

**Patients' experiences and clinicians' views of dental
implants treatment: a qualitative study**

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Abstract

Implants have a significant clinical research evidence base which supports positive treatment outcomes for patients; however, the growing provision of implant restoration has been also accompanied by a rising number of complaints relating to dissatisfaction with treatment outcomes (RCS, 2014).

This thesis presents the findings of qualitative studies which set out to investigate, and subsequently understand, patients' experiences and clinicians' views of dental implant provision. Semi-structured interviews with patients at different stages of dental implant treatment (n=38 interviews) and secondary care implant clinicians (n=8) were undertaken. Data collection and analysis followed the principles of thematic analysis (Braun and Clarke, 2006).

While implant restorations are seen as a durable tooth substitute, this research highlighted how patients saw implants as a 'cure' for tooth loss. Inherent strength, stability and permanency from the material '*titanium*'; the position '*rooted within the bone*' and the uniqueness of the technique '*recent technology*' all contributed to this view. As a result, the direct and long-term potential of implant prosthesis was often misunderstood by inadequately recognising the resources required for regular professional and home care of the implant restoration to ensure longevity. Patients also overestimated the unpleasantness of implant surgery and experienced unanticipated challenges during healing. This was accompanied by uncertainty about maintaining oral hygiene, which continued with both the transitional and final restoration.

Clinicians experienced difficulty in communicating information to patients who held high expectations relating to implant provision. Additionally, clinicians' obligation to negotiate patients' treatment needs and prioritise between patients places some restrictions on fully shared decision making. Several suggestions were made by clinicians and patients to improve the experience of the implant treatment pathway. These included expanding the role of the clinical support team, using technology and ensuring effective, targeted and timely giving of information according to the patient's individual circumstances and their stage of treatment.

Dedication

This thesis is dedicated to the memory of my beloved father, Ahmed A. Kashbour
with admiration and gratitude

Acknowledgements

I would first like to thank my Mum Selima Elmadani, for allowing me to follow my ambitions, and for scarifying her life and time to help me reach my goals and dreams.

I am indebted to my husband Nagi H Ali, who have been a constant support throughout my study period. You have made me feel special even when times were tough for me. You have been my pillar of strength through all my ups and downs. I feel blessed to be a part of your life.

I also thank my wonderful children Zainab, Alzahraa Hamad and Douaa for always making me special, hopeful, determined and for their understanding of my absence instead of caring and playing. I hope that one day they can read this work and understand why I spent so much time in front of my papers and computer.

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List of abbreviations

| | |
|--------------|--|
| COHR | Centre of oral health research, Newcastle |
| CD | Complete Denture |
| DI(s) | Dental implant(s) |
| DIT | Dental implant treatment |
| E | Edentulous |
| GDC | General dental council |
| GDP | General Dental Practitioner |
| IC (tIC) | Implant Crown (transitional IC) |
| IPS | Implant placement surgery |
| ISFP (tISFP) | Implant-supported fixed prostheses (transitional ISFP) |
| ISOD (tISOD) | Implant-supported overdenture (transitional ISOD) |
| ISP | Implant-supported prosthesis |
| NDH | Newcastle Dental Hospital |
| NHS | National health service in the UK |
| OHIP-14 | Oral health impact profile-14 |
| OHIP-49 | Oral health impact profile |
| OHRQOL | Oral-health-related quality of life |
| PD | Partially Dentate |
| PDC | Primary dental care |
| QDA | Qualitative data analysis |
| RCS | Royal College Of Dental Surgery, England |
| RPD | Removable Partial Dentures |
| SDC | Secondary dental care (centre) |
| TIRP | Transitional implant-retained prosthesis |

Chapter 1 Introduction

This thesis presents research that explores and investigates patients' experiences, and clinicians' views, of the dental implant treatment (DIT) pathway in a context of restricted free implant provision, in a UK secondary dental care (SDC) centre within the National Health Service (NHS). Although, the research is a continuous qualitative study; it is presented in this thesis in two categories: Study A ('The patients' experiences'), and Study B ('The clinicians' views'). Both are interlinked and based on qualitative methods of research.

1.1 What is the dental implant treatment pathway?

For the purpose of this study, three stages within DIT were identified. A patient's journey through a course of implant treatment, their pre-implant treatment (stage I), commences at tooth loss and then conventional tooth replacement (crown; bridges; dentures), and the experiences of their consequences include functional, aesthetical deficits, emotional and social impacts. Patients who have obvious difficulties may be deemed suitable for a referral for DIT at a secondary care centre (SDC), where a decision-making process about the provision of DIT takes place. Subsequently, individuals who are seeking DIT in SDC in the UK are likely to be involved in one or more attempt at conventional treatments to replace the lost dentition (partial or complete) before consideration can be made in relation to implant provision. If patients are offered and accept DIT, they progress to the implant placement stage (stage II), which may continue from the implant placement surgery (IPS) up to the placement of the implant-supported prostheses (ISP), involving the healing phase and transitional implant-retained prosthesis (TIRP). After that the patient progresses to the post-implant treatment stage of DIT (Stage III), which commences when the definitive implant-supported prosthesis is placed, and it is followed by the lived experience of having an ISP.

1.2 Dental implant treatment

Osseointegrated dental implants (DIs) have become an attractive choice to replace lost dentitions since their first presentation by Branemark and colleagues (Branemark, 1977).

The most commonly used type of implant in dentistry is the endosseous dental implant, which is screw- or cylinder-shaped and commonly made of pure titanium or titanium alloy (although alternative materials such as ceramics are also available). This is surgically implanted into the alveolar bone, where it resembles a tooth root and acts as an anchor for an abutment that provides support, retention and stability to superstructures of dental prostheses. Dental ISP can be in the form of an individual crown, a fixed bridge or a removable overdenture. The basic features of these prostheses are compared in Table 1.1 (adapted from Misch (2014)).

A predictably high rate of osseointegration was first reported during the 1980s (Branemark, 1983; Eriksson et al., 1990), and thereafter studies shifted towards investigating the aesthetic requirements of implant restoration and extending their clinical applications from single tooth replacement to partial and complete dentition replacement; management of orofacial defects; rehabilitation of compromised cancer patients; and as anchorage in orthodontics (Henry, 2000; Misch, 2014). During the last two decades research has continued in this area, but the focus has moved to address patient-based outcomes by adopting quantitative methods of research in order to investigate patients' expectations, satisfaction and quality-of-life changes.

Recently, the involvement of patients' narratives in several qualitative studies has contributed positively to the knowledge of clinical implant dentistry and patient care: for example, Ellis et al. (2011), Grey et al. (2013) and Rousseau et al. (2014). Given the fact that the overall implant treatment success rate is favourable (Moraschini et al., 2015), the debate may now be directed towards aspects of patients' experiences, which may be considered as key influential factors in the immediate and long-term outcomes of DIT (Papaspolidakos et al., 2012).

1.3 Provision of dental implant treatment

The current technological advances in DIT have made the existence of long-term tooth replacement a reality provided it is utilised and maintained adequately. During the last decade, implant provision has increased substantially. It is estimated that one million implants are used worldwide every year. It has been reported that there were more than 80 different companies producing more than 200 implant brands in 2009 (Pye et al., 2009). This figure could be higher in 2016, though no recent research has been undertaken. The rise in implant provision differs between countries. For example, it is reported that in Italy and South Korea, more than a third of cases of tooth replacement involve implants as an abutment, compared with about one-quarter of replacements in Spain, Germany and Sweden (Misch, 2014). In 2011 alone, implants were involved in only 10% of tooth replacements in the United States and Canada (Misch, 2014). In the UK, data from the 2009 Adult Dental Health Survey identified that approximately 1% of the population had at least one dental implant (White et al., 2012).

The predictability of implant treatment outcomes for the replacement of missing teeth is certainly improving (Thomason et al., 2009; Simonis et al., 2010). Favourable outcomes of implant treatments have been demonstrated in several quantitative studies (Carlson and Carlsson, 1994; Zarb and Schmitt, 1995; Simonis *et al.*, 2010; Yao *et al.*, 2014). Individuals who require replacement of their dentition are often enthusiastic about this relatively novel dental technology regardless of the extent of tooth loss (Grey et al., 2013). Alongside these reported successes, patient-centred studies, especially for edentulous patients, show improvement in patients' satisfaction and quality-of-life after treatment with dental ISPs (Thomason et al., 2007; Heydecke et al., 2008). This evidence also consolidates the McGill and York consensus statements relating to overdentures (Feine et al., 2002; Thomason et al., 2009). Notwithstanding these successful outcomes, some patients refuse DIT based on concerns about the procedure or expense (Ellis et al., 2011).

The increased interest in implant provision is possibly related to a combination of several factors which are reported in the dental implant literature. Important amongst those are: firstly, the increase in patients' awareness of DIs (Wang et al., 2015) combined with the impact of tooth loss on patients' well-being (Nordenram et al., 2013); secondly, the incorporation of DIs in undergraduate programmes and an increase

in postgraduate implant training courses (Mattheos et al., 2009); thirdly, the improvements in implant technology, which have led to a high success rate in implant treatment outcomes (Moraschini et al., 2015); and lastly, the growing demand of the ageing population and the suggestion that two implants supported overdenture should become the minimum standard of care for edentulous patients (Thomason et al., 2012)

Table 1.1. Basic features of implant-supported dental prostheses (adapted from Misch (2014))

| | Implant-supported crown | Implant-supported fixed prosthesis (ISFP) (partial and complete) | Implant-supported overdenture (ISOD) |
|---|--|---|--|
| Support | <ul style="list-style-type: none"> • Implant fixture for every crown | <ul style="list-style-type: none"> • Entirely depends on implants and their distribution • At least 6 for edentulous maxilla • At least 4 for edentulous mandible | <ul style="list-style-type: none"> • Combination between alveolar mucosa and implants • Two implants considered as standard in the mandible by Thomason et al. (2009) • Four implants in the maxilla |
| Retention of the prosthesis | <ul style="list-style-type: none"> • Implant abutment is screwed into the implant fixture • Crown is cemented or screwed into implant abutment | <ul style="list-style-type: none"> • Screwed or cemented prosthesis on implant abutments | <ul style="list-style-type: none"> • Depend on the nature of abutment-attachment interface (locator, ball, magnet, bar) |
| Survival rate in period of 5–10 year | <ul style="list-style-type: none"> • Most predictable high survival rate, exceeding 97 % (Jung et al., 2012) | <ul style="list-style-type: none"> • 98.9-97.8% for 2-4 implants supporting partial fixed prosthesis (Heydecke et al., 2012) • 97.5–95 % for 4-6 implants supporting complete maxillary fixed prosthesis (Papaspyridakos et al., 2014; Heydecke et al., 2012). • 97.9- 95.9 % for 4-6 implant supporting complete mandibular fixed prosthesis Heydecke et al., 2012) | <p>Mandible</p> <ul style="list-style-type: none"> • 3 implants 100 % (Balaguer et al., 2015) • 2 implants 97% (Balaguer et al., 2015) <p>Maxilla</p> <ul style="list-style-type: none"> • 6 implants 100% in maxilla (Balaguer et al., 2015) • 4 implants splinted 98 % (Raghoobar et al., 2014) • Un-splinted 4 implants 88% in anterior maxilla (Raghoobar et al., 2014) |
| Main advantages | <ul style="list-style-type: none"> • Preservation of natural teeth and local alveolar bone • Long-term cost-effectiveness | <ul style="list-style-type: none"> • Preservation of bone (and teeth in partial dentate) | <ul style="list-style-type: none"> • Preservation of alveolar bone • Preservation of masticatory performance • Able to restore soft tissue loss |

| | | | |
|---------------------------|---|---|--|
| | <ul style="list-style-type: none"> • Excellent aesthetic when soft tissue is not lost • Allows good oral hygiene practice | <ul style="list-style-type: none"> • The advantages of fixed prosthesis (e.g. patients does not need to remove the prosthesis, regain self-esteem, etc.) • Good aesthetic and improvement of function | <ul style="list-style-type: none"> • Long-term cost-effectiveness • Allow good oral hygiene practice |
| Main disadvantages | <ul style="list-style-type: none"> • Not optimal aesthetic when soft tissue is lost | <ul style="list-style-type: none"> • Space might be created between the ridge and the prosthesis • Difficulties in oral hygiene maintenance • Expensive | <ul style="list-style-type: none"> • Removable • Retention and stability might be influenced and impaired by the attachment's wear • Prone to fracture because of this base |

1.4 UK implant provision

Half a million British people were reported to have at least one dental implant in 2009 (White et al., 2012). However, it seems that the use of DIs has increased since then. In 2014, and during the conduct of the current research, patients' awareness of DIT complications was debated in the House of Lords (HL Deb (2014–15) 755 Col GC494) (RCS, 2014) as the General Dental Council, UK (GDC) has reported an increase in complaints in relation to DIT, especially related to deficiencies of informed consent, breaches of the patient's charter, damage to the biological tissues surrounding the implant, and implant failures.

DIT in the UK can be obtained either from an NHS dental provision framework or within the private sector. While DIT is provided through SDC within the NHS for free for a limited proportion of patients [who are prioritised by the Royal College of Surgeons (RCS) because of their specific clinical need (Alani et al., 2012)], the majority of implant patients have to self-fund their treatment if seeking DIT via private practice. In addition, the provision of only an ISOD retained by two fixtures is facilitated in primary dental care by minimally trained dental practitioners (Jagger, 2006) since the publication of the McGill consensus (Feine et al., 2002).

However, there is no data to compare DIT provision between sectors.¹ Studies in the northeast reported that the facilitation and cost of DIT vary between practices (Field et al., 2009; Exley et al., 2012). Although the majority of primary dental practitioners consider ISOD in their discussions with patients, only 10% of practitioners are willing to provide ISOD for their patients without the need for referral to another colleague or secondary care hospital (Field et al., 2009).

In relation to implant provision at SDC within the NHS, despite the presence of national guidance on implant provision (Alani et al., 2012), it is observed that there is obvious diversity in the provision of DIT between hospitals (Butterworth et al., 2001).

Differences exist between the numbers of patients offered DIT in relation to consultants who provide DIT. It is also evident that in 2001 there were obstacles related to the

¹ As no publications were found, an attempt was made to find unpublished data to compare implant provision between sectors in the UK by contacting Aws Alani, who is a restorative consultant working in London King College and who has had a role in rewriting implant guidelines, but no data was found.

funding of DIT, which may lead to regional differences in patients' access to care (Butterworth et al., 2001).

1.5 Thesis outline

Following this introduction, Chapter 2 (Literature review) will summarise the current available literature, focusing on aspects of interest to this study with respect to patient experiences of DIT pathways. The research aims and objectives are outlined in Chapter 3. Chapter 4 focuses on the study's methodology and methods.

Chapter 5 provides an overview of the findings of both studies, including the participant's characteristics and a thematic analysis. Chapters 6, 7, 8 and 9 present data and discussion related to Study A ('The patients' experiences'): Chapters 6 and 7 focus on stage I of DIT, namely patients' pre-treatment thoughts, expectations, understanding and knowledge, and then patients' referral and the decision-making process of DIT. Chapter 8 presents patients accounts of stage II: the implant surgical placement and the transitional prostheses. Patients' experiences will finalise at Chapter 9 by presenting patients accounts of the final implant-retained prosthesis.

Chapter 10 presents data and discussion for Study B ('The clinicians' views'). The general discussion (Chapter 11) brings together a summary and a discussion of the two studies' findings, and lastly Chapter 12 presents the conclusions and recommendations for future practice and research. The thesis outline is shown in Figure 1.1.

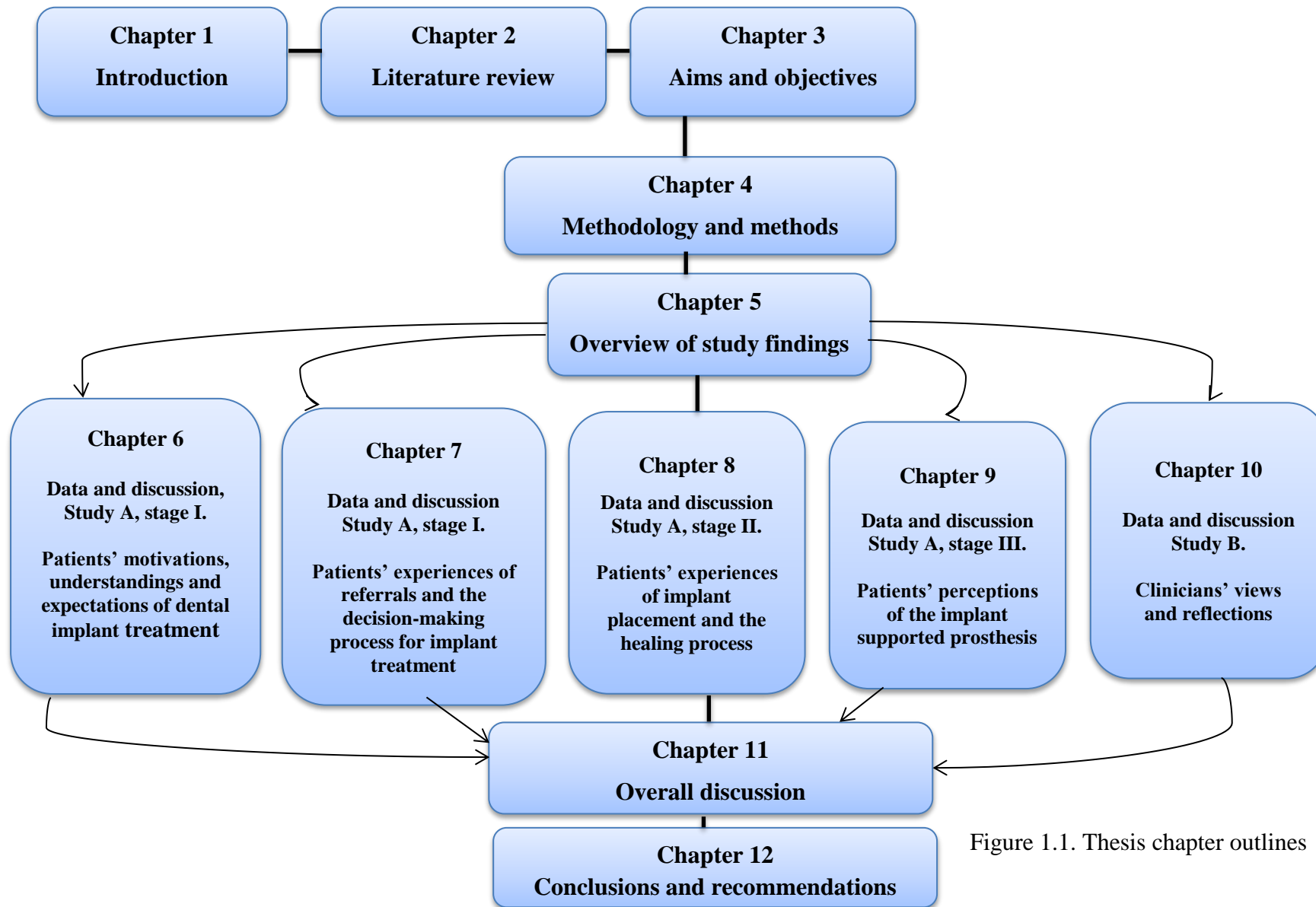


Figure 1.1. Thesis chapter outlines

Chapter 2 Literature review

There are three areas of current literature relating to DIT and patients' experiences. I intended to summarise and organise these under the following three sections:

1. The first section presents a qualitative synthesis of studies concerning patients' experiences of DIT (a substantial amount of material in this section forms the basis of a review paper which was accepted and published in its early version in 2015 (Kashbour *et al.*, 2015), Appendix 1)). The findings of the published review informed the aims and data collection of the current study to a great degree. However, three qualitative papers with findings that overlap the current study were published after the data collection period of the review paper (Atieh *et al.*, 2015; Wang *et al.*, 2015; Abrahamsson *et al.*, 2016) and these are included in this chapter.
2. The second section provides an overview of the quantitative research related to patients' expectations of, satisfaction with, and quality-of-life changes in relation to DIT.
3. The third section presents aspects of the clinical decision-making process and the importance of the patient–clinician relationship.

Thereafter, a summary of the literature review highlights the rationale of this research.

2.1 A qualitative synthesis of key studies concerning patients' experiences of dental implant treatment

2.1.1 Background

In recent years, qualitative studies exploring different aspects of medicine and dentistry have made positive contributions to the investigation of patients' experiences of health care and have identified areas requiring enhancements (Jacobson *et al.*, 2008; Durham *et al.*, 2011). Improving patient's experiences of their treatment procedures may in turn increase patients' satisfaction with their care services and motivation towards their health.

