstrated that making clinicians and students aware of the concept of heuristics and biases will allow them to reflect upon the possible effect of these aspects on their own CR and DM. Trowbridge (2008) suggested explicitly describing heuristics and cognitive biases, which is something that I found immediately allowed me to identify methods to overcome my habits. I then inserted more systematic reasoning by including extra clinical tests, forcing a differential diagnostic list, and then evaluating my less likely hypotheses.

7.5.2.2 Changing my Clinical Reasoning Style

There are a few further concepts that have arisen specifically from the RP element of the study. Broadly, they can be placed into two main categories that of a practice routine directing CR, and a recognition of CR styles motivating a move toward collaborative reasoning. The practice routine had positive consequences, because it is the cue acquisition structure that I use during a new patient case history that helped to direct CR in a positive direction, and elicited important and sometimes tacit information. Also the

development of a timeline helped prediction during analytic reasoning of complex cases. Undesirable effects of a practice routine however, were the unaware reliance on PR, and the tendency toward a biomechanical focus during CR. The overreliance on T¹ cognition changed when I became aware of it and I was introduced to the concept of heuristics and biases, as discussed above. Increased awareness of when a case was uncomplicated made me cognisant of the potential for inhibition and override of my thoughts, and meant I was able to insert de-biasing strategies (Trowbridge, 2008; Croskerry, Singhal and Mamede, 2013b), such as extra clinical tests.

However, as has been pointed out, CR is multidimensional, and there is now emphasis on patient-centred care and SDM in clinical practice. This movement is intended to help emancipate the patient and include them in the treatment and management of their condition, and recognises that they may have separate values from the treating clinician (Patel et al. 2014). Osteopaths often claim that their uniqueness and philosophies naturally include the profession in the realm of patient-centred care and make them BPS oriented (Thomson, 2013b). Whether this is true of individual practitioners may be dependent on when they trained, and their exposure to the BPS model. My training finished in 2000, and although the RCGP (1998) had developed guidelines for doctors designed to help them address the presence of psychosocial factors in patients presenting with LBP, the subject was in its relative infancy in medicine and osteopathy. Now there is an emerging culture of recognition of this model within osteopathy (Penney, 2010) and a movement away from a disease centred model of healthcare (Thomson et al. 2013).

However, the discovery that even though I have previously been tentatively introduced to the concept of BPS approach to musculoskeletal pain, I have the tendency to revert to a biomechanical form of CR. Perhaps it is understandable because osteopaths provide a physical treatment of somatic dysfunction (Williams, 2007), which tends to focus our attention on a reductionist biomedical model of healthcare (Thomson et al. 2013). I would argue, this is particularly present during diagnosis. This focus would naturally create a driving force and define a way of perceiving the world (Balcetis and Dunning, 2006). There are some who suggest that AT Still regarded the human body as a machine and this is where our tacit interpretation of his philosophies have arisen from (Penney, 2013). There are others who propose that he understood health from a mystical, spiritual and emotional standpoint (Leach, 2008) which would rather fulfil the requirements of the BPS model. As he did not write a set of principles and his writings are particularly complex and difficult to comprehend (Evans, 2013), perhaps the modern profession should decide how to move forward in terms of principles, values and models of practice Tyreman (2008; 2013).

The BPS model was originally endorsed by the WHO in 2000 some twenty years after it was first posited by Engel (1977; 1980). It has gradually become the preeminent scientific model central to the understanding of pain in general, and musculoskeletal pain in particular (Penney, 2013). I understand that it is currently taught in the OEs, but when I qualified in 2000 the biomedical model was still dominant, although there is still scant mention of BPS in osteopathic literature (Moran, 2010). There is currently a study occurring that aims to deliver instruction via e-learning for osteopaths who have been qualified longer than fifteen years (Draper-Rodi et al. 2015), which suggests that a need has been identified. As suggested by Penney (2010), it is actually pain that motivates a patient to attend our clinics and not somatic dysfunction. Perhaps he is reminding us that it is people that we treat, and that we need to take a step back from diagnostic reasoning into the realms of patient-centred CR where, in support of Thomson et al. (2013), I would argue there is a symbiosis between BPS and patient-centred care.

Penney (2010) reminds us of the osteopathic philosophies that he believes are congruent with the BPS model which include the body is a unit of mind, body, and spirit. This is fundamental to my practice and I always consider psychosocial factors in my understanding of the patient's presentation even if it is not obvious I have done so, but a biomechanical focus for diagnosis is still prevalent. There was an emphasis on the importance of clinical information when I was a student in clinic at university, identifying contraindications to treatment, possible pathologies, as well as the musculoskeletal elements to their presentation. I entered professional practice thinking predominantly biomedically with knowledge of the psychosocial, but no understanding of how to implement a management programme to help the patient. Esteves (2015) argued that osteopathic undergraduate education promotes a more analytic T² approach which arguably encourages technical rationality. It is demonstrated in this study that although during my years in practice there has been a development of T¹ cognition, the technical rationality in DM appears to have endured.

It is more than just being aware of the possible psychosocial issues that present, there is a need to actively pursue a structure of questioning and managing psychosocial factors when they arise. I found that I tend to leave questions relating to psychosocial issues for either later in the consultation, or for a subsequent appointment, but there are authors that suggest we should address them during the first consultation (Grotle et al. 2005). However, transferring cognitive behavioural skills to non-psychologists has not provided the expected results (Williams, 2007). It is thought that osteopaths can provide lots of empathy and care, but there are certain psychological situations that require referral without which we will struggle to reduce a patient's pain (Pincus, 2006). This leaves us as practitioners with increasing the emphasis on psychosocial factors but it is unclear in which situations we can best assist.

It has been demonstrated in one of the largest and most efficacious RCTs of its type, that spinal manipulation helped patient's back pain beliefs, but that exercise classes helped fear avoidance beliefs (UKBEAM, 2004). During one of the cases in this study the patient was in intense pain and could barely move in any direction. When it came to treating her I consciously made the decision to treat using structural osteopathic techniques because I felt that the patient needed to know that her body could move. This action did indeed help and she was able to lie on her back which she had not been able to achieve when she first arrived in my clinic. At a later stage in the treatment and management of this patient I also gave exercises and advice on movement and posture, but perhaps we should be encouraging patients to attend specific classes more often so that they can be supervised and motivated to release fear avoidance beliefs. There appears to be a gap in the literature regarding how practitioners can approach a case that has strong elements of predisposing psychosocial factors. If we are to move all osteopaths forward to the BPS model and patient-centred care, then identification of exactly how we should approach a patient is needed.