This part of the literature review aims to summarise the findings of published qualitative studies relating to patients' experiences of implant treatment at various stages of the

treatment pathway, particularly 1) patients' experiences of different types of implant prosthesis, ISODs and ISFP; and 2) the extent to which the literature addressed the patient's experience(s) at different stages in their treatment journey. In order to organise the findings of the primary papers, implant treatment pathway was defined as consisting of the three stages identified in Section 1.1.

2.1.2 What is qualitative research synthesis?

While within dentistry the systematic review and meta-analysis of quantitative research are well established, there are comparatively few examples of qualitative research synthesis. This reflects the relative scarcity of qualitative research in dentistry: there are few topics where a body of qualitative research has accumulated of sufficient size to warrant synthesis.

As the amount of qualitative health research has grown, there has been a concomitant desire to bring together findings where several studies have investigated a particular topic. This has led to the development of various methodological approaches to qualitative research synthesis (Evans and Pearson, 2001; Major and Savin-Baden, 2010). In general, the process of synthesising primary qualitative research comprises multiple stages of searching, extracting, combining and reporting qualitative data from original research concerning the same topic (Evans and Pearson, 2001; Major and Savin-Baden, 2010).

In reviewing studies related to patients' experiences of DIT, the applied textual narrative synthesis defined by Lucas et al. (2007) was chosen to organise qualitative studies relating to DIT into more consistent categories of findings and facilitate recognition of similarities and disparities. Briefly, the process involves identification of sub-groups; production of study commentaries (often using tabulation to facilitate cross-study comparison); and sub-group synthesis (Lucas et al., 2007). This approach seemed to be suitable to consider the extent to which experiences were similar or different for those undergoing different forms of implant treatment (ISFP and ISODs) and the extent to which the existing literature addressed the patient's experience at different stages in their treatment journey.

2.1.3 Search strategy, qualitative data extraction and synthesis

We began by defining the aims of the synthesis and identifying the inclusion criteria of primary studies to focus and narrow the search topics and terms. A two-stage search of the literature was carried out to identify relevant qualitative studies (firstly up to September 2013, then November 2014, at the time of submitting the first version of this review (Kashbour et al., 2015), and then continuous update of the finding was considered up to April 2016 by following the same search strategy). The first stage of the search comprised a search of electronic databases, including PubMed, Embase, Scopus, Web of Knowledge, Cochrane Database and Google Scholar. Search terms included ‘dental implant prostheses’, ‘implant crown’, ‘qualitative research methods’, ‘qualitative data analysis’ and ‘patient-based outcome’. The search was limited to ‘human’, ‘dentistry’ and ‘English language’. The second stage involved a search of citations in the included references to identify further relevant studies. Endnote software was used to identify and remove duplicate references from different databases and to manage the review process. Electronic database search alerts were set up to identify any relevant new publications afterward.

Studies were included in this review of the literature if they used qualitative research methods, were published in English, and explicitly considered any aspect of patients’ experiences of DIT. Studies which considered the experience of tooth loss but which did not explicitly mention DIT in the aims, sample or methods were excluded.

After applying the review inclusion criteria, the studies selected for this review were assessed for quality according to the criteria detailed by Dixon-Woods *et al.* (Dixon-Woods et al., 2004). Categories for data extraction included type of implant restoration, stages of implant treatment and methods of data analysis. The authors’ themes (coded in primary studies) were identified, extracted and compared across studies. Tabulation was used to compare across studies and categories (Table 2.1). Lastly, findings within each sub-group were compared, highlighting commonalities across studies and gaps in the literature.

2.1.4 Literature search outcomes

Title and abstract screening of 816 papers identified 43 dental articles that using qualitative methods to consider patients' experiences of dental treatment. Thirteen of those articles considered patients' experience of DIT.

The papers by Rousseau et al. (2014) and Exley et al. (2012) relate to the same larger study (Exley et al., 2009). However as their data relates to different (although overlapping) subsets of participants and concerns different aspects of the patient experience of DIT, they have been treated as separate studies for the purposes of this synthesis. All identified studies were relatively recent (n=13), with the oldest and the newest having been undertaken in Sweden in 2002 and 2016, respectively (Trulsson et al., 2002; Abrahamsson et al., 2016). Four studies were carried out in the UK (Hyland et al., 2009; Exley et al., 2012; Grey et al., 2013; Rousseau et al., 2014); one was carried out between the UK and Canada (Ellis et al., 2011). Another three were performed in Sweden (Johannsen et al., 2012; Narby et al., 2012; Lantto and Wårdh, 2013), two in New Zealand (Osman et al., 2012; Atieh et al., 2015) and one in Hong Kong (Wang et al., 2015).

One-to-one interviews were used for data generation in ten of the studies; a focus group was used in two studies (Ellis et al., 2011; Wang et al., 2015) and telephone interviews in another study (Grey et al., 2013). Although methods of data analysis were not always clearly described, thematic analysis appears to have been used in nine of the primary studies. Grounded theory and/or constant comparative methods of grounded theory also informed the data analysis (Trulsson et al., 2002; Exley et al., 2012; Narby et al., 2012; Lantto and Wårdh, 2013; Abrahamsson et al., 2016).

In addition, a recent qualitative synthesis of patients' experiences of tooth loss and rehabilitation was identified (Nordenram et al., 2013). Unlike the current review, the review by Nordenram et al. had broader aims and does not necessarily include studies reporting only patients' experiences of implant treatment

Table 2.1. A summary of the qualitative studies included in the synthesis

| Citation and country | Aims of the study | Participant stage of treatment at study time | Patient criteria | Data generation and analysis methods | Themes identified by authors |
|---|--|--|--|---|---|
| Trulsson et al. (2002) Sweden | To describe the experience of deteriorating dental status; to analyse what living with a fixed dental prosthesis means to quality of life; and to gain deeper insight of patients' experience of treatment | After the treatment with fixed denture implant | 8 men/10 women. aged 58–86, with deteriorated dentition (may be edentulous or partially edentulous in one jaw) from Branemark centre (the clinic patients' list) | Interviews, CCM of GT ¹ | <ul style="list-style-type: none"> • Alteration in self-image • Becoming a deviating person • Becoming an uncertain person • Becoming the person I once was |
| Hyland et al. (2009) United Kingdom (UK) | To understand the effect of edentulousness and prosthetic rehab on issues surrounding eating (social/ functional and emotional) and to explore the significance of any limitations upon eating behaviour | Post-implant stage, pre-implant stage (patients with CD) | 33 patients who had CD within the last 5 years of the study, aged between 48–84; and 33 patients who had received ISOD within the last 5 years, aged between 44–82 | Semi-structured interview Thematic content analysis | <ul style="list-style-type: none"> • Experience of edentulousness • The public constrain • The impact of replacement • Conventional dentures and eating • The impact of ISOD on eating |
| Ellis et al. (2011) Newcastle UK and Montreal Canada | To gain greater in-depth understanding of why patients who are dissatisfied with their current CD decline DIT | Refused to have implant | 30 patients, aged between 55–88, 17 women/ 13 men, struggling with CD and seeking to replace them and refused to have ISOD | 5 focus groups. Each participant completed a socio-demographic information questionnaire. Thematic analysis methods | <ul style="list-style-type: none"> • Fear of pain and anxiety • Appropriateness of the implant procedures in the elderly |

| | | | | | |
|---|--|--|--|--|---|
| (Johannsen et al., 2012) Sweden | To explore patients' expectations of and experience from DIT who had periodontal as reason of tooth extraction | Late post-implant stage (at least three years of use) | 17 patients, aged 46– 81 9 women/8 men patients are fully or one jaw edentulous, and had at least 3 implants in upper or lower jaw for 3–20 years of fixed implant prostheses | In-depth interview Thematic analysis | <ul style="list-style-type: none"> • Transition from tooth loss to amputation to implants prosthesis: Negative and positive trajectories |
| Narby et al. (2012) Sweden | To describe the process leading to desired implant treatment | Post-implant stage of patients with implant-supported fixed dentures | 10 patients Age between 54 and 84 6 women/4 men Patients had implants supported fixed denture during the past year | Interviews CCM/GT | <p>Journey from social stigma to exhilaration:</p> <ul style="list-style-type: none"> • Becoming an insecure person • Becoming a determined person • Becoming the person I once was • Acquiring a more realistic perspective |
| (Osman et al., 2012) New-Zealand | To gain understanding of patients' perceptions concerning a specific type of implant treatment | Post-implant stage. It is part of RCT, comparing the performance of titanium and zirconia implants to support overdentures | 16 patients, aged 46–80 3 women/13 men, with maxillary and mandibular ISOD | In-depth semi-structured interviews after at least 6 month of implant overdenture. CCM/GT | <ul style="list-style-type: none"> • Perception of implant overdenture treatment- '<i>Positive and Negative aspects of treatment</i>' • Decisive factors in choosing implant therapy • Factor influencing the selection of implant material • Perception of mid palatal implant |
| (Lantto and Wårdh, 2013) Sweden | To explore experiences of receiving and living with DIs for functionally impaired patients' | Post-implant stage | 17 functionally impaired patients: 7 men/10 women, aged 33–87 | Interviews, CCM/GT | <ul style="list-style-type: none"> • The implant treatment is a process of normalisation • The functionally impaired are also entitled to dental care • Edentulousness is a burden for the functionally impaired • There is interaction between implant treatment and other aspects of life |

| | | | | | |
|---|--|--|---|--|---|
| (Grey <i>et al.</i>, 2013) UK | To explore patients' motivations and expectations for DIs | 7 patients at post-implant stage, 1 patient during implant 1 refused the treatment | 9 patients: 3 men/7 women, aged 49—69, with complete missing or partially missing and one patient with single tooth missing | Telephone interviews Thematic analysis | <ul style="list-style-type: none"> • Normality of appearance and function |
| (Rousseau <i>et al.</i>, 2014) UK | To understand the experiences of tooth loss and replacement in the context of the arrival of DIT | 19 at the treatment or post-treatment stage 16 declined the treatment | 39 patients: 16 men/23 women aged 23–84 | Semi-structured interview Thematic analysis | <ul style="list-style-type: none"> • Tooth loss was insignificant for some but disruptive for others • Two main form of disruption were identified: <ol style="list-style-type: none"> 1) The meanings of tooth loss, and 2) Relationship between the self and the mouth in denture users |
| Exley <i>et al.</i> (2012) UK | To examine the influential factors in patients' decision to pay for high-cost implant treatment | 27 patients at decision-making stage of implant treatment: 10 patients paid for DIT, 14 did not pay and 3 were undecided | 27 patients male/female ratio unclear, aged 23–84 | Qualitative interviews, CCM and thematic analysis | <ul style="list-style-type: none"> • Deciding to pay for private healthcare is not simply a matter of price • Decision-mediating factors: self-value of need for treatment, others recommendations, clinical relationship, impact of treatment price on expenditure of self & others |
| Atieh <i>et al.</i> (2015) New Zealand | To understand the experience of participants with immediate single molar implants at pre-operative, operative and post-operative phases of implant treatment | 15 patients at post-implant treatment stages | Patients aged 36–77, 9 female/6 male | Qualitative interviews, inductive and content analysis | <ul style="list-style-type: none"> • Pre-operative: reasons for tooth loss and referral, patient information provision, factors influencing treatment decisions • Surgical phase: overall impression and adverse events, type of anaesthesia • Implant restorative phase: immediate protocol functional and aesthetic considerations |

| | | | | | |
|---|--|--|--|--|--|
| | | | | | <ul style="list-style-type: none"> • Maintenance and future choices: longevity of immediate implants, future maintenance and treatment needs, self-esteem and general appearance |
| Wang et al. (2015) Hong Kong | To evaluate the public's information acquisition and their perceptions of DIs and the effects of these on their care-seeking and decision-making | 28 patients from general public with no involvement in any DIT or consultation | 18 women/10 men, aged 35–64 years of age | Six focus groups Thematic content analysis following GT | <ul style="list-style-type: none"> • Sources of information • Knowledge of DIs • Motivation for seeking DIT • Expectations regarding DIs • Concerns against choosing dental implant as a treatment option • Medical tourism |
| Abrahamsson et al. (2016) Sweden | To explore patients' reactions on being diagnosed with peri-implantitis, their opinions on dental implant therapy and expectations of treatment of the disease | 15 patients at post-implant stage suffering from peri-implantitis | 5 male/10 female, aged 27–87 years | Open-ended interviews, GT | <ul style="list-style-type: none"> • Initial expectations of dental implant therapy and living with DIs • Being referred to a periodontist and diagnosed with peri-implantitis • Investing again in an expensive treatment with no guarantee for the future |

Note *constant comparative methods (CCM), ground theory (GT), dental implant treatments (DIT), complete denture (CD)

- ***The quality assessment and the methods of data production in the included studies***

The criteria developed by Dixon-Woods et al. (2004) were used to assess the quality of the studies considered in this review. Studies of good quality have to meet the following criteria: 1) clarity of the research questions to be addressed; 2) suitability of qualitative methods in relation to the study's aims and objectives; 3) appropriate sampling technique in regard to the research questions and data generation. Some potential limitations were identified across all studies. Firstly, some of the studies' sample groups were not clearly described in terms of the extent of patients' tooth loss (Trulsson et al., 2002; Johannsen et al., 2012; Rousseau et al., 2014; Atieh et al., 2015), which may be important in terms of patients' experiences. Secondly, methods of ensuring the quality of data generation and analysis (such as screening for deviant cases) were not clearly described. However, many of these papers appeared in journals with strict word-count limits and this may have restricted the extent to which qualitative methods could be described. A summary of the data generation, methods of qualitative analysis and the themes produced in the reviewed papers is shown in Table 2.1.

In the majority of the original studies, patients were clearly at stage III and they were asked to describe their experiences of DIT 'retrospectively' after a period of time from the completion of the treatment. One recent study involved participants recruited strictly from the public who had neither previous DIT nor implant-related consultations (Wang et al., 2015); two studies included some patients at stages I and II (Exley et al., 2012; Grey et al., 2013). Very little qualitative data or discussion was found in relation to treatment stage II (i.e. experience of implant surgical placement, healing stage) (Osman et al., 2012; Grey et al., 2013). Another recent study considered patients' experiences of implant complications: 'peri-implantitis' (Abrahamsson et al., 2016). Patients' numbers and stages of treatment are also compared in Table 2.1.

In the following sections, patients' accounts of their implant treatment experiences are grouped according to the relevant stage of treatment. Text in *italics* shows themes which were identified by the authors of the primary studies and they are appropriately cited.

- **Stage I patients' experience at pre-implants treatment**

The majority of the published primary studies (n=10) involved in their samples patients who had experienced tooth loss and conventional CD replacement (in one or both jaws) before they sought implant treatment. Only one study considered solely participants' perceptions of DIs before being part of any DIT or consultation without identifying the extent of their tooth loss (Wang et al., 2015). Experiences of stage I with patients who had only a single posterior implant at the time of the research were investigated in another study (Atieh et al., 2015), with no clear information about the remaining dentition and previous restoration procedures of the participants. Some studies additionally included some participants with compromised dental conditions (i.e. not completely edentulous) without clarification of the extent of their tooth loss or the types of dental restoration they had used prior to implant restorations (Trulsson et al., 2002; Exley et al., 2012; Johannsen et al., 2012; Rousseau et al., 2014). Grey et al. (2013) clearly included patients with varieties of implants, restorations and extent of tooth loss.

The majority of the papers included a discussion of the burden of tooth loss and the impact on patients' oral health and quality of life. In addition, a recent qualitative review and meta-synthesis has consolidated the current knowledge of the impacts of tooth loss and prosthetic replacement on different aspects of patients' life (Nordenram et al., 2013). These impacts included lower than satisfactory function, decreased social confidence, and disturbed self-image and self-esteem. Additionally, Rousseau *et al* (Rousseau *et al.*, 2014) identified that the impacts of tooth loss and replacement varied between their study participants, and it was suggested that this dissimilarity might be related to differences in the interpretation of tooth loss and prosthesis between patients.

Compared with having no teeth, for many people conventional complete dentures have a positive effect on their quality-of-life, including enhancement of function and increased confidence. Nevertheless, for others limitations such as denture instability, appearance and socialisation impairment with CD could not be underestimated. This is discussed in the qualitative analysis by Hyland et al. (2009) and Rousseau et al. (2014). For example, Hyland *et al* (2009) highlighted the '*public constraint*' caused by CD. CD limited patients' social activities, particularly social eating and self-confidence. Patients with a less-than-satisfactory dental prostheses can experience a variety of concerns (Trulsson et al., 2002; Johannsen et al., 2012), including '*alterations in self-image, Becoming a deviating person and Becoming uncertain person*' (Trulsson et al., 2002).

Despite the involvement of patients who had a removable partial denture (RPD), crown or fixed bridge prior to implant prostheses in some studies (Exley et al., 2012; Grey et al., 2013; Rousseau et al., 2014), there was no specific qualitative information or findings about the experience of those patient groups with their conventional restorations and how that related to their subsequent DIT. One excluded qualitative study (Cronin et al., 2009)² explored patients' preferences for the management of the partially dentate condition without aiming to consider patients' experiences of DIs. It was apparent in Cronin et al. that participants have high expectations of dental replacement, particularly younger age groups. In addition, partially dentate patients would increasingly prefer preservation of their natural teeth. The study suggested that increased demands for conservative and fixed dentistry, including implant restoration, might be seen in the future (Cronin et al., 2009).

The general public considered DIs as '*a panacea*' for the treatment of tooth loss (Wang et al., 2015). This was accompanied with over-rating the implant restoration outcomes and longevity and the expertise required for conducting the treatment. Those results are in agreement with the findings from Abrahamsson et al. (2016). In addition, Wang et al. (2015) explained that currently patients' thoughts of DIT are influenced by exposure to different public sources of information, particularly the media and the internet. In-depth qualitative interviews are recommended to further investigate patients' conceptions of implant longevity and the maintenance requirements (Wang et al., 2015).

- ***The decision-making process of dental implant treatment***

Whether or not to restore a depleted dentition with DIs is the outcome of the decision-making process between patient and clinician. Across studies, it seems that three groups of factors were central to the decision-making process: barriers, motivating factors and dentist–patient relationships. These are summarised in Figure 2.1. Atieh et al. (2015) identified that during the decision-making process, patients thought about the affordability of the treatment and assessed if the replacement worth the high cost compared to their knowledge of the longevity and strength of the restoration. In addition, Narby and colleagues (2012) identified barriers, which they called, '*gatekeepers*' within the decision-making process for DIT; these included '*dental*

² This study was excluded because it does not meet the inclusion criteria of the current review. There was no primary aim to consider patients' experience of any aspect of implant treatment; rather, this was only briefly mentioned in one participant's quote.

anxiety’ and the ‘*cost*’ of implant treatment. Other barriers identified in the studies were apprehensiveness about pain and the inability to wear dentures after the implant surgery; concerns about the future cost of maintenance; future complications of the prostheses; and longevity of the treatment and interference with the patients’ medical condition (Trulsson et al., 2002; Ellis et al., 2011; Exley et al., 2012; Osman et al., 2012; Grey et al., 2013; Lantto and Wårdh, 2013; Rousseau et al., 2014; Wang et al., 2015). Findings from two countries suggested two main areas of concerns behind patients’ refusal to undergo DIT: ‘*fear of pain and anxiety*’ and the applicability of treatment in older patients (Ellis et al., 2011).

Another influential factor in the implant decision-making process is the dentist–patient relationship. Previous unpleasant dental experiences might negatively impact on the patients’ decision in the form of worries related to old complicated procedures, current failed restorations or family and friends’ experiences (Narby et al., 2012), whereas a good *patient–dentist relationship* and trust in the dentist may contribute positively to the decision-making process (Exley et al., 2012; Narby et al., 2012; Wang et al., 2015).

Previous quantitative research has investigated whether patients’ motivation to proceed with DIT is influenced by age, gender or social status, but no clear relationships have been established. In the current qualitative literature, some studies reported that patients’ desire to have dentition close to natural teeth and the search for ‘*normality*’ (Grey et al., 2013; Wang et al., 2015; Abrahamsson et al., 2016) or ‘*normalisation*’ (Lantto and Wårdh, 2013) may act as motivating factors during the decision on implant treatment (Grey et al., 2013; Lantto and Wårdh, 2013). Also, a desire to preserve the adjacent teeth by avoiding conventional restoration and the positive influence of friends and relative were reported as motivators for DIT in Wang et al. (2015). The aspiration of retrieving an old identity ‘*becoming the person I was once*’ (Trulsson et al., 2002; Narby et al., 2012) and eliminating the feeling of isolation and ‘*Social stigma*’ (Narby et al., 2012) were other motivating factors for implant restorations. Narby *et al* (2012) claimed that determination to improve dentition and overcome the functional and aesthetical limitations of dentures acted as motivators for the decision to undergo treatment with ISFP.