7.5.2.3 Collaborative Reasoning

This study suggests that I utilise a combination of a patient-centred and practitioner-centred approach when treating patients. I used these terms for simplicity, but it is possible to break them down further into other terms such as narrative, diagnostic, interactive, and ethical reasoning, for example (e.g. Edwards et al. 2004b). It appears that I am empathic but tend toward practitioner-centred CR when situations are routine, and/or the patient presentation is relatively straightforward. It is as though when situations allow I move into an automatic mode of thinking and doing (Bargh and Chartrand, 1999). Reflection on this automaticity allowed me to enter an empathic state retrospectively with the patient, and realise that some of the practitioner-led unaware practice was unacceptable to me. It is thought that there are times when being practitioner-led is acceptable, particularly when the patient is relying on the knowledge of the clinician, and that we should, and do, move in an out of different styles of CR dependent on the situation (Edwards et al. 2004b; Thomson et al. 2013). However, I would argue that technical rationality and practitioner-led CR have an undesirable symbiosis. I noticed a tendency that when I was asking a patient to undress to their underwear there was no discussion of how comfortable they were with this request, it had become a habit for me, possibly as a time saving element. The patient agreed to the request but as Trede and Higgs (2008) argue this is not necessarily a genuine agreement, and the patient may not be mentally or emotionally prepared to answer in an informed manner. As the study progressed it was possible to see a change toward discussion and collaboration occurring. There is no consistent definition or use of the term patient-centred, or SDM in the literature, which makes utilising the term difficult (Bensing, 2000; Makoul and

Clayman, 2006). There is however, a theme that runs through many of the definitions of the term and that is the emphasis on collaboration with the patient. Values, interests and intentions of both parties impact the interaction between patient and practitioner, and agreement is more likely when these are shared. Engaging with the BPS model and psychosocial aspects of a patient's presentation would naturally require clinicians to understand their patients more intimate principles and attitudes, which would naturally require an association that goes beyond compliance.

Franziska Trede directed her doctoral research at investigating experiences of emancipatory practice and collaborative reasoning involving physiotherapy practitioners (Trede, 2006, cited by Trede and Higgs, 2008). Trede posited that a practitioner-centred practice typically favours a technical rationalist, practitioner in power approach. Whereas a patient-centred practitioner wishes to share knowledge and power with the patient, and values input from the patient toward DM and management. The suggestion that we move in an out of different roles does not fit with the ideal patient-centred definition, and suggests that we are sometimes technical rationalist and at others emancipatory and adopt a critical perspective. I would argue, that rather than becoming one or the other, there are times during which gaining tacit agreement from a patient is acceptable, and needs to be judged in relation to the consultation as a whole and not a specific action. Trede and Higgs (2008) concur that there is a place for practitioner-led DM particularly in acute settings but '*collaboration is based on the conviction that inclusiveness and critical self-reflection produce better outcomes for patients than empirico-analytical precision*' (p49). I would concur with this statement, however, there is a necessary requirement for the practitioner to understand both their own and the patient's interests, values and expectations. Given that osteopathic professional principles and values are difficult enough to define (Tyreman, 2008; 2013) it makes adoption of the collaborative approach complex because of potential difficulty individuals may have defining their own and the professions ideals, in addition to the patient's. It would require osteopaths to become aware or increase their awareness, and question their daily practice. Osteopaths are primary contact practitioners who are required to make autonomous judgements regarding their patient care. In order to effectively manage clinical uncertainty and guide their clinical decision making process practitioners are required to possess a highly developed self-reflective capacity. I would argue there is a need to develop osteopathy along a BPS and collaborative CR route with RP at the core of osteopathic CPD.

The following two figures depict the relationship identified between osteopathic CR, perceptual diagnostic judgments, metacognition and RP.

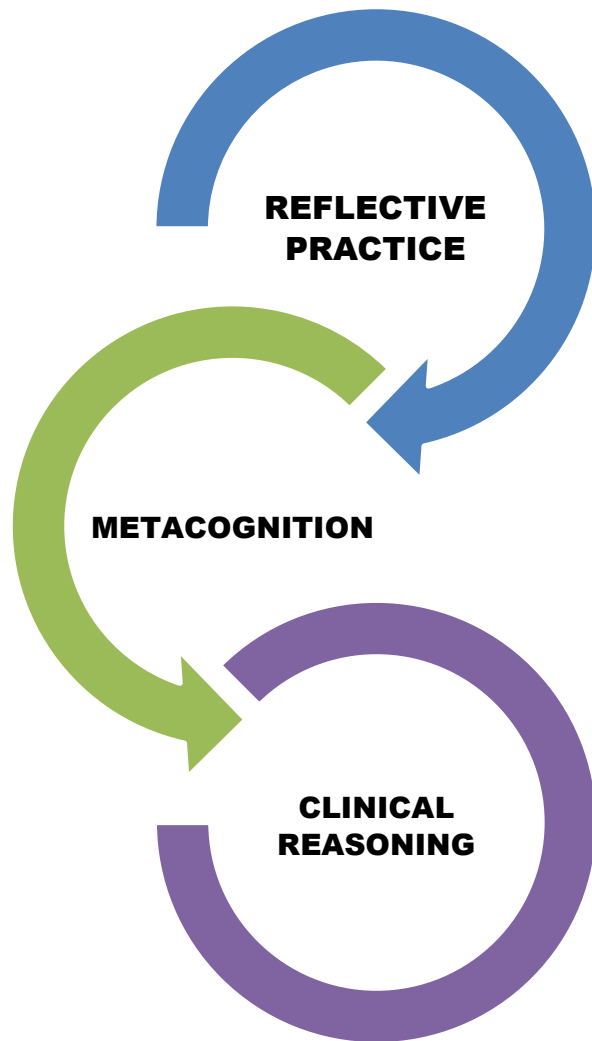
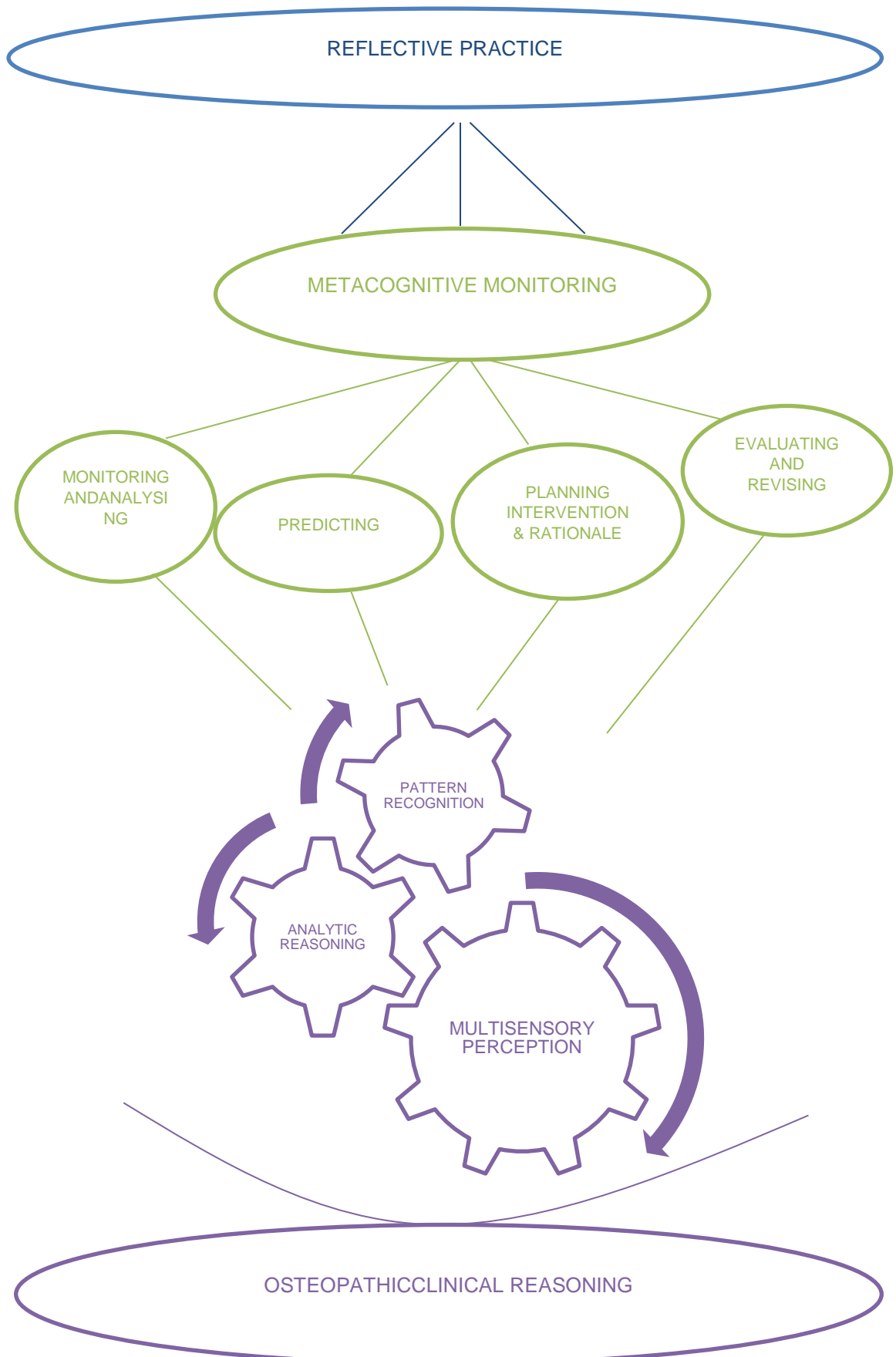


Fig. 7.1 Conceptual Overview of Relationship between CR, metacognition and RP

Fig. 7.2 In depth depiction of relationship between CR and percetual diagnostic judgments, metacognition and RP



7.6 Chapter Summary

This is the first study to investigate the moment-by-moment diagnostic judgments and CR of a single osteopathic practitioner whilst with patients. It is also the first osteopathic study to investigate the contribution of RP to informing osteopathic professional knowledge.

Whilst the limitations of the study are acknowledged, the findings suggest that osteopaths create a mental image of patients that is informed by multiple sensory modalities, and may become embodied. Although it was not possible to capture intuitive thought using the methods employed, the findings suggest that these discrete and combined multisensory perceptions activate both non-analytic and analytic forms of cognitive processing. This finding supports the studies of Thomson et al. (2014a) and Roots et al. (2015), who also found that osteopaths use a combination of PR and HDR during DM and CR. Cranial palpation in particular also informed examination findings and treatment decisions. At no point during CR was an immediate decision made, but information was collected and the diagnosis emerged, which supports the findings of Roots et al. (2015) who found that osteopaths dynamically altered their thinking based on new information.

Metacognitive strategies are important for clinical competence in healthcare and it was found that MK, MS and ME were present during CR, as identified by Flavell et al. (2002). Osteopaths also broadly follow an MS framework similar to that identified by Pesut and Herman, (1992) for nursing. There was also the presence of FOR and JOL found in the ME aspect of metacognition that helped direct the practitioner during reasoning.

The findings also suggest that RP could be an important metacognitive component by informing the moment-by-moment practice of a practitioner, allowing them to understand, develop and change their practice. Specifically, I found it allowed me to develop an enhanced awareness of my practice. It also acted as a conduit for change toward eliminating bias and error, developing a BPS approach and moving my practice toward enhanced patient-centred CR.

CHAPTER 8: SUMMARY, EVALUATION AND CONCLUSIONS

8.1 Introduction

The final chapter of the thesis begins with a summary of the key issues for osteopathic practice and osteopathic education that arise from the study, and discusses the implications for further research in this field. It moves on to evaluate the methods and methodology used for the research. Finally, it presents conclusions which emphasise the key messages that arise from completion of the study.

8.2 Summary of Key Aspects and Implications for Osteopathic Education

This thesis makes a significant contribution to knowledge of the concept of CR and perceptual diagnostic judgments, and how they are made within osteopathic practice on a moment-by-moment basis. Also of the concept of RP and the benefits that it offers to undergraduate and postgraduate osteopathic education. The following section summarises the main themes arising from this study in the context of, and the impact on, osteopathic education.

8.2.1 Perceptual Diagnostic Judgments

Knowledge of how we form CR and diagnostic decisions is vitally important to osteopathic educators, undergraduates and experienced osteopaths alike. At an educational level, understanding how development of visual and haptic feedback mechanisms creates experiential information that is used in both intuitive and analytic modes of processing, could direct undergraduate practise. CR in osteopathy requires the practitioner to engage with the patient in a multidimensional space not least of which takes into account the patient's narrative (Edwards et al. 2004b; Higgs and Jones, 2008). However, within that space it also necessitates the diagnosis and treatment of somatic dysfunction which addresses altered biomechanics and physiology within the patient's body. This study suggests that this is achieved by multisensory integration with mental imagery playing an important role in the composition of perceptual diagnostic judgments. Probably because of the nature of moment-by-moment awareness, I also became cognisant of the fact that the experiential information stored within my LTM allowed me to sense the patient's tissues in my body just as we are able to sense the hardness of a table, or softness of a pillow just by looking at them. The intuitive processing system has been posited to be an experiential organisation because we are aware of two fundamentally different ways of knowing, an intellectual rational way, and another that utilises feelings and experiences (Epstein, 1994). It is likely that the visual feedback that is sensed in my body includes information from the affective domain (Damasio, 1999). It is thought that knowledge of our internal states, and the emotional value associated with that knowledge, create conscious experience. The brain learns to be conscious due to its inherent plasticity