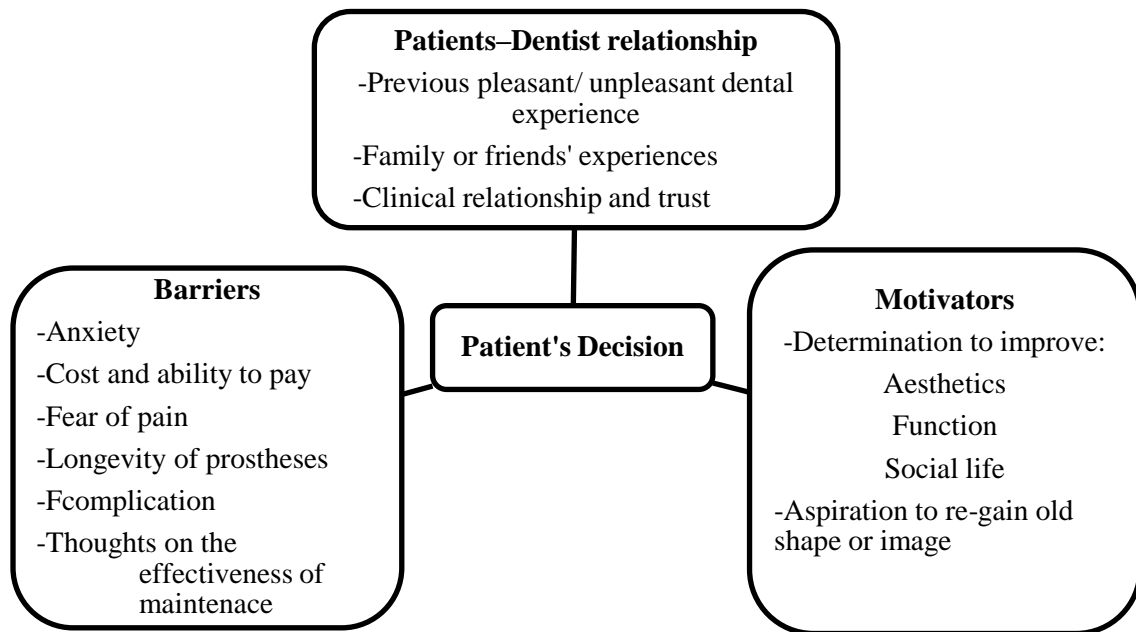


Figure 2.1. Factors influencing patients’ decision for dental implant treatment

- ***Stage II patient experience of implant placement***

Across all papers, very little data was related to the experience of implant placement, and only three studies recruited patients during their treatment stage (Exley et al., 2012; Grey et al., 2013; Rousseau et al., 2014). The limited information on experiences of this stage mainly concerned pain and distress during the surgical phase and issues around using dentures during the healing period. Data available in one study suggests that surgical implant placement for some patients can cause more physical trauma than anticipated (Osman et al., 2012). In another recent study, patients considered their experiences of one implant placement and healing as generally positive despite experiencing struggles during the first year of treatment (Atieh et al., 2015).

- ***Stage III patient experience with implants restoration***

Findings of the patients’ thoughts and experiences of stage III are categorised in this synthesis according to the type of implant restorations provided. Four studies included patients who were treated with ISFP (Trulsson et al., 2002; Johannsen et al., 2012; Narby et al., 2012; Lantto and Wårdh, 2013) and three studies reported patients’

experiences with ISOD (Hyland et al., 2009; Osman et al., 2012; Rousseau et al., 2014). One study involved patients' experiences with a single posterior implant crown (Atieh et al., 2015). Other studies included patients with a variety of implant restorations (Johannsen., 2012; Grey et al., 2013; Rousseau et al., 2014), and there was no clear distinction in the findings. One recent study included patients diagnosed with peri-implantitis in at least one implant and had between one to six implants with no clear presentation of the types of implant prosthesis (Abrahamsson et al., 2016).

- ***Patients' experience after the replacement with ISFP and implant crown***

Themes across four studies reflected patients' thoughts of their ISFP treatment journey (Trulsson et al., 2002; Johannsen et al., 2012; Narby et al., 2012; Lantto and Wårdh, 2013). Patients described DIT as a transition towards their improved dental state and referred to that treatment as a '*positive turning point*' (Trulsson et al., 2002).

Recognition of the functional enhancement and the improvement of their quality of life after the use of ISFP were apparent across studies and coded in one study as '*normality of function*' (Grey et al., 2013). Recovering personal identity and confidence after implant treatment were also reported, and from the patients' perspectives were interpreted as '*becoming the person I was once*' (Trulsson et al., 2002; Narby et al., 2012) and regaining *normality of appearance* (Grey et al., 2013). Patients generally felt an improvement in their confidence, social life and self-image.

Specific groups of patients with functional limitations described treatment with ISFP as '*a process of normalisation*' (Lantto and Wårdh, 2013). Improvement of their quality of life after ISFP replacement had made them independent in selecting their food.

Furthermore, ISFP for this particular group could be advantageous for their confidence and socialisation. Some of the participants proposed that having a secure restoration should be a '*right*' (Lantto and Wårdh, 2013) for them, and it should be provided at reduced cost when financial hardship may act as barrier. Patients with physical disabilities reported difficulties cleaning their ISFP, which might necessitate additional support from the patient's carer (Lantto and Wårdh, 2013). After a period of implant prostheses placements, patients could recognise different DIT outcomes and prostheses' deficiencies. Some of these deficiencies include: speech difficulties at the beginning of ISFP use (Johannsen et al., 2012; Narby et al., 2012); tongue and cheek biting;

increased salivation; change of food taste (Johannsen et al., 2012); and maintaining the prosthesis' hygiene (Johannsen et al., 2012; Narby et al., 2012)

Patients' experiences with single implant crowns are reported in only one study (Atieh et al., 2015) and its findings are in harmony with patients' account of ISFP (Johannsen et al., 2012; Grey et al., 2013). However, Atieh *et al* (2015) highlighted that patients' expectations of the long-term restoration outcomes is not balanced with knowledge of future maintenance needs. Despite experiencing some struggles at stage III, patients with single implant crowns considered their experiences to be positive and were willing to recommend the treatment for others (Atieh et al., 2015).

- ***Patients' experiences after replacement with ISOD***

The experience of patients with ISOD was discussed in the literature from two perspectives. The first was the experience of eating and functioning with ISOD, and the second was the experience of improvement in social life and confidence with ISOD (Hyland et al., 2009; Osman et al., 2012). Studies reported that patients experienced substantial improvements in eating after using ISOD, including improved food choices and enjoyment in their social environment (Hyland et al., 2009). The increases of ISOD dentures' fit and stability during function had two advantages from patients' perspectives. Stable dentures enhanced patients' confidence and clarity of speech and also reduced the frequency of denture-induced ulcers (Osman et al., 2012). Patients also gave their account of the negative aspects of ISOD, such as '*difficulty manipulating the overdenture*' and '*difficulty in cleaning implants*', particularly at the beginning of use (Osman et al., 2012).

- ***Patients' experiences of dental implant complication***

Patients' experiences of implant complication (peri-implantitis) is considered in only one study (Abrahamsson et al., 2016), focusing on the patients' reactions to the disease and changes in their expectations after being diagnosed with peri-implantitis. In addition, complications in general were considered less comprehensively in another study (Atieh et al., 2015). Abrahamsson et al. (2016) indicated that peri-implantitis has a negative impact on patients views on and satisfaction with implant treatment outcomes. Despite their initial high satisfaction with the immediate treatment outcomes, a diagnosis of peri-implantitis was felt by patients as a stressful occurrence, raising

worries about the future of the dentition and the cost of maintenance at specialist clinics, and doubts about effective maintenance. It is proposed that a lack of proper patient knowledge about maintenance might impact on patients' acceptance of the long-term implant outcomes (Atieh et al., 2015; Abrahamsson et al., 2016). Therefore, the authors of those studies suggested that proper communication with an emphasis on the need for implant care and maintenance should be ensured (Atieh et al., 2015; Abrahamsson et al., 2016).

2.1.5 Discussion of findings from the qualitative synthesis

There is increasing use of qualitative methods to investigate patients' experiences of health care provision. This reflects the increasing value placed on patients' opinions, alongside clinicians' views and research evidence, in health care decision-making. In the field of implant dentistry, studies using qualitative methods are mostly limited to the last decade. This review considered solely qualitative studies concerning patients' experiences of DIT. Semi-structured, in-depth one-to-one interviews were the main methods of choice for collecting data from patients in most of the included studies, with two studies using focus group discussions (Ellis et al., 2011; Wang et al., 2015). As in other areas of healthcare research, thematic analysis and constant comparative methods of grounded theory seem to be the preferred methods of qualitative analysis in the reviewed papers.

The majority of participants in the included studies were interviewed after completion of their DIT. This may have reduced the possibility of obtaining in-depth information about patients' experiences earlier in the treatment pathway (i.e. before and during implant placement). In addition, their experiences of the completed ISP may have altered how they perceived the earlier treatment stages. Although some studies explored patients' experiences of implant decision-making, this was usually discussed retrospectively from the perspective of completed implant treatment. In one study, the general public showed signs of high expectations of DIT outcomes (Wang et al., 2015). In addition, patients' experiences of IPS (stage II) were insufficiently considered in the reviewed papers, including experiences of clinical investigation and surgical placement; bone graft procedures; failure of implants' osseointegration; and the experience of temporary implant prostheses. The limited information available about IPS (Osman et

al., 2012) suggests that it can be a difficult period for some patients and warrants further qualitative investigation.

After provision and use of both ISFP and ISOD prostheses, patients were able to discuss the benefits and drawbacks of their restorations (Johannsen et al., 2012; Osman et al., 2012). Recognition of the functional improvement, aesthetic enhancement and social advantages of the ISP were generally reported across studies. For patients with ISFP, implant treatment was seen as '*a process of normalisation*' (Lantto and Wårdh, 2013) and fixed restorations as similar to natural dentition in function and appearance. On the other hand, while patients with ISOD believed that ISP would overcome functional, aesthetical and social requirements, they were not described as resembling natural dentition. This may be primarily because of the requirement to remove the denture frequently. Patients with fixed ISP were concerned about maintaining the hygiene of their ISFP. This was especially the case among individuals who were functionally impaired (Lantto and Wårdh, 2013). Cleaning the prostheses and around implant fixtures was an issue for some participants with ISOD, who also complained about difficulty in unseating their ISOD (Osman et al., 2012). Further, patients' information on how to care for and maintain their implant restoration hygiene may be expedient (Atieh et al., 2015; Abrahamsson et al., 2016).

Patients' expectations of restorative dental treatment are growing (Cronin et al., 2009; Grey et al., 2013) and have been reported to be unrealistic in recent investigations (Atieh et al., 2015; Wang et al., 2015; Abrahamsson et al., 2016; Yao et al., 2016). To accommodate these expectations, decision-making between patients and their restorative clinicians in relation to implant treatment should be more collaborative. Accurate information and discussion on what implants can offer and on their drawbacks should be provided before treatment commences in order for patients to have realistic expectations (Narby et al., 2012). This can be fulfilled by effective clinical communication during the provision of implant information.

Experiencing complications after a period of positive implant restoration outcomes negatively impacted on patients' expectations of and satisfaction with DIT (Abrahamsson et al., 2016). Patients who had high expectations of DIs at the outset of the treatment may be unlikely able to adapt well to the emotional and the financial requirements of peri-implantitis treatment when this occurred (Abrahamsson et al., 2016). In addition, patients experienced doubts about the effectiveness of the treatment

and the benefit of investing additional costs to manage their conditions. That led to patients doubting the long-term success of the implant after treatment and prompted worries regarding the effectiveness of maintenance and the long-term costs of specialist care.

Although the included papers provided considerable insight into the experiences of patients undergoing DIT for extensive tooth loss, there was relatively little information about the experience of patients with single implant crowns (Atieh et al., 2015). Linked to this (as extensive tooth loss is more common in older age groups) there was relatively little information about the experiences and expectations of younger patient groups.

In terms of future research, it will be interesting if more information is gathered regarding factors that influence patients' expectations of the DIT at stage I and how that can impact on satisfaction with prostheses, patients' experiences of implant placement at stage II (surgical and healing stage) and patients' experiences of implant prostheses' maintenance requirements and implant failure. These were identified as areas that were sparsely covered in the current qualitative literature on patients' experience of DIs.

2.1.6 Conclusion

While the growing interest in implant treatment for the replacement of missing teeth is evident, consideration of patients' perceptions of different aspects of implant treatment must be further investigated and reported. The included qualitative studies provided insight into patients' experiences of ISODs, ISFPs and single crowns.

In general, there were two main factors motivating patients to opt for DIT: to improve confidence, and to improve existing functional problems with other types of conventional restoration. Findings across the reviewed papers (n=13) suggested that while patients experienced functional and social improvements after both types of restoration, they additionally saw treatment with ISFP as a process of '*normalisation*' (Grey et al., 2013) and believed that such implant restorations could be similar to natural teeth. Across the studies, less consideration was given to young patients; patients with single and limited tooth loss; and to the significance of patient expectations on treatment decision-making and future satisfaction with treatment outcomes. Future work might focus on investigating patients' experiences and

understanding of DIT at stages I and II, and on how this influences patients' expectations of, and satisfaction with, the implant restoration.

2.2 An overview of patient-based outcomes of dental implant treatment

2.2.1 Background

The aim of this section of the literature review is to provide an overview of aspects related to patients' experiences of implant treatment reported in the quantitative research and that are expected to be involved in patients' accounts of their experiences in this research. These are patients' expectations of, satisfaction with, and oral-health-related quality-of-life (OHRQOL) change with DIT. Patients' satisfaction with DIs were usually considered alongside either expectations or OHRQOL in most of the included studies (So it will not be presented as separate subsection in this overview).

Quantitative studies have presented patients' experiences of DIT through the use of patient-based questionnaires. As DI literature is fast growing, the search for relevant papers in this section was conducted via the electronic databases Scopus, PubMed, Google Scholar and Grey Literature, focusing only on the last decade (with the exception of key papers that are still frequently referred to in the current literature). Different combinations of search terms and their root words were used, including: 'patients', 'dental implant', 'expectation', 'satisfaction', 'quality of life', and 'oral-health-related quality of life'.

2.2.2 Patients' expectations of dental implant treatment

Dental implants are still a relatively novel type of tooth replacement for the general population, and different segments of the population have varying knowledge and understanding of them (Pommer et al., 2011; Saha et al., 2013; Simensen et al., 2015; Wang et al., 2015). In the UK, it has been reported that patients' expectations of implant treatment outcomes are 'high' (Allen et al., 1999) and patients' beliefs about DIT seem to be yet unchanged (Grey et al., 2013). Some recent studies have considered some patients' expectations to be unrealistic (Yao et al., 2016).

Here, it is worth highlighting that the general population's recognition of DIT as a type of tooth replacement is growing. For instance, in 2013, the percentage of patients who were aware of DIs was 77% in the United States, 72% in Austria and 96% in Jordan (Al-Dwairi et al., 2014). This reflects the public awareness of DIT as a type of tooth

replacement. Previous studies indicate that multiple sources of information have contributed to patients' knowledge and understanding of DIs, and the main sources of patient information regarding DI in the UK, Austria and Jordan are family and friends, with reference to dentists when extra information was needed by patients (Pommer et al., 2011).

Generally, expectations of treatment outcome are an important aspect of human experience and can be crucial and decisive in care provision. They are defined as one of the determinants of patient satisfaction with treatment outcomes when an attempt is made to define a model of expectation development (Thompson and Sunol, 1995). Also, they are considered as a modifier in guiding patients' attitudes and influencing their knowledge and understandings of a defined topic in another model of expectation development (Janzen et al., 2006). Yet, the determinants of patients' expectations are not clearly understood or configured. As highlighted, different models have been developed to define how expectation and expectancy, in health and health care, progress and develop (Thompson and Sunol, 1995; Olson et al., 1996; Janzen et al., 2006). This has been undertaken in attempts to inform research into the components of health expectations and to enhance clinicians' understanding of the impact of patients' expectations on their attitudes, and therefore identify ways to minimise the impact of unachievable patient expectations of treatment outcomes. Different factors have been proposed as essential elements that form patients' expectations in health care. These are usually derived from direct personal experiences or witnessing others' experiences, for example family and friends, personal beliefs, and personal understanding and knowledge (Janzen et al., 2006).

In relation to DIT, studies of patients' expectations of DIT outcomes have recently been systematically reviewed (Yao et al., 2014). In that review, ten studies (12 papers) were reviewed, two of them qualitative studies (Johannsen et al., 2012; Grey et al., 2013). In all of the studies it was identified that, regardless of the extent of tooth loss and different implant-retained prostheses, patients showed indications of high of expectations in relation to DIT outcomes. All of the studies on patient's expectation of DIs were observational, and were diverse in their aims and interpretation of patients' expectations. However, there were difficulties in meta-analysing and comparing those studies' outcomes in the review because there were inconsistencies in terms of patients' characteristics and the types of implant-retained prosthesis used between the studies. In addition, studies used different questionnaires in scoring patients' expectations and a

visual analogue scale (VAS) was most frequently used to record the expectation pre-treatment and the satisfaction post-treatment (compared to the baseline measurement).

Moving to patients' satisfaction after DIT, it has been argued that patient-related factors are the main determinants of patient satisfaction with treatment outcomes (Brennan et al., 2010): for example, patients expectations, knowledge, and personal characteristics. Investigations of patients' satisfaction with DIT outcomes have again been based on different types of methods and questionnaires. Patient-administrated questionnaires using a VAS outcome measure were developed for the purpose of identifying patients' satisfaction with their prosthesis (Al-Omiri et al., 2005; Brennan et al., 2010; Garg, 2010; Bonde et al., 2013). Other studies used the oral health impact profile (OHIP-49) questionnaire to record patients' satisfaction, assuming a positive correlation between patients' satisfaction and OHRQOL; these usually use 'Likert' scales as an outcome record (Brennan et al., 2010; Erkapers et al., 2011).

Nevertheless, conflicting results were reported when patients' expectations before and satisfaction after the DIT were compared (Heydecke et al., 2008; Baracat et al., 2011; Andrade de Lima et al., 2012). While some studies showed higher satisfaction scores after DIT, negative patient-based outcomes were observed in others, particularly in relation to the function and comfort of overdentures (Baracat et al., 2011) and the aesthetic of the fixed retained prosthesis (Andrade de Lima et al., 2012). An adverse relationship was found between age and expectation of DIT outcomes as younger patients had higher expectations (Cronin et al., 2009; Baracat et al., 2011), which differs from the recent observation of Yao *et al.*, 2016.

Despite being retrospective and cross-sectional in their designs, it is acknowledged in the review by Yao et al. (2014) that the qualitative studies of Grey *et al* (2013) and Johannsen *et al* (2012) improved the current understanding of patients' expectations of DI, and both studies were further considered in a subsequent qualitative synthesis (Kashbour et al., 2015).

In summary, it is recommended that further studies be conducted to explore patients' expectations of DIT, the factors which influence patient expectations, and how that might impact 1) patients' engagement in the decision-making process (Kashbour et al., 2015), 2) patients' satisfaction and 3) OHRQOL (Baracat et al., 2011). Specifically, a study design that extends longitudinally before and after DIT to acquire better awareness of patients' views, monitors patients' thoughts and anticipations of DIT

outcomes, and also recognises if a change in expectation occurs during the time, was suggested (Johannsen et al., 2012; Grey et al., 2013; Wang et al., 2015).

2.2.3 Oral-health-related quality of life

OHRQOL is a relatively recent and continually growing area of research in dentistry (Tsakos et al., 2012; Bennadi and Reddy, 2013), and has crucial importance in the advancement of clinical practice and patients' care (Locker and Allen, 2007). The concept of OHRQOL has developed over the last three decades following recognition of the importance of considering patient-based measures beside clinical-based measures in dental research (Bennadi and Reddy, 2013). As a result, the definition of the concept of OHRQOL has also been further advanced as several authors have proposed definitions of the concept (Locker and Allen, 2007). For example, Locker et al. (2000, p. 970) defined OHRQOL as '*the extent to which oral disorders affect functioning and psychosocial wellbeing*', and Locker et al. (2002, p. 91) defined it as '*the symptoms and functional and psychosocial impacts that emanate from oral diseases and disorders*'.

Furthermore, measuring subjective patients' OHRQOL become a focus of interest, and a number of indices using multiple-item questionnaires have been established and are still evolving (Slade and Spencer, 1994; Locker and Allen, 2007; Sischo and Broder, 2011). Those indices are mainly based on the fact that OHRQOL is composed of multidimensional categories including oral health and functional, physical, social and emotional well-being (Sischo and Broder, 2011). The most frequently used conceptual model to assess health conditions affecting oral cavity is the one explained by Locker. This model is based on the World Health Organisation (WHO) classifications of impairment, disability and handicap (Locker, 1988).