(Cleermans, 2011) and consciousness is not simply information processing. In addition, there are areas within the brain that are activated and enlarged by repeated sensory input, as has been demonstrated in the brains of expert musicians (Wan and Schlaug, 2010). I would argue that what I was sensing was a form of embodied cognition. The multifaceted sensory feedback that an osteopath experiences daily involves the haptic sense, and enables sensing of ourselves as we sense others (Ratcliffe, 2013), arguably creating the circumstances for embodied cognition (Øberg, Normann, and Gallagher, 2015). The implication is that we can develop the nervous system to enhance our ability in osteopathic practice in a similar way to sport and music. Potentially, using the correct methods, we could speed up development at undergraduate level and cultivate newly qualified osteopaths who are ready for practice earlier than currently. At the moment it probably takes about three years after graduation to develop the needed multisensory sensitivity that makes CR and diagnosis easier for a newly graduated osteopath.

Along the same lines, it would also be interesting to investigate further the neurophysiological and neuroanatomical nature of osteopathic CR. Musicians have been studied because they provide an excellent human model for studying the effect on the brain of acquiring specialised sensorimotor skills (Wan and Schlaug, 2010). There is widespread acceptance of the concept of brain plasticity, and musicians have been used to demonstrate that the multisensory and motor skill requirements create multimodal stimulation for structural and functional changes in the brain (Gaser and Schlaug, 2003; Bengtsson et al. 2005). The suggestion from this study, that osteopaths use multisensory modalities combined with the motor skill requirements of palpation, asks questions as to the brain effects of these activities, and whether specific training can be used to enhance positive effects. It is thought that training in mental imagery techniques has the ability to maintain a high level of professional expertise in experts, and allow students to develop more rapidly (Jarodzka, Jaarsma, and Boshuizen, 2015).

Osteopathic students begin to develop their skillset as soon as they begin university. However, the first year is very academic and there used to be limited focus on developing sensory skills. In addition, there was limited specific sensory training apart from occasional classes using observation skills that were facilitated by a tutor, or looking for bony landmarks using palpation. Osteopathic technique and clinical situations provided the opportunity to practise haptic skills, but they were generally directed at treating the patient, or performing a specific technique, rather than maximising sensory feedback. As an osteopathic tutor I would see certain students diligently practising their technique in order to improve their ability. It is clearly no coincidence that it was also generally those students who received top marks in technical examinations. This study suggests that

osteopathic CR is heavily underpinned by multisensory perception, and as soon as the patient walks into the clinic we are implicitly and explicitly absorbing information that we use to evaluate their presentation. I would argue that there is a need to begin specific sensory training as early as possible in order to maximise diagnostic reliability, which has been shown to increase when using combined visual and palpatory perception (Esteves et al. 2008). The earlier a novice practitioner can become proficient in these skills the easier it would be to transition into professional life successfully. I would argue that, although novice clinicians require many hours of experience to develop their 'illness scripts' (Boshuizen and Schmidt, 2008), it is possible to advance their technical proficiency much earlier. It is possible that visual and haptic integration is more important than traditionally perceived. The emphasis in osteopathy has generally been toward methods to improve education of palpatory skills (Browning, 2014; Aubin et al. 2014). It would be useful to understand how the auditory, visual and haptic senses integrate to create embodiment, so that training can be focused on the different areas to ensure efficient integration.

8.2.2 Analytic and Intuitive Reasoning

This study found that I utilised a combination of HDR and PR during CR, which is in keeping with the finding of Thomson et al. (2014a) and Roots et al. (2015). However, the moment-by-moment nature of this study also allowed the discovery of the fact that visual, auditory, and palpatory sensory feedback all appeared to stimulate both T¹ and T² processes at various stages during the study. Although at times the processes were discrete, there appeared to be a general movement back and forward between the two, which corroborates the findings of physiotherapy research (Doody and McAteer; 2002; Edwards et al. 2004a) and occupational therapy (Mattingly, 1991). There is agreement between studies and across disciplines, that healthcare practitioners utilise both forms of cognitive processing. There is also the suggestion that we spend ninety-five percent of our cognitive processing time in the intuitive mode (Lakoff and Johnson, 1999; Klein, 2003). It was not possible to understand how much time is allocated to each during CR in this study. I would argue that our educational focus perhaps should include a greater understanding of PR processes involved in osteopathic CR. This could be achieved by directing the focus of a research project specifically at the moment of movement between the two processes. However, a more useful focus may be the development of the use of PR in diagnosis at undergraduate level. Osteopathic education tends to focus on HDR at undergraduate level possibly due to the early medical DM research of Elstein et al. (1978). Even though we do not know exactly how much time is spent in each mode, the possibility is that there is at least an equal amount. There is a suggestion that the emphasis on HDR creates the tendency for undergraduates to resort to technical rationalist thinking (Thomson, 2013a). This would suggest that the focus of osteopathic clinical

education could be on determining ways in which we can train students in both methods of reasoning. The focus of research could be broadened to identify specific training methods that might enhance and improve the non-analytical cognitive processing of novice osteopaths, in addition to the analytical. It is unfortunately unlikely that the profession has the ability to fund research that investigates the link between specific training methods and the activation of multi-modal neural centres, however that would be an interesting and potentially fruitful research project.

It is thought possible to teach ourselves how to become more intuitive by identifying the key decisions requirements of the job, practising and then reviewing them (Klein, 2003). Significant amounts of practise are required to begin to make the understanding intuitive. It is thought that it takes ten thousand hours to become expert whether in a sport or a profession (Ericsson, 2004). Hogarth (2010) suggested that shadowing experts is important, and agreed with Klein (2003) that it is important to structure the learning and to seek feedback. He also believes that we require scientific research to understand how we can best learn to be intuitive. Certainly, understanding when intuition and analysis enter a clinical situation could potentially focus one's attention when learning diagnostic skill. It could also aid osteopathic educators in deciding where to focus their attention for the courses they provide. At a postgraduate level, awareness of how we make diagnostic decisions and therefore the importance of relevant CPD courses, rather than ones we simply like, will enhance and improve continuing osteopathic standards within the profession.

8.2.3 Reflective Practice

Until this study RP has not been utilised in osteopathy as a research method, or combined with a moment-by-moment assessment of subjective osteopathic experiences during patient consultations. I was particularly interested in how RP could inform professional knowledge because, in the broadest sense, it is an instrument for self-examination that can be used to create professional growth (Ruth-Sahd, 2003). Also, whether it could be used as a vehicle for improving osteopathic understanding of aspects of CR. It is thought that reflective thinking is similar to critical thinking because it involves the close inspection of a subject and a turning over of it in one's mind (Dewey, 1933).

RP has been described as the meta-meta level of metacognition (Nelson, 1996), and provides the decision maker with a method of retrospectively reflecting and analysing the judgments they have made. It has been demonstrated that it is possible to access the reflection-in-action mode of metacognition that enables us to become aware of our thought processes as they occur (Schön, 1983). Metacognition is the sub-level to reflection, and this study shows that during osteopathic CR it is activated as the

practitioner is evaluating the presenting patient and making decisions. Broadly, it could be viewed a framework for understanding and evaluating the world and its inhabitants, including ourselves, with strategies for modifying our cognition and behaviour. The findings in this study suggest that RP has the potential to highlight areas of practitioner blind-sight providing a forum for improving clinical competence.

8.2.3.1 Cognitive Bias

There are many articles in the literature that espouse concern for the possibility of medical errors occurring due to the over-reliance on intuitive cognitive processes, for example; (Croskerry, 2003a; Klein, 2005). There are others that provide strategies intended to help prevent them, for example; (Croskerry, Singhal and Mamede, 2013a; Trowbridge, 2008). In this study I would suggest there was a possibility of the presence of premature closure, and the halo effect, as biases in my CR. They were evidenced early in this study possibly as a result of an over-reliance on PR. Although Norman and Eva's (2010) review of the literature would suggest that medical errors are not an over-reliance on one kind of thinking. They argue that they occur in both analytic and non-analytic processing and as a result of a variety of factors. Nevertheless, my tendency to have bias in my CR changed as the study progressed and reflection began to occur. The presence of improved knowledge dramatically changed my awareness of my CR behaviours, and as a result my approach to CR and diagnosis. I was also able to introduce de-biasing strategies, one of which was maintaining an awareness of the routine nature of a consultation, and as a result inserting extra diagnostic measures and clinical tests as recommended by a number of authors for example (Croskerry, Singhal and Mamede, 2013b; Trowbridge, 2008).

Whether the de-biasing strategies that were adopted resulted, or would result, in a reduction in diagnostic error is outside of the scope of this study. It is also outside the scope of this study to evaluate in-depth all cognitive de-biasing strategies recommended in the literature. However, there are authors who question such strategies and the focus of blame placed on non-analytic reasoning as the predominant cause for error (Wellbery, 2011; Norman and Eva, 2010). They also question the validity of cognitive forcing strategies for counteracting heuristics and bias (Sherbino et al. 2014). It is suggested that a misdiagnosis can be simply that the clinician did not consider the diagnosis and so did not include it in their diagnostic list (Norman and Eva, 2010). This would result in premature closure, but using a de-biasing strategy may not work perhaps because the clinician lacked sufficient knowledge of the correct diagnosis. As a requirement for delivering high quality patient care in the UK, the osteopathic regulator requires osteopaths to be able formulate a differential diagnosis, working diagnosis, and treatment plan (GOsC, 2012). Although I discovered the presence of premature closure in this

study, it was not clear whether it led to an error in diagnosis. I would argue that before we implement strategies to reduce error we need to identify the percentage and types of errors that undergraduate and postgraduate osteopaths make, and under what circumstances they occur. Assuming that there is a need for de-biasing strategies, we can then develop strategies to determine what they should be and how best to implement them.

8.2.3.2 BPS Model and Collaborative Reasoning

The over-reliance on the biomechanical model during diagnosis and the tendency for practitioner-led reasoning when situations were more routine, produce a symbiotic relationship. They were both motivators to changing my CR style to encompass the BPS model, and a move toward collaborative reasoning. I cannot emphasise enough the impact that RP has had upon my practice and my perception of osteopathy. One of the reasons for embarking upon the professional doctorate was to challenge my thinking, because practice life can become entrenched in habit. Reflection and learning from experience is thought to be crucial for maintaining competence across a practice lifetime (Mann, Gordon and MacLeod, 2009). My concern having negotiated this study, is for the profession and the number of experienced practitioners who may make decisions based on habit and lack of awareness of current knowledge, and whose clinical competence may be suffering as a result. Stein (2003) calls this working within the known. He believes that RP is working on the boundary of what one does and does not know in the awareness that there are areas of lack of understanding. He asks the question, how do you know you need to think outside the box, or that you are in a box in the first place? It is thought that there are many clinicians' that are unaware of the need to change their thinking (Croskerry, Singhal and Mamede, 2013b). I certainly was unaware of this need, and undertaking RP and moment-by-moment awareness highlighted the presence of me in my particular box. If I am representative of the profession, there is definitely a requirement for education in RP for use in both undergraduate and postgraduate osteopathic education.

Although there was enough evidence of patient-centred care within the study, it also highlighted the need to integrate the BPS model of healthcare into my practice and possibly a move toward collaborative reasoning. Despite recognising there was a need to consider psychosocial aspects in more depth during consultations, there was very little direction available from the literature. I was aware that I did not always know how to approach the subject of emotional concerns with patients early in the consultation. Pincus (2006) suggested that osteopaths can help with some psychological presentations, but there is a need to know when to refer. Making that decision early may be important for the patient. I would argue the need for osteopathic education to be directed at how to

develop the questioning to elicit the necessary kind of information from patients. A requirement for further training has been identified by Draper-Rodi et al. (2015) who are undertaking the development of an e-learning course for osteopaths qualified for longer than fifteen years. Clearly a need has been identified.

The concepts of both patient-centred care and collaborative reasoning are both relatively unclear. They both put the patient firmly at the centre of DM, with emphasis on the patient as a person and the need to include them in decisions on treatment and management of their presentation. Phrases such as, exploring the patient's condition and illness experience, understanding the whole person, and finding common ground for goals, are among suggestions incorporated in the model of Stewart et al. (2003) (cited in Atkins and Ersser, 2008). However, precisely how that needs to occur requires further study particularly as Patel et al. (2014) suggested that SDM can produce diminished patient outcomes. Although, it could be argued that their study was really testing the use of a decision support package and a choice of treatment options integrated into patient-centred physiotherapy. It nevertheless places doubt on SDM enough to require further research to be undertaken.

Collaborative reasoning requires an identification of the patients and practitioner's values and beliefs, which are often implicit. Given that osteopathic professional principles and values are difficult enough to define (Tyreman, 2008; 2013), it arguably makes adoption of the collaborative approach complex because of potential difficulty individuals may have defining their own and the professions ideals in addition to the patient's. It would require osteopaths to become aware, or increase their awareness, and question their daily practice. Osteopaths are primary contact practitioners who are required to make autonomous judgements regarding their patient care. In order to effectively manage clinical uncertainty and guide their clinical DM process, osteopaths are required to possess highly developed self-reflective capacity. I would argue there is a need to develop osteopathy along a BPS and collaborative CR route, with RP at the core of osteopathic CPD.