The psychosocial dimensions of oral disorders were considered in Locker's model, and others had argued that oral diseases may impact on general well-being (Allen and McMillan, 2003). Locker's model proposes that oral disease possibly leads to five consequences of impairment in people's quality of life: functional limitation, pain, discomfort, disability and handicap. For example, tooth loss and edentulism cause functional limitation during eating, leading to an inability to perform daily activities in a satisfactory way (e.g. having a healthy diet), or causing handicap if that led to social isolation (Locker, 1988).

As arguments developed on the effectiveness of different indices in measuring OHRQOL and the sensitivity of these measurements, Locker and Allen (2007) devised a criteria for evaluating indices for research purposes. In their paper, Locker and Allen (2007) reviewed five of what they argued were the most frequently used questionnaires in assessing OHRQOL; among those was the oral health impact profile (OHIP). They concluded that although the existing OHRQOL measures need further improvement to clarify the nature of their measurements and overall scores, the questionnaires conform to two requirements in measuring OHRQOL: 1) they are patient-centered in their development, and 2) they involve aspects of patient's daily life that patients claimed are important (Locker and Allen, 2007).

- ***Tooth loss and oral-health-related quality of life***

Investigation of the impact of tooth loss with the OHRQOL measurement is widely considered. For a long time, tooth loss has been considered as a chronic disability that directly impacts patients' quality of life (Fiske et al., 1998; Davis et al., 2001). Despite improvements in oral health provision and progress in preventive and restorative dentistry in modern societies (Crocombe et al., 2009; Steele et al., 2012), tooth loss and its consequences are still a burden for patients, the dental profession (Craddock, 2009) and health services (Steele et al., 2012). The extent of tooth loss can vary from single tooth loss to the loss of the entire dentition, which is known as edentulism. The impact of partial tooth loss and edentulism on a patient's quality of life has been widely investigated and reported (Allen and McMillan, 1999; Davis, 2000; Trulsson et al., 2002; Okoro et al., 2012; Rousseau et al., 2014)

Studies that investigated patients' perceptions of tooth loss and replacement reported physiological, aesthetic, functional, nutritional, psychosocial and social impacts of tooth loss on patients (Fiske et al., 1998; Davis et al., 2001; Graham et al., 2006; Brennan et al., 2008; Craddock, 2009; Okoje et al., 2012). These impairments played essential roles in patients' motivations to undergo DI treatment for tooth replacement (Johannsen et al., 2012; Grey et al., 2013; Yao et al., 2016). For example, it is reported that OHRQOL is more impaired as a result of tooth loss in patients attempting DIT than in those who accepted conventional dentures (Allen and McMillan, 2003).

- ***Dental implants and oral-health-related quality of life***

Moving to OHRQOL in relation to the DIT, enhancements of OHRQOL are reported in multiple studies after DIT with respect to all types of implant restoration. For example, in the UK, a recent study was conducted to compare OHRQOL both pre- and post-DIT in dentate and edentate participants (Patel et al., 2015). This study used OHIP-49 (Slade and Spencer, 1994) as its outcomes. The study concluded that DIT had a substantial positive effect on OHRQOL. Another study used the same instrument both before and after DIT to compare patients' OHRQOL for immediate loading and delayed loading techniques of DI placement (Dolz et al., 2014) and showed a similar improvement in OHRQOL for both groups. They also noted greater improvement when the implants were loaded immediately. Nevertheless, the long-term success of immediate loading is doubted by some authors (Atieh et al., 2013). In addition, an improvement in OHRQOL was observed when implants were placed under conventional CD and RPD (Wolfart et al., 2013). A similar finding was reported when implants were used to retain a fixed prosthesis with different extents of tooth loss (i.e. single tooth, partial dentate and edentulous); an enhancement of OHRQOL was reported among all groups (Fillion et al., 2013).

Furthermore, amongst edentulous patients there was a significant improvement in OHRQOL after obtaining a fixed implant-retained prosthesis (Petricevic et al., 2012). Additionally, it was reported that the improvement in OHRQOL was higher in patients who received a fixed ISP than amongst those with a removable implant-retained prosthesis (Petricevic et al., 2012). In contrast, a crossover study comparing fixed and removable options reported that while some patients might prefer a fixed prosthesis due to its stability, others favour an ISOD for oral hygiene reasons (Heydecke et al., 2008).

It could be summarised that positive enhancement of OHRQOL after DIT is observed in the majority of the reviewed studies. This improvement might be associated with positive changes in patients' general health (Smith et al., 2009). However, during this review it was observed that all studies reported the improvement of patient's OHRQOL after DIT in a relatively short period of time extending to 6 months after placement of ISP and three years (Petricevic et al., 2012). No report has been identified considering long-term changes in patients' OHRQOL after a longer period of experiencing other aspects of ISP such as maintenance or complications. This could be considered as an area warranting further investigation.

Because in the upcoming research OHIP-49 will be used, a brief literature of the OHIP index will be summarised in the next subsection (OHIP-49 is used in the upcoming study as one of patients' descriptive characteristics, alongside patient's demographical information (this is will be clarified in Chapters 4 and 5)).

- ***Oral health impact profile***

The OHIP was developed with the intention to measure OHRQOL (Slade and Spencer, 1994). It aims to score how people perceive the impact their oral disorders have on the quality of their daily life and well-being (Slade, 1997). It is a multi-item questionnaire consisting of 49 questions relating to people's problems over a period of the 12 months prior to the time of response-taking. Some of those are difficulty in eating, self-consciousness about self-image, difficulties in social communication because of problems or concerns related to the mouth or dentures (Slade, 1997)

The OHIP-49 was developed by Slade and Spencer in 1994 (Slade and Spencer, 1994) and is based on Locker's framework of disease and its consequences (Locker, 1988; Locker and Allen, 2007). It was developed through consequent stages; these were: 1) integrating patients, who were suffering from any form of oral disorder in qualitative interviews and asking about the impact of their oral disorders on their daily quality of life (Slade and Spencer, 1994), 2) the resultant generation of 535 patient-centred statements pertaining to the functional, social and psychological impact the oral conditions had on the individual, 3) reduction of the statements by expert editing, and sorting into 46 items, 4) addition of three items from existing generic health status measures to represent the concept of handicap, 5) further grouping of the 49 statements into seven domains (Table 2.2), utilising a conceptual framework derived from the WHO International Classification of Impairments, Disabilities and Handicaps (Slade and Spencer, 1994), and 6) changing of the final statements into questions related to oral health disorders.

| Domain | Number of questions representing the domain |
|--------------------------|---|
| Functional limitation | 9 |
| Physical pain | 9 |
| Psychological discomfort | 5 |
| Physical disability | 9 |
| Psychological disability | 6 |
| Social disability | 5 |
| Handicap | 6 |

Table 2.2. The seven domains of OHIP-49

Patients' responses to the 49 questions are reported in a Likert format (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often and 4 = very often). Once the questionnaire is answered by patients, the impacts are calculated in the form of numerical scores derived by the use of one of three ways of calculation. These are the Dichotomous score, the Ordinal score and the Weight standardised score, as shown in Table 2. 3 (Allen et al., 2001).

| | |
|-------------------------------------|---|
| Dichotomous score (OHIP-SC) | Calculated by counting the number of 'fairly often' and 'very often'. |
| Ordinal scores (OHIP-ADD) | Calculated by summing up the response codes of the 49 statements. |
| Weight standardised score (OHIP-WS) | Calculated by multiplying the response code of each statement by the statement weight and then summing the scores in the subscales. |

Table 2.3. Methods to calculate the score of the OHIP-49

The OHIP-49 is believed to be the most frequently used measure for assessing OHRQOL. It is validated as a reliable instrument in measuring the impact of oral disorders and diseases on patient's life (Locker and Allen, 2007). In the first

development of OHIP-49, Slade and Spencer (1994) argued that the questionnaire can be used not only to assess OHRQOL for group or population, but also potentially for an individual to reflect the impact of oral disorder on the patient's life in a clinical setting. OHIP-49 is translated into several languages, and a shorter form consisting of only 14 items (OHIP-14) has also been developed (Allen and Locker, 2002).

One disadvantage of OHIP is its length, as 49 questions need to be answered. Therefore, to reduce time and the cost of its use, researchers tend to use it as a self-administered questionnaire rather than in an interview format (Sierwald et al., 2011). Furthermore, the questionnaire can be administered electronically online (Sierwald et al., 2011). The choices of the methods of administration and calculation depend upon different factors, including patient burden, cost and response rate, and the aim of the research using the questionnaire.

2.2.4 Conclusion

Multiple cross-sectional studies have reported aspects of patient's expectation of, satisfaction with and OHRQOL change after DIT by the use of questionnaires. The majority of those studies confirmed the positive contribution that DIT brought to patients' quality of life by improving patients' oral health. However, patient's expectations of implant restoration outcomes seemed to be agreeably high in most studies and this might impact on patients' long-term experiences of and satisfaction with implant restoration. In addition, patient satisfaction and OHRQOL seemed to be considered shortly after DIT, neglecting the long-term impact of maintenance and complications on those reports.

2.3 The decision-making process in implant dentistry and the dentist–patient relationship

2.3.1 Background

The main aim of this part of the literature review is to provide an overview of and summarise the knowledge related to decision-making process and the influence of the clinician–patient relationship, and relate that to implant dentistry where possible.

Decision-making is an integral part of patients' health care provision (Rapley, 2008), and the interaction between clinician and patient may influence treatment outcome (Albrecht, 1977). The theory and practice of the decision-making is increasingly becoming an area of research focus in dental health care and implant dentistry, with several recent studies investigating different aspects of the concept in clinical practice (Marder, 2005a; Marder, 2005b; Lundgren et al., 2008; Exley et al., 2012; Flemmig and Beikler, 2009; Cosyn et al., 2012; Narby et al., 2012; Junges et al., 2013; Szymańska and Koszuta, 2013; Junges et al., 2014; Vernazza et al., 2015; Zhang, 2014; Korsch et al., 2015). This interest may be due to two influences: firstly, decisions regarding patient management developed from disease-centred care towards patient-centred care; and, secondly, patients have increasingly preferred to be an active participant in making decisions regarding their healthcare and their treatment (Korsch et al., 2015).

Patient-centred care focuses on the importance of the doctor–patient relationship in establishing an approach that recognises the patient's values, needs and desires in addition to clinicians' expertise in the process of treatment decision-making (Karnieli-Miller and Eisikovits, 2009). Nevertheless, the process is complex and influenced by multiple and intersecting variables. It is argued that the treatment decision is '*distributed*' in its structure and development with involvement of different subjects with multiple roles, knowledge and perspectives (Rapley, 2008, p. 429). The distributed nature of decision-making applies to decision-making in implant dentistry when payment needs to be considered by patients; an example of this is given in previous analysis by Exley et al. (2012).

2.3.2 Types of decision-making in health care

Three style of decision-making in healthcare have been previously debated (Charles et al., 1997; Charles et al., 1999). Variations between those approaches are based on the varying degrees of interaction between patient and clinician during decision-making. These approaches are the paternalistic approach, in which the treatment decision is dominated by the clinicians' views, contrasted with the informed approach, when the patient leads the choice of treatment with passive clinician involvement. In between those two paradigms is the shared decision-making (SDM) approach, which builds upon the mutual participation of patient and clinician in discussion, with both parties sharing their information, experiences, concepts and concerns regarding different types of management. In addition, Charles et al. (1999) argued that a hybrid approach is potentially adopted by clinicians in real clinical encounters when an absolute approach may not be achievable. In a restricted clinical context and when negotiating clinical need, patients' involvement and clinicians' approach to the decision may vary and the clinician may use different styles interchangeably to achieve a desirable outcome (Gustavsson and Sandman, 2015).

In addition, two theoretical components of decision-making in healthcare are defined (Flemmig and Beikler, 2009; Alani et al., 2011): the prescriptive (also called the normative part), and the descriptive; the prescriptive constituent of the decision is derived from objective judgements made by the clinician about patient suitability for treatment and is determined by evidence-based practice knowledge. In contrast, the descriptive element of decision-making is developed through subjective judgements and negotiation between clinician and patient throughout the stages of the clinical decision-making.

2.3.3 Decision-influencing factors in implant treatment

Decision-making in implant dentistry can be shaped by clinical and non-clinical factors. The clinical factors are related to the possibility of involving implant provision in decision-making. Those are clearly structured in the literature (Marder, 2005a; Marder, 2005b; Misch, 2007). Briefly, these are categorised as follows. Firstly, patient-related clinical factors, including biomedical consideration of patients suitability for DI, patients' medical and oral health, and related medication (Marder, 2005a; Marder,

2005b). In spite of the increase in dental implant provision and the decline in its restraints, there are still certain medical conditions which, when active, may prohibit the possibility of DIT: for example, bone and blood diseases. Secondly, clinician- and practice-related clinical factors, such as clinician's training, ability to provide implant treatment and the availability of the treatment in the dental practice (Zitzmann et al., 2011). It is beyond the scope of the current review to discuss in detail the clinical influencing factors in the provision of implant treatment but they are discussed elsewhere (Misch, 2014).

- ***Non-clinical Influencing factors***

The focus of the upcoming subsections is on non-clinical influencing factors, and these can also be categorised as related to: 1) patient characteristics (Eisenberg, 1979; Narby et al., 2012), including their motivators and barriers for DIT; 2) clinician characteristics (Aminoshariae et al., 2014) and their interaction with the health care system and policies (Eisenberg 1979); and 3) the patient–dentist relationship and interaction. Previously, in Sections 2.1.4 and Figure 2.1, patients' motivators and barriers for DIT were discussed and summarised from qualitative literature and published in Kashbour et al. (2015). The following discussion will focus on the other influencing factors and the patient-dentist relationship.

- ***Patient-related influences***

Previous research found no clear association between patients' personality, age, gender, type of health insurance, or the number of implants needed and patients' decision-making with regard to implant treatment (Aminoshariae et al., 2014; Korsch et al., 2015). However, conflicting results were found with regard to the influence of patients' socioeconomic status (Szymańska and Koszuta, 2013) and patients' ability to pay for implant treatment on the clinical decision of implant provision (Exley et al., 2012; Atieh et al., 2015; Wang et al., 2015).

A study conducted by Narby et al. (2010) claimed that patients with a high income and good dental status were more inclined towards accepting and paying for DIT during the decision. However, findings from a qualitative study conducted by Exley et al. (2012) suggest that while, for some, cost could be absolute barrier, patients with different

financial circumstances may be willing to pay for implant treatment when they are determined to enhance their oral health.

- ***Clinician-related influences***

In general, clinicians can leverage decision-making in healthcare by different means. These are summarised in the literature as clinicians' personality, expertise and knowledge, uncertainties about and questioning of diagnosis and management, and bias of information, as well as clinicians' inclination to adhere to evidence-based practice and/or guidelines (Flemmig and Beikler, 2009; Junges et al., 2014) (Figure 2.2).

It is claimed that decisions regarding implant provision may be influenced by a clinician's characteristics, speciality and level of expertise (Field et al., 2009; Zitzmann et al., 2011; Junges et al., 2014). In the UK, a study conducted in the northeast region into primary dental care (PDC), where payment needed to be made by patients, reported that male practitioners are more inclined to consider and provide DIT when the practice has the appropriate implant treatment facility (Field et al., 2009). The same trend is observed in the USA (Zitzmann et al., 2011; Junges et al., 2014). It is also noted that younger practitioners may consider the involvement of implant provision more than older dentists (Field et al., 2009).

Considering the influence of the clinician's level of expertise, a study on USA PDC, where insurance schemes are involved in payment for treatment, reported significant differences in treatment planning and decisions regarding implant provision between general practitioners and specialists in endodontists. Disagreements in treatment planning between clinicians was not influenced by patients' characteristics, insurance status, type of payment or cost, but it was influenced by the type of dental treatment required to preserve natural dentition. Practitioners in the USA planned significantly more towards extraction and implant placement compared with endodontists who attempted to save natural dentition by using their specialised clinical skills (Aminoshariae et al., 2014). The same concept and trend were observed amongst periodontists and GDPs in deciding between extraction then implant provision, and periodontal treatment (Junges et al., 2014).

When payment is involved in the decision towards implant provision, clinicians' approaches to the decision-making process was investigated in the UK by Vernazza et al. (2015). It is observed that clinicians in private dental care might take various approaches to including information on implant provision when patients are self-funding their treatment. '*Comprehensive*', '*distorted*' and '*incomplete*' descriptions of implant treatment were practised (Vernazza et al., 2015, p. 78). Factors that influenced clinicians' choices in this context were related to clinicians' assumptions about patients' demographical characteristics, clinicians' knowledge of decision-making styles, and the practices' business and legal requirements.

There is limited information on the roles of clinicians in implant decisions at SDC in the UK, where clinical guidelines are implemented and the decision may be influenced by clinicians' judgements in prioritising patients for treatment and rationing. The only study found, which was conducted in 2001 (Butterworth et al., 2001), reported that consultants' provisions were influenced by the clinical factors of implant provision and the suitability of patients for implant in the context of the RCS clinical guidance.

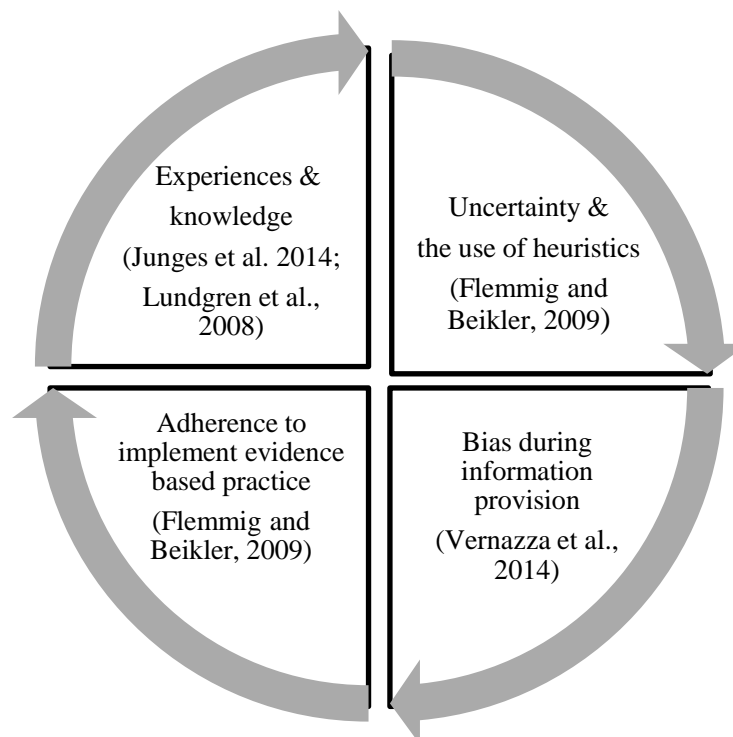


Figure 2.2. Clinicians' related influences of clinical decision-making

- ***Clinician–patient relationship***

Studies considering DIT emphasised the value and importance of the relationship and communication between clinicians and patients (Grey et al., 2013; Atieh et al., 2015). In addition, it is identified that effective communication and respect are important factors in developing patients' trust and confidence in the clinicians and facilitating a SDM environment in relation to DIT (Narby et al., 2004; Narby, 2011). In the UK, there is a lack of recent studies investigating current patients' views of the dental service in the UK. However, data from the UK adult oral health survey of 2009 claimed that the majority of UK people were satisfied with the quality of dental care they received from their dentist, with less than 20% of patients experiencing some difficulties with their dental care (Hill et al., 2013).

There is a growing interest in promoting respectful and trustful clinician–patient relationships (Yamalik, 2005b). The literature identifies three components of the dentist–patient relationship that should be maintained: interpersonal communication, trust and quality of care.

Interpersonal communication

The main aim of communication in a clinical dental setting is to build an environment that enables patient-centred care to be undertaken through the exchange of information, enhancing patient education and mutual SDM (Yamalik, 2005c). Dental patients anticipate an active role during decision-making (Chapple et al., 2003) and expect positive communication with clinicians during decision-making and information provision (Alani et al., 2011). The interpersonal relationship is facilitated through effective verbal and nonverbal communication. Verbal communication is key to establish a rapport between patient and clinician and also for patient satisfaction, particularly for those undergoing prosthodontic rehabilitation (Sondell et al., 2004). However, other methods of communication are rarely investigated, such as written and electronic shared information, which can provide patients with effective and long-lasting knowledge.

While clinicians achieve greater diagnostic accuracy when patients are actively engaged in decision-making, the power dynamic during communication may directly or

indirectly influence the decision and the treatment agreement: for example: the extent to which clinicians (or sometimes patients) hold control of the discussion, the depth of information provided and perceived, and the will to accept others' views in the decision-making process (Beresford and Sloper, 2008; Paget et al., 2011). Provision of trustful information and adherence to transparency and full disclosure can be ensured through mutual respect, and therefore facilitate a supportive environment for making an appropriate decision (Yamalik, 2005c; Paget et al., 2011).

Quality of care and trust

Patients increasingly have access to current sources of information, and because of this they integrate during clinical discussions and begin to be more focused on quality of treatment (Yamalik, 2005a), particularly if payment is involved (Steele, 2009). Whether patients' trust in dentists during dental treatment can influence the treatment outcomes or the dentist–patient relationship are not fully established in the literature. However, it could be argued that trust in the dentist and a good patient–dentist relationship enhance patients' understanding of clinical information and improve communication in the clinical setting, and this may contribute positively to the decision-making process (Jacquot and Bauer, 2005; Narby et al., 2012). Exley et al. (2012) claim that patients' trust in their dentist had a positive influence on the decision to pay for implant treatment. In contrast, previous unpleasant dental experiences or worries related to pain might negatively impact on the patient's decision for treatment (Narby et al., 2012).

Therefore, the advantages of a good dentist–patient relationship for clinical practice are multiple. Importantly, it facilitates a collaborative and trusting environment, and this ensures high-quality oral health care, increases patients' interest in participating in the decisions and adhering to clinicians' instructions, reduces patients' dental fear and anxiety and facilitates a comfortable clinical environment (Epstein 2003). Patient participation and improved communication would reduce conflict between patients and dentists while negotiating diagnosis and treatment, enhance trust in clinicians, and improve patients' visit pattern (Hill et al., 2013). In contrast, the benefits to clinicians of good patient relationships cannot be ignored as this improves clinical productivity, patient satisfaction and, therefore, patient retention (Lucarotti and Burke, 2015).

2.3.4 Treatment decision-making in the context of restricted resources

Shared decision-making is recognised as a feature of good practice and is encouraged within healthcare policies throughout the use of treatment-informed consent (GDC, 2005). SDM could be developed through sequences of social interaction between patients and clinicians, as shown in Table 2.4 (adapted from Elwyn et al. (2000)).

| Stages of shared decision-making, adapted from Elwyn et al. (2000) |
|--|
| 1) Encourage patient participation in treatment discussion |
| 2) Making appropriate diagnosis for patient complaints |
| 3) Explore patients' knowledge, understanding, concerns and anticipation of the complaint and possible treatments |
| 4) Identify a list of the possible treatments influenced by the patient's condition |
| 5) Tailor information involving patient preferences and desire |
| 6) Checking process: understanding information and that patients accept the process and decision-making role preference. |
| 7) Make, discuss or defer decisions |
| 8) Arrange follow up |

Table 2.4. Stages of shared decision-making

Nevertheless, SDM might be difficult to implement in several clinical care contexts (Charles et al., 1999): for example, when the decision for treatment is made in a context of limited resources and with restriction of provision by clinical guidance, funds and need for rationing. Clinicians in this environment may have to find a balance between two important roles: one as a care provider who has responsibility towards a patient's health care and interests (patient's agent), and another as a gatekeeper for clinical resources (an agent for wider society) (Jones et al., 2004).

In addition, clinicians may face the dilemma of determining and negotiating clinical needs with patients, differentiating between needs and desires when limited resources must be prioritised between patients with similar conditions (Gustavsson and Sandman,

2015). When clinicians face difficulties in judging a patient's priority for that treatment, there might be an ethical obligation towards the patient's health needs but not their desire, and therefore decision-making, in this situation, should favour patients in need (Gustavsson and Sandman, 2015) and based on cost-effectiveness in allocating the resources, rather than the best treatment effectiveness (Schulpher et al., 2002). Hajjaj et al. (2010) claim that clinical guidelines are the main deterrents experienced by clinicians to implementing evidence-based practice when negotiating treatment decisions.

However, understanding and interpreting actual need, perceived need and desire might be complex when applied to clinical practice (Gustavsson and Sandman, 2015). Conflict of interest on the best achievable outcomes might be raised between patients and clinicians (Gustavsson and Sandman, 2015). To reach an agreement, the decision interaction at the point of diagnosis and treatment might be shaped by '*negotiation*' and '*bargaining*' (Albrecht, 1977, p. 279), in which some form of tolerable compromise needs to be reached between clinician and patient in order to reach a desirable decision. Favourable negotiation could be facilitated by mutual communication, clear understanding of the diagnosis and the possible ways of management in the context of the practice limitation. Therefore, a clinician's negotiating and persuasion skills are essential in the decision process (Albrecht, 1977).

- ***Rationing in health care***

Rationing in healthcare is the way in which limited resources are allocated between patients with competing needs (Owen-Smith et al., 2015). A framework developed by Doyal (1998) suggested that health care policy and clinicians should be explicit about the degree of patients' involvement in and the fairness of access to restricted resources. In addition, the principle of rationing in the NHS might be clearly identified and discussed at the level of policy-making in form of guidance; an example of that is a framework of rationing in decision making developed by Maybin and Klein and discussed in Owen-Smith et al. (2015). At consultation, three levels of rationing were proposed: rationing by exclusion, rationing by deterrence, and rationing by dilution (Owen-Smith et al., 2015).

Occasionally, there is a need to implement decision-making that may empower the clinician's role, especially in conditions where absolute rehabilitation may be not achievable. In these situations the decisions aims to ensure that patients are managed according to their needs but not necessarily according to their desire. Patients' needs can be recognised by comprehensive and mutual interactions between clinician and patient (Narby et al., 2004). While in medicine there are some attempts to investigate this aspect of health care decision-making in primary care (Jones et al., 2004), in dentistry (particularly within the NHS) there is a lack of reports on the way in which funding limitation and clinical guidance influence clinicians in allocating access to restricted resources.

- ***Implant provision in secondary dental care within the NHS***

Within SDC in the NHS, the presence of the RCS guidelines on implant provision (Alani et al., 2012) (Appendix 2) can potentially play an influencing role on the process of decision-making for implant provision. A previous study indicated that clinicians in SDC always consider these guidance during implant decision-making (Butterworth et al., 2001). Briefly, the guidelines indicate that patients with pre-identified conditions might be given priority with regard to receiving free DIT on the NHS with respect to other patients' individual requirements. Nevertheless, matching these categories does not guarantee that DIT is offered to patients at SDC, as there are other considerations specific to each SDC that need to be weighed up. Restrictions on the provision of DIT at NHS SDCs are needed for two main reasons: the high costs associated with DIT, and the expertise and skills required for DIT provision.

The current guidance published by Alani et al. (2012) is an update of a previous version, and the difference is based on the principles of the growth of implant provision in the UK. The current RCS aims to provide a structure that assists the discussion between health commissioner and provider (Alani et al., 2012). It incorporates flexibility and advises consideration of the regional and local demand for implant provision. Several local guidelines have been developed within individual hospital trusts to accommodate local patients and hospital requirements and resources. However, these are still mainly based on the RCS recommendations.

- ***The regional regulation, Newcastle Dental Hospital***

Local Newcastle Dental Hospital (NDH) implant guidelines are based on the recommendations of the RCS national guidance (see Appendix 2 for RCS and the local guidelines). However, the local resources at the SDC, including funds available at the time of consultation and the clinician team's availability, play additional restrictive roles during patient selection. Briefly, DIT can be only provided to a limited number of patients, where alternative treatment options must have been tried prior to considering implant provision. Acceptance criteria for treatment with DIs at the dental hospital are subject to change according to contact arrangements between commissioners and Newcastle Hospitals NHS Foundation Trust. Additionally, patients should have no oral or general conditions that might complicate the treatment or interfere with the possibility of carrying out the treatment stages at the dental hospital.

2.3.5 Conclusion

Nowadays, patients expect to have an active role in the treatment decision-making process, and recent research encourages clinicians to support and assist patient involvement in a SDM environment (Cronin et al., 2009; Cosyn et al., 2012; Korsch et al., 2015). Patient involvement during treatment decision-making contributes to patient satisfaction and compliance with the clinician's instructions (Rapley, 2008). However, the clinician may have greater influence when a decision is made in a resource-restricted environment, for conditions of no absolute cure and provision of treatment need to be rationed between patients with same condition.

Because there is a lack of previous investigations on the effect of the RCS guidelines on decisions regarding implant provisions in SDC, NHS, it is not clear how clinicians within SDC who are involved in implant provision communicate and implement those guidelines with patients to ensure the establishment of a clinical environment that facilitates SDM. It would be valuable to explore patients' and clinicians' experiences of, and participation in, the decision-making process regarding implant provision at SDC, NHS in the light of the current guidance restrictions.

2.4 Summary and limitations of current literature

This chapter has provided an introduction to DIT, highlighting the rapid expansion and implementation of this technology. Following the introduction, a synthesis of key qualitative studies on patients' experiences of DIT was provided. After that, patient-based outcome studies were summarised. Then, some aspects of the decision-making process in implant dentistry and the dentist–patient relationship were highlighted.

The evidence base for the effectiveness of DIT and patient satisfaction at the end point of restoration provision is rich, establishing that outcomes from DIT in research settings have been good (Feine et al., 2002; Brennan et al., 2010; Moraschini et al., 2015), yet there is little research which considers patient's perspective as they journey through a treatment pathway (Johannsen et al., 2012) and after a period of experiencing implant complications and drawbacks. The widespread take-up of DIT has recently been accompanied by an increasing number of complaints registered by the UK GDC, mainly relating to dissatisfaction with treatment outcomes (RCS, 2014).

Greater understanding of patients' experiences would be invaluable for informing clinicians as to how the various stages of DIT affect patients, and indeed whether this is the same regardless of age and the extent of tooth loss. Clarifying those issues would be advantageous to identify aspects of care which are problematic and could be improved and to enhance effective communication between health providers and patients in future (Gustafsson et al., 2010).

Although there is an increasing body of qualitative research on patients' experiences of DIT, some significant gaps remain. In particular, there is a lack of knowledge about some aspects related to patients' understanding and expectations of DIT, and the decision-making process of DIT at SDC are still not sufficiently understood. In addition, little is known about patients' experiences of the implant placement stage (stage II), including the implant surgical placement and its impact on a patient's perception of the implant treatment (Johannsen et al., 2012; Grey et al., 2013; Wang et al., 2015). Greater understanding of every aspect of the treatment process would be valuable for informing clinicians.

The use of a qualitative study design has proved to be successful in other branches of dental and medical clinical studies: for instance, hip and knee joint replacement (Jacobson et al., 2008; Gustafsson et al., 2010). Exploring the treatment pathway for those patients could improve the clinical outcomes of the treatment in two ways. Firstly, through enhancement of clinicians' understanding of patients' thoughts about and experiences with the treatment. Secondly, through implementing that understanding in the management of patient expectations. Another example of the success of the qualitative approach in dentistry is a study undertaken by Durham et al. (2011), who explored patients' thoughts and experiences through the treatment journey of temporomandibular mandibular joint disorders. The authors defined ways to reduce patient concerns during care and improve clinical service of the condition.

The following chapter outlines the aims and objectives of the current research.

Chapter 3 Aims and objectives

3.1 Aims

This study aims to investigate, describe and understand, patients' and clinicians' thoughts and experiences regarding different aspects of dental implant provision throughout the implant treatment pathway in a UK NHS secondary dental care environment.

In order to achieve this, two interlinked qualitative exploratory studies (Study A and Study B) adopted generic qualitative research methods (Caelli et al., 2003).

3.2 Study A: patients' experiences

- **Objectives**

This study undertook in-depth exploration of patients' experiences of the implant treatment stages through iterative qualitative semi-structured interviews. The qualitative data were contextualised by the patients' demographic information, including their OHRQOL as measured by OHIP-49³ (Slade and Spencer, 1994), which was collected at the time of the interviews.

The objectives of Study A were to:

1. explore patients' thoughts, understanding, motivations, expectations and satisfaction with regard to their implant treatment as they journey through their implant treatment pathway
2. consider how patients perceive the referral and decision-making processes of DIT
3. explore patients' perceptions of IPS, the healing stages and the TIRP
4. understand how patients with different extents of tooth loss experience their implant treatment journey

³ Oral Health Impact Profile-49 (OHIP-49) Slade, G.D. and Spencer, A.J. (1994) 'Development and evaluation of the Oral Health Impact Profile', *Community dental health*, 11(1), pp. 3-11.

5. explore how information on DIs is communicated

As this study involved patients from different stages of treatment, there was a requirement to define the DIT pathway as consisting of three stages, which have been clarified previously (Chapter 1, Section 1.1).

3.3 Study B: clinicians' views

- **Objectives**

Study B explores clinicians' views, thoughts and reflections on patients' experiences of implant treatment. The objectives of Study B arose out of the preliminary analysis of Study A.

The main objectives of Study B were to:

1. understand what clinicians who provide implant treatment think of the patients' experiences of implant treatment (topics from the thematic analysis of Study A)
2. determine how decisions are made in relation to the restricted implant provision in SDC within the NHS
3. identify the measures that could realistically be implemented to improve patients' experience of implant treatment and provide patients with a better understanding of the implant treatment process

Chapter 4 Methodology and methods

This chapter discusses the theoretical perspectives and the methodology underpinning the current research methods, as well as detailing the research methods used in Studies A and B.

4.1 Theoretical/ philosophical perspectives

The construction of and process of research is usually achieved through a series of consecutive stages. It starts broadly, with formulating the research question(s) and its aims and objectives, and then focusses down to determine the research method or approach, with the research approach being informed by the chosen research methodology. In qualitative research in particular, the researcher's philosophical stance may inform the methodology and provide context for its logic and principles (Green and Thorogood, 2009).

4.2 Ontology and epistemology perspectives

In social research, ontology concerns the nature of reality or existence (what constitutes reality and how can we understand the nature of existence). Different stances are continually evolving; however, 'realism' and 'idealism' are the two extremes of ontology. Realism refers to the social world being independent of individuals' thoughts and behaviours, so it is external to the researcher. In contrast, idealism proposes that the social world interacts with the individual's conscious thoughts and depends on them for its existence, and hence reality is shaped by the researcher's description and understanding.

Epistemology, on the other hand, focuses on what constitutes valid knowledge and how we can obtain it in our research. It is concerned with how the researcher understands the world and communicates that understanding and knowledge to others. It is related to '*methods*' of knowing or concluding the truth (Nicholls, 2009a). In social science, there are several epistemological perspectives, but, again, two are dominant. These are 'Positivism' and 'Interpretivism'. Positivists believe that the researcher has no influence on the social world being investigated as knowledge is unique and has a single objective

reality; this is possibly the theoretical stance found to some extent in quantitative research. Most quantitative research operates from a post-positivist perspective, positivism that aims to verify; and post-positivism that aims to disprove. So, a hypothesis will be proved or disproved for generalisability by the study's findings and outcomes.

In contrast, interpretivists (or constructivists) consider that researchers are different in their knowledge, understandings and beliefs, and therefore those beliefs and knowledge will somehow influence the researcher's description (or interpretation) of the social world that is being explored or investigated. Interpretivism is linked to qualitative research in which a hypothesis or concept may be developed or generated, for transferability of the study's findings (Kuper et al., 2008; Britten, 2011).

In reality, researchers may bring to the research a combination of assumptions, beliefs, frameworks and approaches. Because of this, Hammersley (1992) proposed a 'subtle realism' viewpoint which is philosophically somewhere in between idealism and realism. Subtle realism assumes that reality can only be known from a researcher's own perspective of it and therefore recognises that the researcher would possibly influence the research through their subjective experiences and beliefs, which will be inevitably engaged in the interpretation of the findings.

Subtle realism conforms to idealism in that beliefs and knowledge are based on the researcher's assumptions about and interpretation of the circumstance being studied. Also, it shares with realism an admission that there is only one truth, which is independent of the researcher's beliefs, and the description of that truth has different degrees of accuracy depending on its representation. Therefore, the researcher here is not aiming for the absolute truth in describing the reality, but for a full and rich account in presenting, interpreting or describing it. As a result, there could be several harmonious (not conflicting) legitimate explanations of the same circumstances which are influenced by researchers' interpretations and descriptions, but it cannot be claimed that any of them is the absolute truth. Establishing a theoretical perspective was essential during the methodological design of the current research.

Subsequently, I accept that subtle realism and interpretivism are my philosophical perspectives in this research.

4.3 The roles of the researcher in this research

It is argued that, when carrying out qualitative research, it is essential to define the researcher's philosophical and theoretical perspectives openly and clearly in order to be reflexive and transparent while conducting the research and also in the subsequent reporting of the research findings (Cresswell, 2007). As a researcher in this PhD study and with a background in dentistry, it is possible that my subjective clinical experiences and understandings may influence the research methods (i.e. the study data collection, interpretation and writing of the study findings).

In addition, in organised social contexts such as interviews, the setting and the interaction between the interviewer and participants may influence the data collected (Cresswell, 2007). The dynamic of the interviews might also be affected by power imbalances, which could be confounded by the researcher's or participants' profession, knowledge and demographic characteristics (e.g. gender, age, and ethnicity) (Green and Thorogood, 2009) (See Section 4.4.2). In this research, I have no intention to or interest in proving or disproving the success or failure of DIT outcomes. Rather, my main interest is to explore, understand and then describe and interpret how people involved in DIT think about their experiences of the treatment pathway.

4.4 Methodology

Broadly, there are three types of research methodology: quantitative, qualitative, and mixed methods approaches. In contrast to quantitative research, qualitative research aims to interpret data to understand, describe and explain interactions, experiences and perspectives of a phenomenon (Cresswell, 2007). For the aims of this research, the appropriate approach to follow was the qualitative approach, as the objectives were to explore and investigate patients' and clinicians' experiences of different aspects of implant treatment pathways.

Qualitative research, in particular, addresses research questions that are different from those considered by clinical epidemiology. Qualitative research can investigate practitioners' and patients' attitudes, beliefs, and preferences, and the whole question of how evidence is turned into practice. The value of qualitative methods lies in their ability to pursue systematically the kinds of research questions that are not easily answerable by experimental methods.

(Green and Britten, 1998, p. 1230)

4.4.1 The generic qualitative approaches

Qualitative methods is a broad term that involves a variety of theoretical approaches with different epistemological and ontological assumptions (Britten, 2011). A generic qualitative approach is also known as interpretive description (Thorne et al., 1997; Cooper and Endacott, 2007; Caelli et al., 2003), and it is explained by Thorne et al. (1997, p. 1) as a ‘*non-categorical*’ qualitative research approach’ (i.e. it may not fit under the main categories of social research, for example phenomenology or ground theory, and it does not necessitate the researcher to be an expert in the fundamentals of social or psychological sciences). Rather, it is an exploratory type of research, which focuses on understanding participants’ experiences, events or social phenomena. This has led to an increase in the use of this approach in clinical and health research. As described by (Merriam, 1998), the generic qualitative approach intends to explore and understand a process and/or the viewpoints of the people involved. As a researcher with a medical and clinical background, I was comfortable with the applicability of the generic approach to fulfil my research objectives and questions.

4.4.2 Qualitative interviewing

Data gathering in qualitative research can be undertaken using several methods. These may be qualitative interviews, observations and focus groups. Qualitative interviewing has been widely used in qualitative health research and is defined by Rapley (in Seale et al., 2004, p. 16) as:

“[A] social encounter where speakers collaborate in producing retrospective (and prospective) accounts or versions of their past (or future) actions, experiences, feelings and thoughts”.

For the purpose of this qualitative research, qualitative interviewing was identified as the appropriate technique to use as a method of data collection. This is because of several reasons: firstly, it is believed that qualitative interviews can provide ‘deep’ insights and understandings of participants’ views, thoughts and opinions, which are needed to fulfil this research’s aims and objectives. Secondly, by employing qualitative interviews, study participants are given the opportunity to disclose their experiences without being guided by the researcher’s views or pre-assumptions. Lastly, interviews

are also particularly appropriate when a possibility of discussing sensitive topics exists: for example, the experiences of tooth loss.

After choosing interviewing as a method of data collection, consideration was given first to the type and style of interview to be used, and second, the factors that might influence the outcomes of the interviews. In-depth semi-structured qualitative interviews were employed for this research. These were conducted both face-to-face and via telephone.

The forthcoming sections give an overview of the interview techniques and the factors that the researcher considered when conducting interviews.

- ***In-depth semi-structured interview; face-to-face vs telephone interviews***

In-depth semi-structured interviews are based on a topic guide rather than on strict lists of defined questions (the topic guide includes the main topics related to the research questions and can provide a productive discussion, leading to fulfilment of the research objectives). This approach allows flexibility in exploring the research enquiries and it also allows the discussion of new topics that had not previously been anticipated (Rapley, 2012).

In addition to traditional face-to-face interviews, the use of telephone interviews as an alternative has become an increasingly attractive option amongst qualitative researchers. However, there are some concerns about the effectiveness of telephone interviewing compared to face-to-face interviewing. Some researchers have highlighted that data from telephone interviews may lack depth, in contrast with data from face-to-face interviews; this is because of the lack of visual and interpersonal interactions during the interviews (Gillham, 2005; Irvine, 2011).