This study has shown, that it is in keeping with the view that reflection and RP have the ability to create change in a situation which may not be straightforward, and for which there may be no obvious answer (Moon, 1999; Nguyen et al. 2014). However, this sort of reflective work requires motivation and effort. This is comparable to what Dewey (1933) and Eraut (1994) have referred to as 'intellectual effort', in order to push oneself further in inquiry and inquisitiveness about the world. It would require osteopaths to be motivated to perform this kind of reflective work. There are arguments for and against whether we really need a separate model of RP for osteopathy, or whether we can utilise a combination of the current cyclic (Gibbs, 1988), and structured models (Johns, 2004). I

have used them as a broad framework for the reflective method in this study, but did not reference them that often after the initial few case studies were complete. They were developed specifically for education and nursing respectively, and osteopathy has elements within its CR and diagnosis that are specific to the profession. Another concern with the currently available models is how usable they are, and how many practitioners would embrace their procedures unless it was a requirement from the regulator. In conclusion I would suggest, that if we are to move reflective self-awareness and metacognitive proficiency forward at undergraduate and postgraduate level, it may require a more workable, accessible model. Study to understand how easily the current models of RP could be used at both undergraduate and postgraduate levels would allow the development of a workable version, if it proved valuable.

8.2.4 Metacognition

There is posited a strong link between metacognitive proficiency and the prevention of cognitive bias (Croskerry, 2000). It is suggested that metacognitive proficiency is vitally important for clinicians to ensure optimal DM. In addition to procedural skills, Croskerry (2000) suggests we should study our cognitive processes more closely in order to be able to educate novice clinicians how to avoid errors in DM, thereby enhancing patient care. He uses the phrase *'awareness of and insight into cognitive processes'* (p1224). The development of awareness was a recurring theme in this study, and one I would argue is a vitally important aspect of metacognitive capability. It is thought that intuiting does not have to be unconscious (Sinclair, 2010). Recent research into mindfulness suggests that we can train ourselves to be aware, and pay attention to peripheral cues in the environment (Dane, 2007), and we can bring ourselves into a state of non-intruding thought (Orloff, 2001). This is at the heart of reflection-in-action which is essentially a metacognitive strategy originally suggested by Schön (1983; 1987). It enables the clinician to continually monitor and regulate their thoughts during problem solving. In doing so it is possible to notice when you override a thought, which has implications for clinical competency. It has been suggested that a combination of analytic processing and reflective thinking provide a strategy that reduces medical error (Ark, Brooks and Eva, 2007). However, there is suggestion that these strategies may develop at different rates, and may therefore require specific training to enhance the one that is slower (Spadaccini and Esteves, 2014).

I would argue that it is in the interests of individual osteopaths, the osteopathic profession and our patients, that practitioners become cognisant of mindfulness techniques in order to foster a state of awareness of our CR. It is likely that it is this moment-by-moment paying attention on purpose (Kabat- Zinn, 1982) that has helped access the types of cognitive processing that, I would argue, are in evidence in this study. It has also allowed

the identification of topics for transformation and areas that inform practice. Jankowski and Holas (2014) and Nelson and Narens (1996) propose that mindfulness induces a meta-meta level of metacognition that is accessed when a person starts to monitor their basic consciousness. This suggests the ability to become extra vigilant as a result of developing mindfulness techniques.

Teaching people about metacognition and how to use it to improve problem-solving skills is one of three main recommendations that have emerged from decades of educational research (Bransford, Brown and Cocking, 2000). There are few researchers that question the importance of this strategy for improving learning, but there is little presence of its teaching in our educational establishments (Georghiades, 2004). There are obvious implications for osteopathic education, because CR, which involves problem-solving, is a necessity for autonomous clinical practice. Metacognition and problem solving ability are important aspects in the development of expertise (Chartier, 2001), and along with cognition and emotion are thought to have an effect upon the quality of DM (Dunphy et al. 2010). During undergraduate education I was taught the metacognitive strategy of planning treatment, whilst having a realistic rationale for the intervention used. This has endured over the sixteen years of working within the profession as a postgraduate, and is evidenced as one of the MS arising in this study. The study also suggests we use a combination of MK, ME and MS many of which are automatic. MK and MS strategies are accompanied by ME as a FOR, or JOL, which are essentially feelings of confidence that our decisions are correct. These would also be enhanced by awareness and mindfulness training. Clearly, if a taught metacognitive strategy has endured in postgraduate osteopathic practice, there is argument for teaching the other strategies that support DM and CR. Undergraduates would benefit from framework training to accelerate, enhance, and improve understanding of the CR process. The combination of training in RP and the metacognitive framework would enhance osteopathic clinical competence.

8.3 Evaluation of Methods and Methodology

This research study has been developed in line with the thinking of Silverman (2013) and Creswell (2009) regarding the need to critique and determine the quality of the study. As a result, one of the strengths of the study exists due to its connection to the existing literature, in chapters two to five and in the discussion in chapter seven. Additionally, the research questions arose as a result of my experiences with RP and CR in combination with an interpretation of the existing literature to identify possible gaps.

This is the first time this method has been used in an osteopathic context, and is therefore a novel method of data collection in the context of osteopathy and osteopathic

research. The qualitative nature of the methodology is also comparatively novel to osteopathy, as it is relatively rare for the qualitative paradigm to be used in manual therapy (Petty et al. 2012a). The method is considered sensitive enough to provide information to answer the research questions. It has been described along with an understanding of the methodology in chapter five. My data collection and record keeping were well organised, although initially there were times when this was tested when I was still familiarising myself with technical aspects. However, the use of the seven cases in the pilot study, alongside maintenance of a field diary, allowed me to understand the shortcomings and correct them.

The four research questions created a significant amount of data. It could be argued that there were too many for a part-time professional doctorate, and perhaps concentrating just on perceptual osteopathic judgments and metacognition would allow greater focus. However, I would argue that one of my aims was to understand how RP could inform osteopathic CR, and I believe the results from the investigation have proved valuable, certainly for myself, but also for the wider osteopathic profession as a gateway to how it may be utilised for CPD. It also dovetails with metacognition as a supervision of our thinking during CR.

The study focused on my subjective experiences of working with patients during CR, which places the method within the boundaries of autoethnography. As a practicing osteopath this provided me with familiarity of the culture, which meant that I did not need to try to comprehend an unfamiliar philosophy with a different set of values. However, that also places me very close to the subject matter, and the study is influenced by this. It could be argued that a researcher from another background may interpret the findings differently, or even myself at another time, or in another context (Roulston, 2001). The subjectivity I believe is a strength in this study, because I was examining my own thoughts, and therefore only I am able to get close enough to record them. It provides the potential to inhabit a microcosm of cognition during CR. However, it must be noted that research on the cognition of a singular osteopath can only be interpreted with caution to the wider osteopathic community without further research, and only provides a partial vantage point (Anderson, 2006). My thoughts were written as they arose which did not leave time for interpretation during note taking. A potential weakness of the method is, that on occasion during the treatment phase of the consultations it would not be appropriate to leave the patient to note a thought, therefore some were not recorded. However, because I was not needing empirical data I suggest this did not detract from the information that was gained, and does not change the interpretation of the study. In addition, forty-five case studies were undertaken and nine were analysed, which should ensure a relative level of normalising of the type of thoughts collected. The data arguably could have been gathered via 'think aloud' protocols. However, my intention to study my

practice with actual patients from my clinic makes thinking aloud untenable, because of the need at times to verbalise potentially worrying information whilst reasoning.

The interpretation stages tentatively began when I was writing the notes into a descriptive text. I was aware that if I gave too much time at this stage then I would not be purely relying on LTM. Thirty minutes to write up the notes was not enough time to embellish the information arising. I attempted to only write what had happened in long hand and stay loyal to the notes. This descriptive text was then inserted into the narrative and that was used in order to reflect on my practice. The descriptive text was then only altered within the narrative in order to change the tense to past or present. As a result, I would argue that the narrative provided a text similar to an interview transcript; the difference being that it described more faithfully what I did, rather than what I thought I did (Bolton, 2009). This has therefore provided a deeper exploration of what happens during osteopathic CR, enriches the previous osteopathic studies in the existing literature, and provides a significant contribution to the osteopathic knowledge base.

The study is subject to ethical considerations to protect the participants, and as a result there is information that was not available to be included. However, this is of a personal nature to the participants, and again does not detract from the study. The ethical considerations in chapter five were also maintained.

I have tried to remain reflexive throughout the study, but recognise that this is something that develops with experience as we find ways of interpreting the world around us. The reflective nature of the study meant that I wrestled with ways of staying subjectively objective, and not revealing too much of my personal self within the work. I believe I have managed to stay self-aware, and not self-revealing as a result. My previous encouraging experience of the results of RP on CR and its positive effects, should be noted. However, I have tried to maintain an attitude of curiosity throughout the study, and to allow the information held within the data to unfold without forcing (Braun and Clarke, 2006). Completion of the study has corroborated my feelings and thoughts about both RP and CR within osteopathy. However, it has also generated questions that need answering if they are to help improve osteopathic education.

This study used the thought processes of a single osteopath which may not be representative of the whole profession, and further research is required to identify whether the conclusions can be directed comprehensively to the profession. Selectively designed focus groups could identify the possibility that the conclusions may transfer to other osteopaths in the UK or abroad.

8.4 Conclusions to the Study

In a modern healthcare climate there is an emphasis on EBM, patient-centred care and reflection as a means to enhanced DM and CR. This does and will continue to affect the osteopathic profession, which currently is attempting to enlarge its evidence base and increase its understanding of its practice. Developing an understanding of how osteopathic practitioners make decisions will allow educators and policy makers to design strategies based on sound evidence. This will ensure we continue to produce a profession focused on high levels of clinical competence and patient care. It should also help position the profession of osteopathy in order to influence future healthcare strategy. The primary aim of this study was to understand and evaluate, in depth, the perceptual diagnostic judgments, and metacognitive strategy of a practicing osteopath during clinical reasoning (CR) in the presence of patients. It also investigated the capability of reflective practice (RP) to inform professional knowledge.

It has been demonstrated in previous studies that osteopaths use both PR and HDR as cognitive strategies during diagnosis and CR (Thomson et al. 2014a; Roots et al. 2015). However, no other study has evaluated the moment-by-moment DM processes of an osteopathic practitioner whilst treating patients. This study corroborated the findings of previous research and extended our understanding, as results suggest, that multisensory feedback is capable of activating both types of cognitive processing strategy. There is also tentative evidence to suggest that experienced osteopaths are constantly moving in and out of each strategy. Although it was not possible to directly capture the intuitive processes occurring with the method used, I would suggest it is possible to infer their presence because of the occurrence of PR, and the evidence of T¹ processing activated by discrete and combined multisensory perception. Intuitive processes have been marginalised in healthcare but, given their contribution to DM, the detailed effect of multisensory perception on CR should be researched in greater depth. The suggestion that we spend ninety-five percent of our time in non-analytic reasoning mode (Lakoff and Johnson, 1999; Klein, 2003), creates an argument that osteopathic diagnosis at undergraduate level should focus on both analytic and non-analytic reasoning strategies equally. This should reduce the tendency for osteopathic graduates to be technical rationalists and make it easier to develop the BPS model of healthcare within osteopathy.

Palpation plays a major role in osteopathic diagnosis and is addressed at undergraduate level when teaching the diagnosis of somatic dysfunction (Browning, 2014). Few if any studies have been carried out that address the interaction of multiple senses in osteopathic CR. The results of this study provide evidence to suggest that perceptual diagnostic judgments in osteopathy arise as a result of mental imagery. This is stimulated by multisensory feedback mechanisms of discrete and combined auditory, visual and

haptic sources. It is also argued that this multisensory feedback is absorbed and embodied within the osteopath creating the conditions for embodied cognition, outlined by Øberg et al. (2015). The presence of embodied cognition is significant in the search for an understanding of how we perceive, and how we make decisions during CR because it should change the way we educate learners. It should direct us to focus more heavily on the felt sense, embodied and intuitive experiences, and DM. In this study the information absorbed began upon meeting the patient and allowed the osteopath to build a picture of the patient, and of their function and dysfunction. During the study, at no point did the osteopath jump to immediate conclusions, but used the multisensory information to inform treatment and DM. These findings support, and are supported by the research of Roots et al. (2015), who found that osteopaths dynamically altered their thinking during CR. Whilst the limitations of this research are acknowledged, the knowledge generated could impact the way in which we teach perceptual diagnostic judgments, CR and DM at undergraduate level, placing more emphasis on the contribution of perception and mental imagery. At the very least, further study is required to see if these results can be generalised to the wider osteopathic community, and to further develop our understanding of the concept of embodied cognition.