Therefore, several studies have compared the use of face-to-face and telephone interviews in qualitative studies in terms of interactional differences, data quality and data findings. Sturges and Hanrahan (2004) found that telephone interviews can be as productive as one-to-one interviews. Likewise, other researchers have argued that telephone interviews produced the same information as face-to-face interviews when compared during data analysis (Block and Erskine, 2012). The main advantages of telephone interviews are cost-effectiveness, time-effectiveness and their suitability

when interviews involve discussing sensitive topics (Block and Erskine, 2012). In addition, when sampling following a purposive technique, telephone interviews facilitate exposure to a wider group of potential participants. A summary comparison of face-to-face and telephone interviews is adapted from (Sturges and Hanrahan, 2004; Irvine, 2011; Irvine et al., 2013) and is presented in Table 4.1.

Several recommendations exist in the literature to reduce the discrepancies between data from face-to-face and telephone interviews and to ensure high-quality data from telephone interviews (Gillham, 2005; Drabble et al., 2015). These include establishing a rapport and good communication with participants; validating the responsiveness to the interview questions through active listening and clarification rehearsal; and displaying regard, appreciation and reassurance to the interviewees for their contribution before the interviews to encourage the discussion. In-depth semi-structured face-to-face and telephone interviews were both used for the data collection in Study A ('The patients' experience').

| | Telephone interview | Face-to-face interview |
|---------------|---|---|
| Advantages | <ul style="list-style-type: none"> • Time and cost effective • Suitable for sensitive and emotional topics • Interviewer safety is not an issue • Suitable for purposive sampling as a wider pool of participants can be recruited • Reported high response rate | <ul style="list-style-type: none"> • Better communication between interviewer and interviewee to achieve rapport • Suitable for use of visual aids • Enable effective support surrounding emotional topics |
| Disadvantages | <ul style="list-style-type: none"> • Interviewee/interviewer interactions may be less effective • Difficulty in controlling patients surrounding environment • Tend to be shorter in duration which may impact on content | <ul style="list-style-type: none"> • Higher cost |

Table 4.1. Comparison between face-to-face and telephone interview

In Study B ('The clinicians' view') only face-to-face semi-structured qualitative interviews were used. This approach allowed the researcher to involve particular topics and questions related to themes emerging from Study A, thereby allowing clinicians to reflect on the findings (themes) from Study A. Additionally, it was possible to explore with clinicians the positive and the negative aspects of patients' treatment pathways from Study A and to discuss how a patient's journey may be improved in the future.

With respect to Studies A and B, consideration was given to the interview location and context, language and social differences, power domination during the interviews, and style and sensitivity. The importance of these factors in this research will be detailed in the following sections.

- ***Location and context of interviews***

The location of the interviews provides the environmental context, and this may influence the interview account, content and quality (Sturges and Hanrahan, 2004). Different places have specific social and cultural characteristics. Therefore, the interview location should ensure the comfort, privacy and safety of both the interviewer and the interviewee. In addition, it should reduce the possibility of distraction and interruption during the interviews (Green and Thorogood, 2009).

To arrange the most appropriate location and environment for the interviews, different considerations were given for the patients' and clinicians' interviews. The participants in Study A were encouraged to choose between their own home or The Centre of Oral Health Research facility (COHR) within the Newcastle School of Dental Science. Participants' transport costs were provided for the day of the interview if the patients needed to travel. Furthermore, telephone interviews were always offered as an option for patients who were not willing to come to the COHR or to have interviews at home. When a telephone interview was chosen, arrangements were made for the interviewer to use a room within the COHR facility. This room has the necessary equipment (for face-to-face and telephone interviews) and is tailored for qualitative interviewing.

In Study B, the clinicians were asked to choose the location of their interview within the hospital building (their office or a seminar room). This was to eliminate any delay in arranging a time and also for the convenience of the clinicians, who are normally engaged in the academic and clinical environment. Telephone interview was not a chosen option in Study B.

- ***Language and cross-cultural differences***

When conducting qualitative research, language has essential and multiple roles. It is an integral part of the qualitative approach through which the researcher explores people's experiences, events or processes (Hennink, 2008). In qualitative research, Green and Thorogood (2009) argue, the research language is central to the research method and data interpretation. It is the means of communicating, understanding and interacting between researchers and participants. At the same time, the data, which is regarded as a product of that interaction, is spoken language that will be transcribed and interpreted (Green and Thorogood, 2009). All of these require a good understanding of the research language and the social context during the interviews in order to eliminate the need for translation.

English is my second language; however, I have been studying in the UK since 2008 and there was no perceived language barrier during the stages of the research and no need for translation. In addition, to ensure robustness of data gathering and analysis and avoid misinterpretation of the transcripts, the thematic analysis and report writing for this research were continually monitored and discussed through continuous formal presentation between the researcher and the study supervisors. Using multiple observers is considered as analyst triangulation. The goals were to understand multiple ways of seeing the data and developing the iterative interviews topics and analysis (Patton, 1999).

- ***Power relation during interviews***

Interviews are social interactions shaped by the social and cultural characteristics of the people involved. In addition, data are jointly constructed by both parties in the interviews and affected by the dynamics of that interaction (Kvale, 2005). In general, the interviewer may have a dominant role in qualitative interviewing in terms of defining the interviews topics, leading and controlling the discussion, and deciding when to terminate the interview conversation. On the other hand, the interviewee, as a participant in the study, also has a significant role throughout the interview. They have their own areas of control, not only in answering the questions, but also in talking about different topics that are not necessarily related to the research interest. They can also end the interview at any time.

Therefore, to establish a relaxed environment for the interviews, rapport was always established before the interview started. As a researcher, I did this by introducing myself, welcoming the participants and accompanying them to the interview room. I then opened up an informal discussion to establish the patient's comfort (for example, a chat about their journey to the hospital or the weather, ensuring they feel comfortable in their chair, offering water or a hot drink). Confidentiality was carefully considered and ensured to reduce the power imbalance between me as a researcher and the patient. The independence of the research from their clinical care was made clear to the participants. This was to allow the participants to become comfortable in the interview and to express their viewpoint openly. It was made apparent to them that their account will not have any effect on their future relationship with their clinicians or on their treatment outcome. After that I explained the research topic again (the first time was at the recruitment stage, which will be discussed later), and clarified to the interviewee that I am interested in their unique account and experience, and that this is the focus of the research.

Although there are several types of qualitative interviews (in term of dominance during interviews), I chose to be neutral throughout the interviews or used the active interview technique with participants who were less willing to disclose their accounts. Active interviews were introduced by Bellah and co-workers in 1985 (Kvale, 2005). The method invests the interviewee with a substantial range of interpretive methods and it involves activating, provoking and stimulating the discussion to address the research questions. Active interviews also allow some sort of balance or symmetrical interaction but they do not seek agreement (or disagreement) on the topic between the interviewer and the interviewee, which potentially produces rich data (Holstein and Gubrium, 1995).

- ***Interviewing clinicians***

All of the clinicians who participated in the interviews are clinicians at NDH, where this study was conducted. With the majority having academic roles, I knew most of them before I interviewed them. They had already been informed about the research during the patient recruitment stages, and we had had a number of previous conversation about the study, including discussions in which the topic guide for Study A was constructed (this will be discussed in Section 4.6.1). Therefore, I considered whether there were any implications from my previous interaction, with the clinicians, and also considered

potential power relationships during interviews. From the beginning of the research I disclosed my status as a researcher (and clinician in a different country). In this context I felt I am operating within a different role in the interview process, and so to get the most from those interviews I began by providing clinicians with an overview of the study structure, aims and objectives of Studies A and B, and I also illustrated the findings of Study A in themes (as shown in Figure 5.1). Then I introduced the clinicians to the aims of Study B (i.e. the clinicians' interviews). The discussion was guided by a semi-structured topic guide based on the findings from Study A.

On reflection, I felt my previous interaction with the clinicians helped me to be more comfortable at the time of the interviews. Also, because the clinicians are at higher academic and clinical positions than me, I felt that introducing myself as a researcher (and not a clinician) provided me with the confidence that I would not be driven into clinical discussion or assessed on my clinical knowledge. However, while I felt that the dialogue during the interview was informative and interactive when clinicians established the discussion in their subject of interest, I always attempted to regain the balance of the interview by bringing the discussion back onto a topic related to the topic guide.

- ***The researcher's influence on data***

During the study design, considerations were given to my role as the only field researcher and interviewer, and also my potential influence or impact upon the data collection and interpretation. Communicating with patients who are experiencing tooth loss and replacement is one of my main interests as a dentist. Being naïve regarding the discipline of qualitative research, it was essential to follow a number of stages of development and training and acquire the basic skills, in order to reduce my influence and impact on the data gathering and interpretation.

My stages of development and training began before the commencement of the patient recruitment and sampling. I carried out the first stage of literature reading in relation to qualitative research methods in dentistry and sociology. This was followed by attending several courses on qualitative research interviewing and analysis with the Health Experience Research group at the University of Oxford and on qualitative methods research at Newcastle University, Institute of Health and Society.

Next, I carried out pilot interviews with two patients who are on the implant treatment pathway. I transcribed these, and the transcripts from those interviews were used 1) to enrich the interview topic guide; 2) to identify ways to improve the future interviews; 3) to address any limitations before the beginning of the real interviews; and 4) to carry out preliminary thematic analysis for training. The pilot interviews will be detailed in Section 4.6.1.

Whether the interview narratives and patients' interests might be influenced by the role of the researcher (for example, whether they indicate that they are a dentist or a researcher) has been also debated. During my patient interviews I introduced myself as a researcher and participants were informed that this research was completely separate from their clinical care. This was to reduce the possibility of any questions from them in relation to clinical care or the implant itself. I also tried to apply active listening techniques, and I waited for several seconds after the patients had finished talking to keep interruption to a minimum and to encourage them to illustrate their points more (Rapley, 2012).

On reflection, for some participants who were at early assessment stages, there were some attempts to ask for clarification regarding doubts about the clinical effectiveness, the success of implants as a type of tooth replacement, and the chance of obtaining DIT. When faced with these situations, I again reiterated my role as a researcher who has no link to the clinical team or the environment and assured patients that all doubts could be openly discussed with the clinical team in their next clinical appointment.

4.4.3 Sampling in qualitative research

After establishing the interview approach and techniques, my focus turned to how to establish a suitable sampling strategy. A productive and efficient sampling strategy is essential for the robustness of qualitative studies. With probability sampling, the researcher seeks to utilise some form of random selection and use sampling that is statistically representative, which ensures that every element in the defined population has an equal probability of being chosen in the study sample. The aim here is to produce a statistically representative sample from the total population, and therefore generalisability of the study's findings can be assumed.

In contrast, sampling in qualitative studies is non-probable and is undertaken with the aim of achieving the objectives of the research by including subjects that are relevant to the main questions in the research (Mays and Pope, 1995; Cooper and Endacott, 2007). Robust qualitative sampling demonstrates the diversity of study participants so as to produce data of sufficient depth and richness.

In this study, because of the heterogeneity of the potential populations (in terms of the extent of tooth loss, age of the potential participants, and types of implant restoration) purposive sampling was used to facilitate the selection of the participants depending on the main study questions and linked to the thematic analysis and theme saturation. (Pope and Mays, 2007; Green and Thorogood, 2009). Sample size was also considered in this study. It is advised in the literature that between 6 and 10 interviews may be sufficient to reach data saturation when the research question is focused and the participants are less varied in their characteristics (Guest et al., 2006). A wider topic, which aims to inductively explore participants' accounts, may need a larger sample size to generate rich data. Identifying, accessing and recruiting the research participants for this study was completed in four key stages, as identified by Rubin and Rubin (1995) these are: identifying suitable interviewees; conducting the interviews; testing emergent themes with subsequent participants; and again identifying the next interviewees. Figure 4.1 is adapted from different sources to illustrate the purposive sampling strategies used in Study A (Braun and Clarke, 2006; Pope et al., 2007; Nicholls, 2009b; Rapley, 2011).

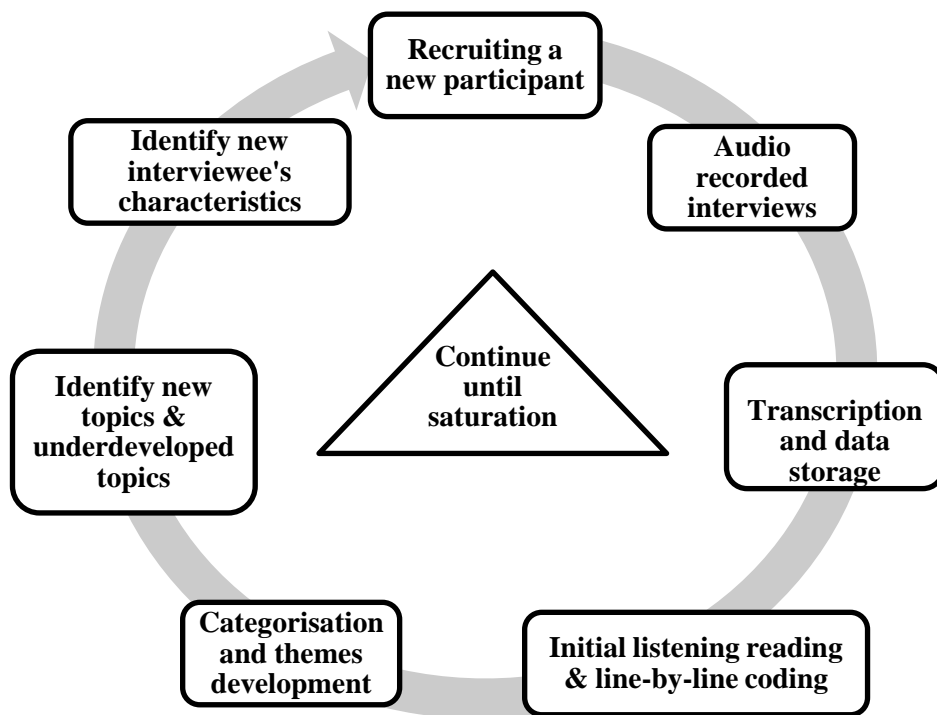


Figure 4.1. Stages of purposive sampling

4.4.4 Qualitative analysis

Qualitative Data Analysis (QDA) comprises a sequence of stages whereby researchers transform the qualitative data that have been gathered (mainly textual data) into a report of the findings. This involves explaining and interpreting the data to provide answers to the research questions (Taylor and Gibbs, 2010). The way in which the QDA is conducted depends on the type of methods used and the aims of the research (Guest et al., 2012). Analysis of the data from this qualitative study has been undertaken following the principles of thematic analysis (Braun and Clarke, 2006). This is commonly used in health and social research and it is known to be flexible and yet productive in answering qualitative research questions, particularly in relation to health care studies.

Thematic analysis is a method of identifying and reporting trends (themes) within data. A theme is a text, or chunk from the data itself, which captures an important meaning or pattern in relation to the research questions. A theme, often called a code, consists of several subthemes (sub codes) that are related to the main topic of that theme. Themes are used to facilitate the reporting of the findings and for interpreting various aspects of the research questions (Braun and Clarke, 2006).

The analysis process is not a consecutive process of easily moving from one stage to another. It is more of an iterative and circular process, wherein analysis begins at the data collection stage and progresses back and forth as required to achieve the development of the data over time (Ely et al., 1997). There are two types of analysis: inductive and deductive. Deductive analysis is hypothesis-driven and is guided by previous researchers' ideas or frameworks. In contrast, inductive analysis aims to aid an understanding of meaning in qualitative data through the development of themes or codes from the main data itself.

The stages of thematic analysis as described by several authors in the literature were considered in this research (Braun and Clarke, 2006; Pope et al., 2007; Nicholls, 2009b; Rapley, 2011), and are adapted and presented in Table 4.2.

4.4.5 Measures to ensure rigour within qualitative research

The appraisal and assessment of qualitative research is a topic of ongoing debate. Unlike quantitative research where sensitivity, reliability, bias and validity can be measured and controlled, the quality of qualitative research depends mostly on transparency of the research conduct and reports. Several tools and criteria have been developed to help in optimising, criticising and improving the quality of qualitative research (Pope et al., 2000; Dixon-Woods et al., 2004; Kuper et al., 2008; Green and Thorogood, 2009).

All of these quality criteria share the same principles, which are primarily: 1) clarity of the research questions; 2) suitability of qualitative methods (in relation to the main questions); 3) appropriateness of the sampling technique in addressing the research questions; and 4) transparency of reporting the findings. Therefore, qualitative researchers must retell the narrative of their research approaches in detail to enable the readers to make judgements about whether the study's findings are applicable to their own interests or situations. Due to their simplicity and clarity, the criteria developed by Dixon-Woods et al. (2004) were continuously used to monitor the quality of the current study.

| Stages of Study A data development | Approach to fulfilling thematic data analysis stages |
|--|---|
| 1. Generation of text from raw data (audio-record) | <ul style="list-style-type: none"> • Interviews for Studies A and B completed • Data were audio-recorded and strictly transcribed • Data were stored in N vivo software |
| 2. Familiarising myself with the data content | <ul style="list-style-type: none"> • Initial listening to the records • This was followed by reading the transcripts several times in addition to writing notes about possible themes from the first stage |
| 3. Generating initial codes | <ul style="list-style-type: none"> • Line-by-line inductive coding approach • Preliminary coding was refined and debated by discussion with academic supervisors |
| 4. Searching for themes | <ul style="list-style-type: none"> • Related sub-codes were integrated and combined to develop topics and main themes |
| 5. Reviewing and refining themes | <ul style="list-style-type: none"> • Discussion with supervisors for further analysis • Re-testing themes with new interviews for transferability • Identifying new emergent themes for further investigation in next interviews |
| 6. Defining and re-naming themes | <ul style="list-style-type: none"> • These were carried out in a continuous iterative manner until theme saturation occurred and no further interviews were required |
| 7. Producing the report | <ul style="list-style-type: none"> • At this stage, themes from the data were discussed, linked to the current literature and facilitated by interviewee quotations |

Table 4.2. Stages of qualitative data analysis in Studies A and B

In keeping with the principles of rigorous qualitative research, during the interview stage the data collection was responsive to the study context and analysis, and it was anticipated that in some cases fewer interviews would be required and conducted, and, in others, additional data might be collected in response to the emerging themes. Therefore, assessment of the data set against the emergent themes was continuously undertaken throughout the iterative analysis. This is to eliminate the possibility of neglecting important information and to avoid missing key events or issues related to the research questions. The process continued until new interviews failed to produce any new themes. Having this flexibility in identifying and focusing on issues that the

analysis suggested are key to provide sufficient and in-depth understandings of the patients' DIT journeys. Continuous assessment of the research quality was done to ensure the validity of the data for answering the main research question. A summary of this is shown in Table 4.3.

| Stage of assessment | Details of assessment of the current study |
|---|--|
| Research proposal: identifying the research questions | <ol style="list-style-type: none"> 1. Research questions cover the topic in its broad position without making predictions or assumptions about the study's outcomes 2. No attempts were made to form a hypothesis 3. This study investigates patients' and clinicians' experiences of implant treatment and seeks to answer 'what', 'how' and 'why' questions regarding different aspects of their treatment and experiences |
| During the study: design & methodology formulation | <ol style="list-style-type: none"> 1. The researcher's theoretical perspectives were identified and detailed 2. Reflexivity, which is the influence that the researcher may bring to the research questions and interpretation of the results, is determined and acknowledged in the methods section 3. The ethical issues were monitored and these are reported on accurately in the methods section |
| Reflexivity and critical self- reflection during recruitment, sampling, interviews and data analysis | <ol style="list-style-type: none"> 1. The sampling, recruitment, interviews and thematic analysis were iteratively conducted; the sampling followed non-probabilistic purposive criteria. 2. The data analysis was iterative to ensure continuous monitoring of the new topics generated by the participants. Also it was continuously assessed, debated and refined through discussion between the researchers' academic supervisors to make sure that no category has been undermined, misinterpreted or neglected 3. The data gathering was done in harmony with the method of qualitative research being used 4. Semi-structured interviews following a topic guide were used to answer the primary questions of the research 5. Secondary questions were added iteratively to cover all of the aspects of the primary research questions and emergent themes |
| Analyst triangulation | <ol style="list-style-type: none"> 1. The researcher and supervisor continually assess the analysis and agreement on themes occurring after the discussion |
| Relevance | <ol style="list-style-type: none"> 1. The relevance of the study can be assessed by determining whether the study has increased the knowledge about specific phenomena and, if not, whether it increases the understanding of the research question |

Table 4.3. Stages of quality assessment of this research data

4.5 Ethical considerations

Following approval of the proposal for Studies A and B (Appendix 3) from the local university institute, ethical opinion was required from the National Research Ethics Service (NRES) in the UK. NRES acts as a central function of the UK health research committee, which is committed to supporting ethical research in the NHS. It protects the rights, and ensures the safety, dignity and well-being of research participants. The study was granted approval from NRES Committee London – Stanmore (REC Reference number 13/LO/0765) (Appendix 4) and later study amendments were sought, which were included in the proposal for Study B (Appendix 5).