The cognitive strategies used by clinicians are posited to be monitored by metacognition. This is a concept that describes a level of consciousness that exhibits executive control over our thinking (Flavell, 1979). It has been identified as an important part of critical thinking and DM, and therefore clinical competence. It includes reflection, which is considered to be a meta-meta level of metacognition (Nelson and Narens, 1996). It has also been postulated that mindfulness is related to the highest metacognitive level, and depends on dynamic cooperation of all three main components of metacognition MK, MS and ME (Jankowski and Holas, 2014). In this study, these components were present during the consultations with patients, and often appeared to be triggered automatically as suggested is possible by Flavell (1979). This is particularly true of ME, which could be seen as a FOR and JOL. The moment-by-moment capturing of thought processes in this study, along with reflection and the development of narratives, stimulated awareness, or mindfulness, that allowed the researcher to identify when she was overriding a decision. Awareness is a quality that has the potential to improve our CR and metacognitive strategies, making us more cognisant of our moment-by-moment decisions. The large amount of time spent in the non-analytical processing mode suggests there is a need to have organised frameworks that allow us to understand and enhance our metacognition. This will ensure the maintenance of high quality clinical competence. This has potential consequences for clinical competence, and is an area that requires further research and development to determine optimal conditions for error free DM.

Learning by experience involves reflective awareness and analysis of a situation of uncertainty in order to come to understand it (Lowe and Kerr, 1998). RP has been utilised in the healthcare arena as a method for improving clinical competence and enhancing education (for example; Johns, 2009; Barbour, 2013). It has the ability to provide conditions for a practitioner to evaluate and understand many aspects, often tacitly held, of themselves and their practice (McEntee et al. 2003). In this study RP was found to create the conditions for enhanced awareness of practice and a conduit for changing thinking and procedures. It has the ability to inform and deepen professional practice creating an awareness of moment-by-moment DM, and thereby enhancing patient care. The study has demonstrated that there is an interlinking relationship between CR, perceptual diagnostic judgments, metacognitive strategies and RP. It has initiated an understanding of this relationship within osteopathic CR. Devising a robust metacognitive framework for osteopaths and teaching metacognitive strategies, including RP and mindfulness techniques, has the potential to improve osteopathic CR and enhance the professional journey from novice to expert clinicians. It would allow osteopaths to develop their skills of criticality and their ability to reflect on, and analyse their practice experiences. The use of improved reasoning and metacognitive strategies should improve diagnosis and DM thereby reducing the possibility of diagnostic errors. Further development of the various elements will make an important contribution toward osteopathic clinical competence and professional practice.

Chapter 9: References

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Appendices

Appendix 1 Participant Information Sheet

Participant Information Sheet

Study Title Reflective Practice Study of Osteopathic Professional Practice: Clinical Reasoning and Perceptual Diagnostic Judgments.

Invitation: I would like to invite you to take part in my research study. Before you decide whether you would like to take part, I would like you to understand why the research is occurring and what it would involve for you. Please read the information contained in this sheet and feel free to ask any further questions you may have.

What is the purpose of the study? This study aims to explore professional osteopathic knowledge and clinical competence by an in-depth study of the osteopath's thoughts about their clinical decisions and treatment plans with specific patients. The study is being conducted as part of a Professional Doctorate in Osteopathy that is directed by The British School of Osteopathy in conjunction with The University of Bedfordshire. The study will use a new kind of reflective practice research methodology previously used and validated in PhD studies in nursing for some time and the study aims to generate new knowledge in the field of osteopathy about the role of touch and intuition to osteopaths' clinical reasoning. There have been considerable changes in the way that we view touch within osteopathy and other healthcare professions. It has moved further away from just being considered to be moving joints and stretching contracted muscles.

Why have I been invited? You have been invited because you are attending the Letchworth Osteopathic & Sports Injury Clinic for osteopathic treatment. Over the next 2-3 months approximately 100 patients will be randomly selected and invited to participate.

Do I have to take part? No. It is up to you to decide and whether you decide to join the study, or not, will not affect your standing as a patient at this practice. You can also withdraw from the study at any time, without giving any reasons, up until the thesis is being written in late 2013

What will happen if I take part? This study involves me reflecting on sessions with patients, so you will not need to do anything, apart from provide consent for me to make reflective, anonymous notes about your session.

What are the possible benefits? There are no direct benefits for you and participating will not affect your treatment but you will be contributing to a new research which aims to provide more effective treatment for future patients.

What are the possible disadvantages of taking part? There are no known disadvantages to taking part, as you do not have to do anything and participating will not affect your treatment. All data about you will remain confidential and you will not be identifiable in any written reports.

What if there is a problem? If you have any complaints regarding the study or feel harmed in any way, please contact myself or my study supervisor using the contact details at the end of this form.

Will my taking part remain confidential? Yes. It will not be possible to identify any participants. I may use some clinical details from treatment sessions but random letters will be used in place of names and other details will be changed to maintain anonymity. Data from the study will be kept using cloud technology, the data will be encrypted and only I will have access to the password. After the study ends, the data will be stored securely at the British School of Osteopathy for 6 years, after which time electronic data will be deleted and paper data will be destroyed by shredding.

What will happen to the results from the study? If you would like to receive a lay copy of the results at the end of the study in late 2013 or early 2014, please complete the tear off section at the bottom of the Consent Form and provide a postal or email address. A copy of the completed thesis will also be available in the British School of Osteopathy library when the study is finished. It will also be in the University of Bedfordshire and British Library and results will be disseminated through conference presentations and peer reviewed publications

Who is organising the research? The researcher is Cindy McIntyre who is a practicing osteopath studying for a Professional Doctorate with the British School of Osteopath and University of Bedfordshire. The study is being conducted as part of the requirements for completing the Osteopathic Doctorate. The Director of Studies is Dr Jorge Esteves who is Head of Postgraduate Studies and Research Education at the British School of Osteopathy.

Thank you for taking the time to read the information sheet. Our contact details are given below should you have any questions or want further information.

Researcher contact details:

Cindy McIntyre
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01462 674438

Supervisor contact details:

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275 Borough High Street,
London SE1 1JE
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020 7407 0222

Appendix 2 Consent Form

CONFIDENTIAL

Participant Identification Number:

CONSENT FORM

Title of Project: A guided reflection study exploring effective osteopathic practice and the contribution of touch and intuition to osteopathic clinical reasoning.

Name of Researcher: Cindy McIntyre

Name of Supervisor: Dr. Jorge Esteves

Please tick where appropriate

1. I confirm that I have read the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
3. I agree to take part in the above study.
4. I would like to receive a summary of the results.
5. Please send a summary of the results to

Name of the Participant

Date

Signature

Researcher

Date

Signature

Appendix 3 Opt Out Form

CONFIDENTIAL

Participant Identification Number:

OPT OUT FORM

Title of Project: Reflective Practice Study of Osteopathic Professional Practice:
Clinical Reasoning and Perceptual Diagnostic Judgments

Name of Researcher: Cindy McIntyre

Name of Supervisor: Dr. Jorge Esteves

I have decided that I do not want to continue my participation in the above project and I no longer allow my case details to be utilised for the research.

Name of the Participant

Date

Signature

Researcher

Date

Signature