There are some ethical issues that needed to be considered before, during and after the research. These are discussed in the following sections.

4.5.1 Patients' consent

The clinicians involved in the patients' treatment acted as gatekeepers for the patient recruitment in this study. The patients were first approached for participation by their lead clinician during a routine clinical visit. They were given initial verbal information about the study and, in writing, a form of 'introductory letter' to the study, and were asked to provide their written consent to contact to allow the researcher to contact them directly.

Enabling 'consent to contact' meant that potential interviewees at this stage had not consented to take part in the study, but only to be contacted by the researcher to be told more about the study and then to be recruited. During the first physical contact between the researcher and patients (in person during a subsequent clinic), the researcher firstly introduce herself and in-depth verbal information was given to the patients regarding the study's aims and objectives. If the patient indicated their interest in participating, a detailed study information sheet, OHIP-49 questionnaire and consent to participate were provided at the time by hand, together with pre-paid postal envelope. A cooling-off period of one to two weeks was ensured, then the researcher contacted the potential participant by phone to arrange the interview type, time and location, if the participant was still interested. Participants were asked to bring their response to the OHIP-49 and provide their informed consent immediately before the interview. When a telephone

interview was chosen by a patient, initial verbal consent was taken at the time of the interview and then the patients were asked to send the consent and the questionnaire by post.

4.5.2 Minimising emotional distress

For some patients, recounting the experience of tooth loss may be sensitive, embarrassing or upsetting. The interviews were conducted by the author, who is a PhD student and a qualified dentist, and who has received training in interpersonal skills at Benghazi University as part of a postgraduate preparation course in 2007. Additional training in qualitative research methods and interviewing techniques was undertaken at Oxford University (May 2013) and Newcastle University (June 2013). Those communication skills include establishing rapport with every patient at the beginning of the interviews, good listening without interruption, appropriate reassurance and avoiding false reassurance.

If emotional distress occurred, I paused the recording and supported the interviewee by showing understanding and sympathy and offering water. To restart the interview I ensured that the patient was happy to continue and the terms of the informed consent were still valid. After finalising the interview I aimed to end the interview on a positive note and make sure the interviewee was comfortable to leave.

4.5.3 Confidentiality and anonymity of patients' identity

All of the study participants were under the care of clinicians at NDH, some of whom (the research supervisors) are associated with the study itself. The patients were advised that what they told the researcher would remain confidential and would not be shared beyond the research team, and that within the research team the data would always be anonymised to ensure confidentiality. In addition, interviewees were informed that scientific publication of findings from the study might involve data from the interviews, but those would be also always anonymised.

4.5.4 Data protection and future data management

The patient data are held securely on the university server and are password protected. The data are only accessible to the main researcher and to the supervisory team when required. The interviews transcripts have been checked and anonymised. As well as the interviewees' names, all other potentially identifying information, such as the locations and dates of their treatment, has been removed. It was stated in the ethical approval that the data would be held on the university server for five years and that no access would be granted except to the researcher and the study supervisors.

4.6 Methods

This research comprises two related and pertinent qualitative studies; Study A and Study B. Study A, ‘the patients experience’, involved patients at any point in their implant treatment. Study B, ‘clinicians’ views’, included clinicians who are engaged in the process of DIT and decision-making at NHS UK, NDH (which is part of a secondary care trust). Both studies are generic qualitative studies and both used qualitative interviewing to collect the data. The Study A and Study B proposals are in Appendix 3, and the stages of the study development are presented in Appendix 6.

The following subsections detail the method stages under two categories: Study A (the patients’ study); and study B (the clinicians’ study).

4.6.1 Study A: patients’ study methods

After establishing the research objectives and methodology, Study A was developed through seven related and overlapping stages, which will be detailed in the forthcoming sections. These are:

1) Generation of the Study A topic guide; 2) conducting the pilot patients’ interviews; 3) identification of the time points for recruitment; 4) designing the sampling and recruitment strategies; 5) recruiting the Study A participants; 6) conducting the patient interviews; 7) carrying out the thematic analysis of Study A.

- **Generation of topic guide**

A patient’s interview topic guide (see Appendix 7) was designed to allow flexibilities in its use according to each patient’s stage of treatment. It was initially informed by the literature review. It was then further discussed and developed following a 45-minute open group discussion (n=7: 3 female, 4 male). This group discussion included four main implant clinicians, one experienced qualitative researcher and three dental PhD researchers at Newcastle Dental School. The outcomes of the group discussion were also used to clarify the time points for the recruitment (which will be discussed in the following section). The interview topic guide used open-ended questions and was flexible in order to further stimulate the discussion.

In general, the Study A topic guide aimed to collect all of the relevant information concerning the patient's journey through the implant treatment pathway. However, it was developed throughout the research period and was continuously informed by the findings from the thematic analysis. This was undertaken in order to incorporate new emergent topics, which were then explored in the subsequent interviews to progress towards data saturation. The initial main topics, selected for inclusion in the topic guide for Study A, are:

1. Patients' understandings of implant treatment
2. Patients' expectations of implants
3. Experience of implant referral process
4. Implant decision-making process
5. The experience of implant surgery
6. Experience of implant restoration

- ***Pilot patients' interviews***

Two interviews, lasting 20 and 25 minutes, were conducted at NDH. One patient was at the pre-implant stage and the other was at the post-implant stage and under consideration for retreatment. These patients were chosen randomly from the list of implant patients in the department of prosthodontics. The topic guide for Study A was used to facilitate the interviews. The purpose of those pilot interviews was to give the researcher an insight into the suitability of the topic guide and how it could be used. Also, they were used to test, develop and improve the topic guide content for better patient understandings. In addition, the pilot interviews were used to give the researcher an insight into the reality of the interviews and to test the researcher's interview skills. These interviews gave an opportunity to the researcher to gain access to real audio-records, which were transcribed by the researcher and then utilised to practise thematic analysis on Word documents (by hand) and N vivo, as part of the N vivo training process.

Those interviews were not incorporated into the main data set; however, they contributed to improving the interview topic guide, particularly in relation to 1) provision of implant information, and 2) topics related to patients' understanding of the implant treatment pathway and the referral process

- **Identifying time points of patients' recruitments**

Implant clinicians suggested that potential participants should be identified in accordance to predefined DIT stages as the following: Group 1 included participants at the pre-implant stage (either before or after restorative consultation visits); Group 2 included participants at the placement stage (after implant surgery or during restorative treatment stages, from implant clinics); Group 3 included participants at the post-implant stage (after they have received their implant restoration; this group could be recruited immediately after their treatment was finalised, or weeks, months or years later). These are shown in Figure 4.2.

However, the time frame available for the study did not allow the researcher to follow a single cohort of patients throughout their treatment path. Rather, evidence was collected from samples of patients at different stages of their treatment. That meant that some patients might be included more than once – and possibly up to three times.

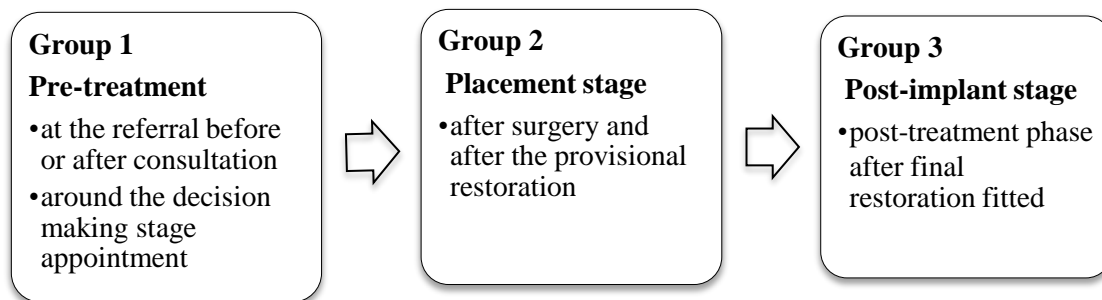


Figure 4.2. Time points of participants' recruitment

- **Sampling and recruitment strategies**

Selection of the patients for Study A followed non-probability purposive samplings. The study inclusion criteria and the patients' variables are illustrated in Table 4.4.

In the current study, potential subjects were identified in two ways. The first route was through the implant patient database of NDH, and the second route was via the consultants' treatment and diagnostic clinics. As described in Section 4.5.1, after identification of potential participants, they were firstly approached by their clinicians then provided with a study introductory letter and consent to contact. In a second

contact, information sheets relating to the study and an OHIP-49 questionnaire were provided by the researcher. Patients were allowed a cooling-off period of one to two weeks before they were contacted to arrange the interview. The recruitment strategies are illustrated in Figure 4.3.

| Variables | | Rational |
|----------------------------|---|---|
| Gender | Male and female | To explore both genders' experiences and to include all ranges of thoughts |
| Age | Adults above 18 | Implant treatment is usually only indicated for people over 18 years old |
| Dental condition | Partially dentate and edentulous patients | To explore whether patients' experience is affected by the extent of tooth loss |
| Treatment stage | Any time in the treatment pathway from the referral point up to the maintenance point | To explore how different treatment stages might influence individuals' thinking and experience |
| Capacity to consent | Mental health | Able to give or refuse informed consent Able to engage in spoken interview and discussion and give details of experience |
| Languages | English language | Study carried out in English; translation might be inappropriate for this type of research |
| Location | Newcastle Dental Hospital | This is where the study was conducted; it is a secondary dental care centre, NHS |

Table 4.4. Study A, purposive sampling: 'Patients' variables'

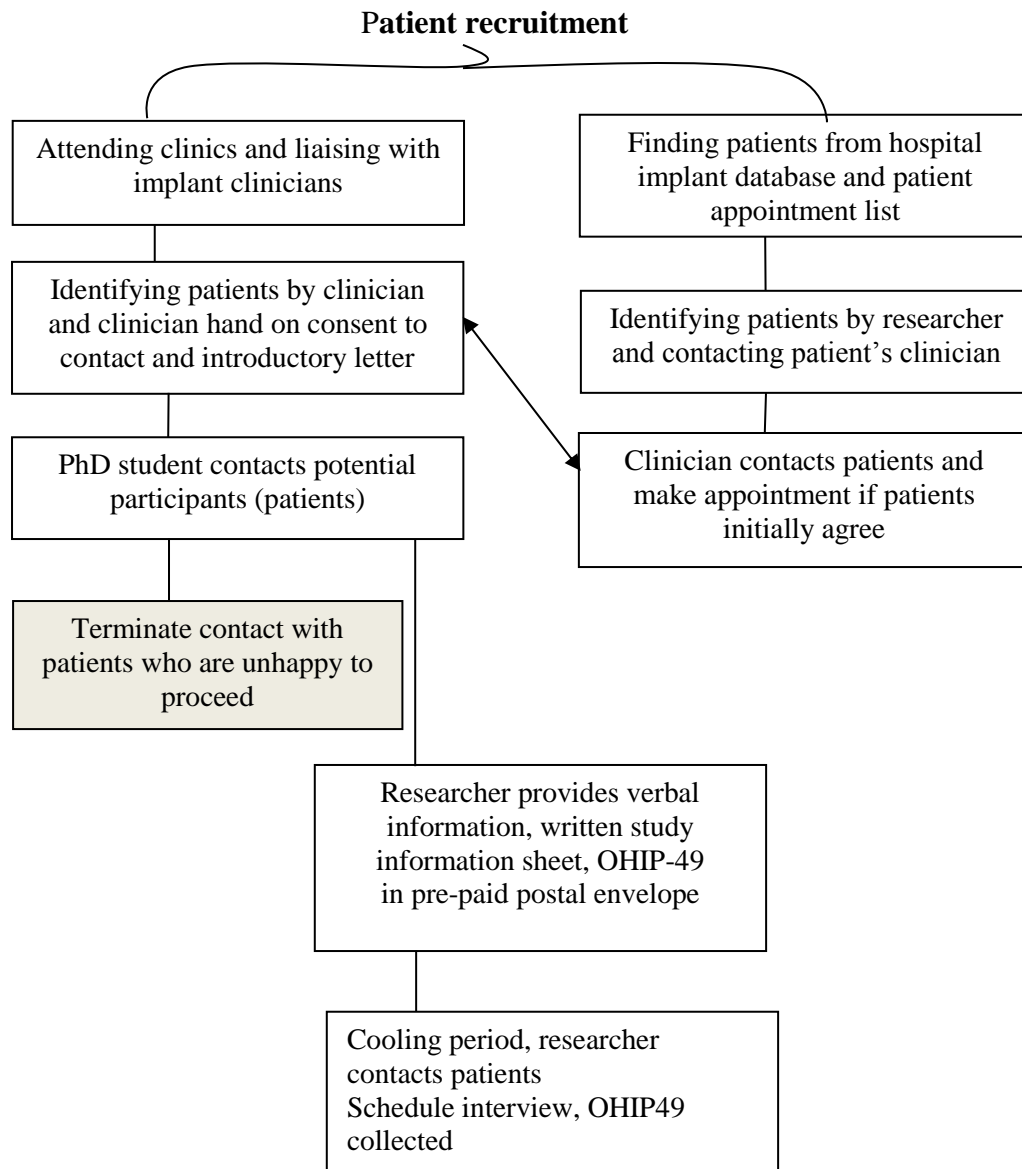


Figure 4.3. Patient recruitment strategies

- **Study A patients interviews**

As previously clarified, the interviews for Study A consisted of two types: face-to-face and telephone interviews. Both types of interviews were directed by the same researcher and used the same patients' introductory letter (Appendix 8), information sheet (Appendix 9) and interview topic guide (Appendix 7). The interview topic guide was modified iteratively throughout the study and after every interview, in accordance with

the emergent themes. Telephone interviews were used in addition to face-to-face interviews in order to overcome some of the recruitment difficulties and interview delays experienced with face-to-face interviews. A higher response rate was observed (in relation to the time and speed of the interviews) when telephone interviews were given as an option to potential interviewees. This may be due to several reasons. Some of the patients had a time preference, which was mainly outside of working hours, and some patients lived some distance from the research facility.

Demographic information, including name, age, occupation, nationality, and also extent of tooth loss and stage of implant treatment, of Study A participants were inspected and reported from the patients' clinical records during recruitment and confirmed verbally and recorded in the research diary before the interviews. These were to be used as descriptive information for the interviewees during analysis, quotations and data interpretation when required. Additionally, patients were also asked to complete an OHIP-49 questionnaire before the interviews and bring it on the day of the interviews or post it (in cases of telephone interviews). The aim of using the OHIP-49 was to identify the current status of the impact of oral health on quality of life for the patient as a baseline measure. It was anticipated that this additional data may help to contextualise and elucidate the emergent themes and trends, and how these may differ between individuals. It was dealt with as one of the demographic characteristics of the participants during the data analysis. The interviews were audio-recorded and transcribed verbatim with the use of strict transcription (which is offered by UK Transcription Ltd and involves an exact transcription of the interview content).

To maximise the quality of the telephone interview data, the following strategies were adopted:

1. The recruitment was undertaken after initial face-to-face contact with the interviewees at their primary consultant clinic, where I introduced myself as a researcher and a rapport was established with the patients as preparation for telephone interview if chosen. Also, the primary aims of the study were clarified through a brief five-minute discussion.
2. Patients are supplied with an introductory letter and research information sheet in advance, which gave them in-depth information about the study's aims and objectives. Their consent for the interview was then sought and, if the patient agreed

to participate, they were asked to select the most suitable time for them for the interview.

3. The interview topic guide was developed iteratively after each interview regardless of the interview type and I made sure that I covered all of the essential information in each interview.
4. I followed the active listening technique during the interviews and allowed the interviewee to speak without interruption unless clarification was required.
5. I communicated with the patient during the interview by the use of ‘*receipt token*’ (Irvine et al., 2013) to indicate to the patients that what they were saying was understood and clear. On the other hand, if there were any misunderstandings or deviation from the study topic, this was received first and followed by clarification and comprehension of the primary question.

- ***Analysis of Study A data***

The stages of thematic analysis illustrated in Table 4.2 were followed and inductive analysis was adopted during data interpretation until data saturation was achieved. I began by collecting notes from clinic observations during patients’ visits to enrich my understanding of the DIT pathway at NDH. I listened carefully, several times, to each interview record, and read and re-read the transcripts looking for key words and trends to familiarise myself with the data content. During my analysis, I began by approaching the data by the traditional means of reading, hand-highlighting and extracting codes, and this was followed by the use of special qualitative analysis software (N vivo). N vivo is ‘specialised computer assisted qualitative data analysis software’ (Pope et al., 2000), which allows easy sorting, structuring, analysing and storing of large amounts of textual and audio-recorded data. It also facilitates the management of the resulting coding: interpretations and evaluations (Pope et al., 2000). I attended an N vivo software course at Newcastle University in 2013, which provided me with sufficient skills to use this software. Measures to ensure the rigour of the research process were followed, as described in Section 4.4.5.

There were certain topics which were raised from the interviews during the iterative data analysis. Those topics were required to be incorporated in subsequent interview topic guides during the progress of the research, and therefore influenced the purposive

sampling as attempts were made by the researcher to recruit participants experienced in those circumstances in order to explore it further. For example, towards the end of the data collection I actively sought additional younger participants who had experienced less favourable DIT outcomes, implant failure and/or had hypodontia, these topics are shown in Table 4.5.

| Raised topics | | The rational of purposive sampling |
|--|---|--|
| Issues related to maintenance experiences | Patients who are experiencing complications and require immediate maintenance of implant restorations | To explore patients' thoughts and satisfaction regarding implant restoration at this stage |
| Implant failure | Patients who are experiencing failure of implant restoration | To explore how patients feel about losing their implant restoration and going back to other replacements |
| Patients with hypodontia | Single or multiple | To explore whether the experience of this group is different from others |

Table 4.5. Topics were required to be incorporated into the topic guide

4.6.2 Study B: clinicians' study methods

Study B began as Study A came to an end. Semi-structured interviews were used to explore clinicians' thoughts and reflections on the findings of Study A.

After establishing the aim of Study B, it was developed through several stages, beginning with generation of the topic guide. The topic guide for Study B (Appendix 10) was developed in accordance with the findings from Study A. The following main initial topics were considered:

- The length of implant referral
- The ambiguity of implant selection in the NHS
- The decision-making process with regard to implant treatment
- Why patients' expectations are so high
- Patients' understanding of implant treatment

Then recruitment for Study B started, with the main research supervisor contacting the clinicians engaged in the implant treatment process at NDH through the intra university email. An introductory letter and study information sheet (Appendix 11) were sent to the clinicians' hospital offices. Interview appointments were arranged with the participants; they were asked to indicate their time and location preference for the interview (they were asked to choose between the COHR facility and their hospital office). They were informed that only one face-to-face semi-structured interview would be carried out with each clinician. It was anticipated initially that 5 to 10 interviews would need to be carried out until data saturation occurred.

All clinicians identified that the interviews could be carried out at their own hospital offices outside of their NHS working hours. To facilitate the thematic analysis, every interview was audio-recorded and transcribed using strict transcription (offered by UK Transcription Ltd).

The analysis of the Study B data followed the same stages as the Study A thematic analysis.

4.7 Limitations of the chosen methods

Whilst qualitative methods can enrich our understanding of a particular topic or phenomenon, as with other methods of research the conduct and reporting of qualitative research may have some drawbacks, which should be clarified. In relation to my studies, four main limitations were considered and managed in order to reduce their effect on the conduct of the study. These were:

4.7.1 Time constraints

Within the constraints of the timescale of a PhD, I was unable to follow a full cohort of patients through all the stages of their treatment. However, efforts were made to ensure that I could follow some patients through more than one stage. This might provide better continuity of the patients' experiences even if one stage were to be missed. Additionally, the processes of identifying participants, contacting them, waiting for a response and arranging the interviews were very time consuming and so time had to be carefully planned and organised to account for these aspects.

4.7.2 Researcher training and the influence of the researcher

The possible impact of the researcher on the data generation and analysis has been acknowledged in the methods section, and I acknowledge here that I had no intention of guiding the data interpretation and report. These were all validated by experienced academic supervisors.

4.7.3 Generalisability

Qualitative research does not seek generalisability in its nature. This study's sample was purposely aiming not to represent the general population, but to select participants who had experienced the situation under investigation and could provide insight into the research questions. However, transferability of the findings was considered during the research by involving wider patients' characteristics, patients with different extents of tooth loss, patients at different stages of treatment, and patients experiencing complications and/or retreatment. In addition, diversity amongst the clinician sample was considered in terms of clinical position and experience, age and sex.

In this chapter the methods and the methodology which have been used to address the research questions have been described and discussed thoroughly in relation to the current research context. The following chapter will focus on presenting overviews of the studies' participants and the thematic framework of both studies.

Chapter 5 Overview of study findings

5.1 Introduction

This chapter has two aims. Firstly, to introduce the reader to the participants, who are the sources of Studies A and B qualitative data (i.e. the interviewees) and the wide samples from which the participants were recruited (i.e. overall sample), and secondly, to provide brief overviews of the Studies A and B thematic frameworks (findings from thematic analysis). By doing that, context for the upcoming data and discussion chapters shall be established.

5.2 Study A

5.2.1 Participants and interviews

In Study A, recruitment continued until data saturation was achieved. Over 20 months, 75 patients (37 male and 38 female) were invited to take part in the study. Thirty-eight interviews were conducted with 34 participants at different stages of implant treatment pathway, with four patients being interviewed twice. All participants were British adults attending NDH between 2013 and 2015. At the time of the interviews, 12 interviewees were employed, 8 were students at university or college, 12 were retired and 2 were unemployed. About half of the patients were edentulous; 22 were women and 12 were men. About half of the sample were under the age of 40.

All interviews for Study A were conducted at/from Newcastle University COHR facility. Twenty-two interviews were semi-structured face-to-face interviews, and 16 were semi-structured telephone interviews. All interviews were directed by the same researcher and used the study topic guide, which was iteratively updated in accordance with the emergent themes throughout the study and after every interview. The lengths of the interviews were not distinctively different between the face-to-face and telephone interviews, and varied between 25 minutes and 42 minutes. Details of the Study A participants and their characteristics is shown in Appendix 12.

It is worth acknowledging that the sampling of Study A was influenced by the referral strategy of patients from PDC. Usually only patients whose dental management was

considered too challenging for PDC are referred to SDC. To ensure a breadth of views in the data, consideration was always given to the participants' demographical and dental characteristics (details are given in Chapter 4), and those were decided according to the emergent themes and data saturation (Tables 5.1 and 5.2).

The patient recruitment process was time consuming, and two limitations were observed in finding potential participants for Study A. Firstly, the number of implant patients who could be accessed from NDH was limited because DIT is not widely offered. Secondly, patients who fit the characteristics of Study A purposive sampling could choose whether or not to participate in the study, and when the decision was negative, additional time was needed to find replacement participants.

In particular, there were great difficulties recruiting two groups of patients: patients who had experienced a failure of an implant fixture; and patients who had experienced failure of an implant-supported restoration, especially the fixed implant prosthesis. There was no clear explanation for the refusal of these groups to participate. However, it is assumed that the difficulties were encountered because of two main reasons. The first reason is that patients who experienced those circumstances were usually young adults who were working or studying and hence had difficulties in attending for extra interview time. The second reason was the extended length of the treatment journey for patients who had implant failure, which may have made them less willing to consent to a study which may need additional time

All of the study participants had previous experiences of a removable appliance (CD or acrylic partial denture as transitional restoration). The partially dentate patient had at least one failed attempt with conventional fixed bridges.

Table 5.1 will clarify how different variables in patient recruitment were considered.

| Variable | | Approached patients | Study A participants/ number of interviews |
|---------------------------------|----------------------|---------------------|---|
| Gender | Female (F) | 38 | 22 |
| | Male (M) | 37 | 12 |
| Age | < 40 | 45 | 16 |
| | > 40 | 30 | 18 |
| Extent of tooth loss | Partial dentate (Pd) | 40 | 13 |
| | Edentulous (E) | 35 | 21 |
| Treatment stages | Stage I | 25 | 10/ (11 interviews) |
| | Stage II | 20 | 10/ (11 interviews) |
| | Stage III | 30 | 14/ (16 interviews) |

Table 5.1. Variables of the study participants

5.2.2 Oral health impact profile 49 (OHIP-49)

An OHIP-49 score can be derived in several ways (Slade and Spencer, 1994) (see Section 2.2.3). In this study, OHIP-49 was used as one of the patients' descriptive characteristics (the purpose of using OHIP-49 is clarified in detail in Section 4.6.1). Ordinal scores of OHIP-49 are calculated by summing up the responses codes of all 49 statements; achieving a score of zero reflects no impact at all, and 196 reflects the highest score of impacts (Özhayat, 2012).

5.2.3 Study A: Thematic framework

Thematic analysis of interview data from Study A has shown that the emergent themes seemed to fit appropriately within the three categories of implant treatment stages (see Section 1.1). Therefore, data and analysis throughout the next chapters were categorised to follow patients' experiences of the implant treatment pathway in chronological order and according to the three stages of implant treatment. This will facilitate narration of patients' accounts in an explicit way. Qualitative interview data will be also discussed with reference to themes and subthemes. Figure 5.1 shows the thematic framework of

Study A. Whether patients will be offered implant replacement on the NHS or not they generally progress through the same phase of experiences at stage I. Then, obviously only patients who have been offered DIT would progress to stages II and III of the treatment pathway. Further illustration of themes and subthemes structures will be provided in the Appendices (17, 18, and 19).

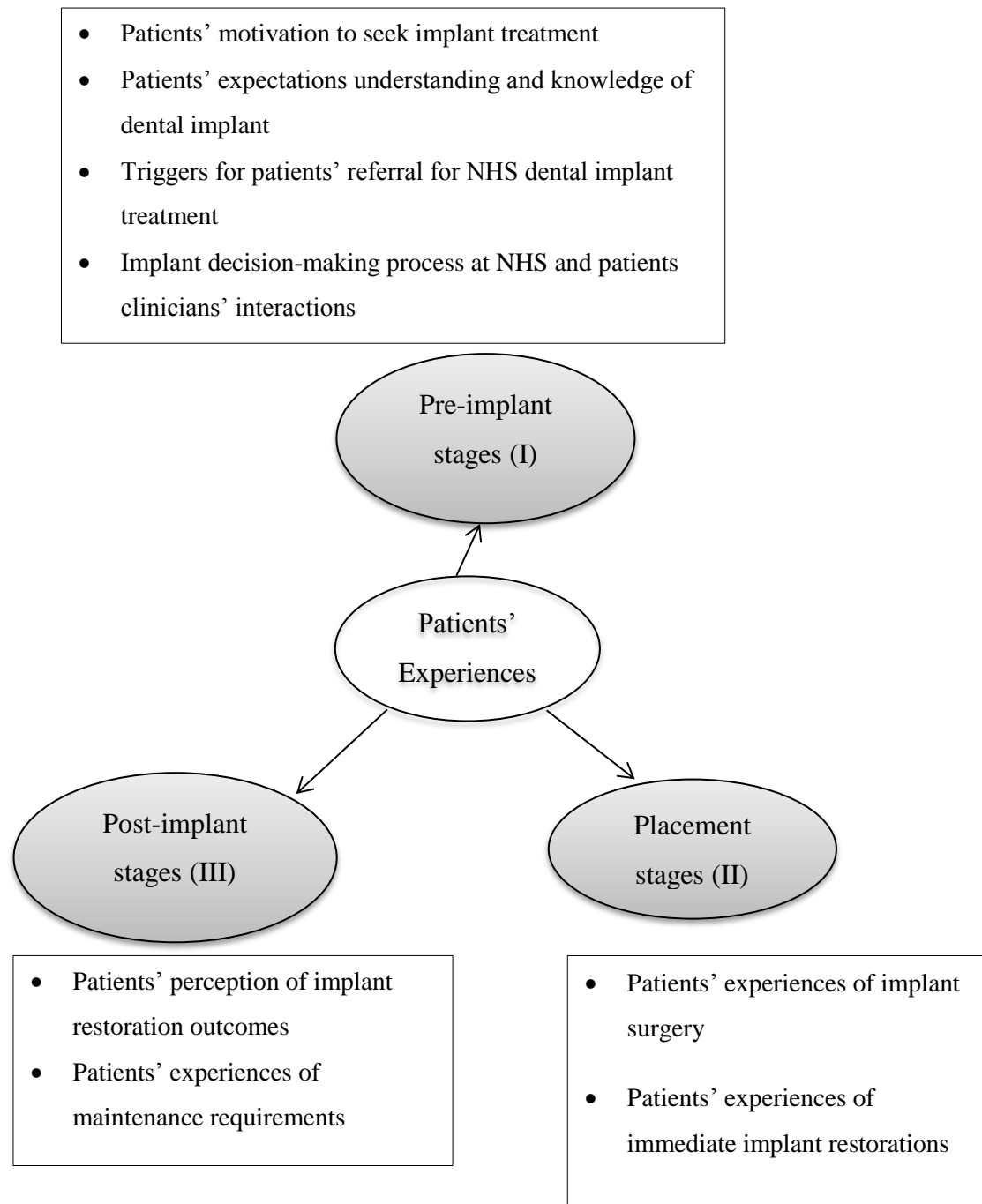


Figure 5.1. Thematic framework of patients' experiences of implant treatment

5.2.4 Interview data and patients' descriptive

To aid discussion, quotes from interviews transcripts, which are textual data representative of saturated themes or subthemes, will be utilised. In the parenthesis, at the end of each patient's quotation, is the patient's descriptive. A specific descriptive for each interviewee was assigned to reflect that patient's main demographic information (including their OHIP-49 score collected at the time of the interview). It was clarified in the methods chapter (4) that demographic data was collected in Study A at every interview.

Therefore, a patient's descriptive would include their anonymous name, age, the stage of implant treatment (I, II, III), the extent of tooth loss (partial dentate (Pd) or edentulous (E)), the OHIP-49 score and the type of current prosthesis at the time of the interview (those were complete denture (CD), acrylic partial denture (RPD), implant-supported fixed prosthesis (ISFP), implant crown (IC) or implant-supported overdenture (ISOD)). When the ISP is transitional the lowercase letter 't' will be added (tISOD), (tISFP) and (tIC)). For patients who were interviewed for a second time, the number 2 is added beside the name to indicate that. Also, for patients at stage III the time since the final restoration was placed will be provided.

For example, Andrea is 50 year old, is at stage III of implant treatment and edentulous, her OHIP-49 was 30 at the time of the second interview (2) and she had ISFP at the time of the interview for 7 weeks. Therefore, Andrea's descriptive during discussion will be (Andrea 2, 50, III, E, 30, ISFP, 7 weeks).

The advantages of having a patient's descriptive alongside each quotation is to provide the reader with sufficient insight into the different aspects of the relevant dental implant patient characteristics, including the impact of their current dental condition on their quality of life.

Although this study conducted 38 interviews, it was impractical to illustrate each theme using data from all interviews. Attempts were made to use varieties of transcripts to demonstrate the breadth of the available data. Where possible, quotations will be used from all patients regardless of their stage of treatment. This is because patients at advanced stages of care sometimes provide retrospective relevant experiences related to earlier treatment stages.

Additional to the patients' experiences of care, there were additional concurrent emotional experiences. Attempts were made, where possible, to highlight those emotional thoughts and feelings from patients' talks and they will be in brackets, when relevant, beside the themes being discussed.

5.3 Study B

5.3.1 Clinicians' and descriptive

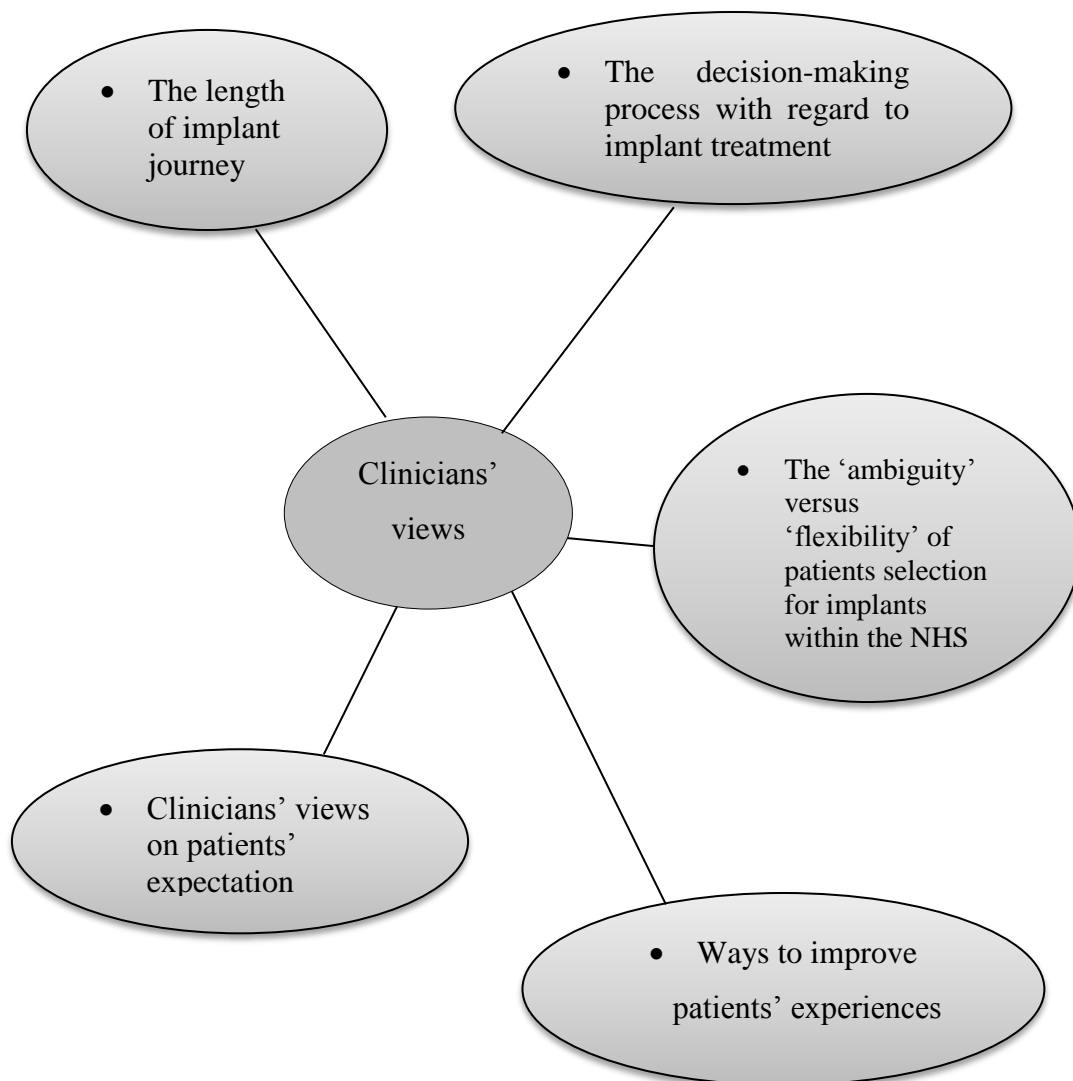
Three main factors were considered during recruitment of clinicians for Study B. Those were clinicians' clinical roles in DIT, gender and their consent to participate. The implant team at NDH consists of six clinical consultants and one implant teaching lead. Five restorative speciality trainees are also involved in the DIT process, alongside nurses and students. The recruitment excluded nurses and postgraduate students as their experiences may be influenced by their clinical supervisors.

Twelve clinicians were invited to participate. Although only eight participated, this number was adequate to address the study aims. Four of those were clinical consultants; four were speciality trainees (StR).⁴ Five were female, and three were male. The clinicians' interviews were conducted by the researcher and they lasted between 20 and 30 minutes.

Clinicians' descriptive were used in parenthesis following their quotes. The descriptive consists of the clinical role (consultant or speciality registrar (StR)) and a randomly assigned number: for example, Consultant 08, StR 07. As the implant clinicians in the dental hospital were limited in number, additional details were not disclosed, for example gender and age, to ensure anonymity.

⁴ Restorative speciality trainee (StR) is a 'middle grade' member of staff who is undertaking advanced training in a specific discipline, in this case on restorative dentistry.

Figure 5.2. Study B: Thematic frameworks



Chapter 6 Data and discussion Study A, stage I. Patients motivations, understanding and expectation of dental implant treatment

6.1 Introduction

Themes relating to patients' experiences of stage I of the implant treatment pathway are presented and discussed in Chapters 6 and 7. This chapter reports on data concerning patients' understanding, knowledge and expectations of DIT. These data are gathered from 38 in-depth interviews held with 34 patients in Study A, of which 10 patients (11 interviews) were at stage I. These patients discussed their current experiences at the time of the interviews, while other patients recounted their experience retrospectively as they were at more advanced stages of DIT. Data will be presented under the following headings:

- Patients' motivation to seek implant treatment
- Patients' expectations of dental implant treatment and anticipation of outcome
- Sources of patients' information
- Demands for particular knowledge

Whilst patients' motivations, understandings and expectations of DIT have been investigated in the literature, there is a need for further research. In general, expectations of health care remains a subject of interest for researchers, and it is still insufficiently understood (Janzen et al., 2006). As discussed in the literature review (Chapter 2), exploring patients' expectations is important to ensure delivery of healthcare which meets patients' needs, and patient expectations in several aspects of healthcare are reported to be high (Lateef, 2011). This may be influenced by patients' understanding of their illness, and their beliefs, cultural background, attitudes and demographic characteristics. Increased clinicians' awareness and understanding of patients' thoughts and feelings may potentially improve the chances of a successful outcome of the treatment (Janzen et al., 2006).

6.2 Patients' motivations to seek dental implant treatment

Multiple reasons for pursuing DIT emerged from participants' interviews; however, these can be summarised as three main motivating factors: 1) the hope of eliminating the impact of tooth loss and unsatisfactory restoration on their everyday life; 2) the possibility of gaining a referral from PDC for 'free' DIT within a SDC, NHS hospital; and 3) the anticipation that DIs would provide a perfect solution for tooth replacement (Figure 6.1).

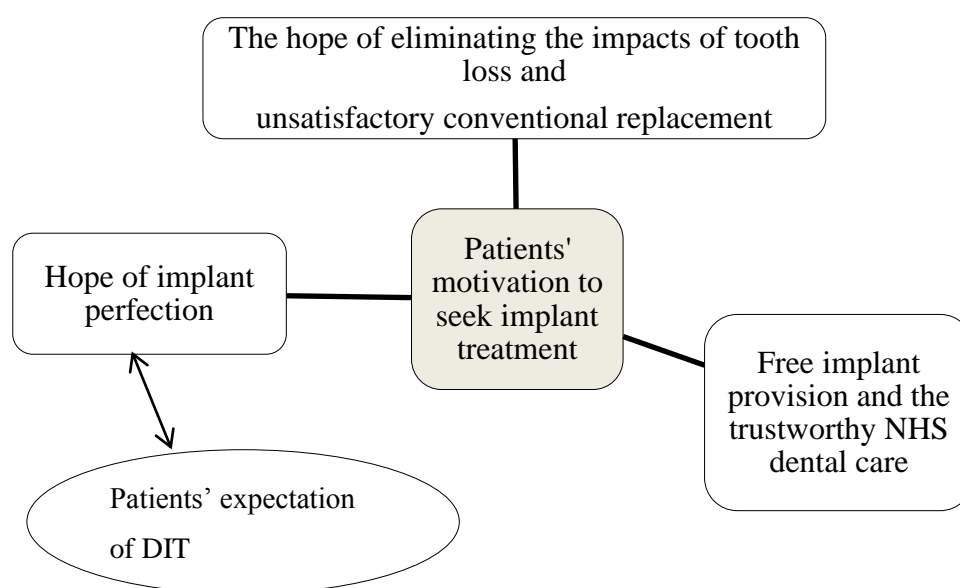


Figure 6.1. Motivating factors for dental implant treatment

6.2.1 *The hope of eliminating the impacts of tooth loss and unsatisfactory replacement:*

- ***From tooth loss to the time of referral for DIT, a journey of struggle***

Patients' narratives of their journey mostly began when they lost their teeth, regardless of the timing, the reasons for tooth loss (old or new story), the age and/or the extent of tooth loss. Patients of all age and extent of tooth loss thought of initial tooth loss as the real beginning of their journey towards implant provision, even if this occurred a considerable time ago.

My trouble started when I lost my teeth all of them and I was 28.

Sandra, 55, I, E, 131, CD

I lost one front tooth when I was 12 or 13, when I fell off my pushbike, oh and then from there it was all begun, I had lots of trouble with my teeth.

David, 22, III, Pd, 30, IC, 2 years

It was all begun when I was 26, when I lost those [front teeth] I feel now that I was badly advised by my dentist about that, they could have been saved.

Linda 74, III, E, 30, ISOD, 5 years

Among the participants, the shame and the stigma of losing teeth were usually disclosed through denial of responsibility. Other circumstances, such as disease, life events and sometimes failures of dental care were the main predisposing factors for losing teeth from a patient's perspective. Patients were explicit in defining how they cared for their dentition and how things went awry.

I've always from when I was young, made to brush my teeth and I have always had that stuff that you put on, like you have to brush off, the coloured stuff, so you have to make you brush your teeth properly, So I don't actually know what happened, he [the dentist] decided that it would be the best thing. He took them all out in the end, which I'm not happy about. I did try and say I don't really want them out. I don't have any teeth left and I am still 27.

Martha 27, I, E, 158, CD

Oh golly, it, I don't know why that happened, because I was really suicidal about my teeth, you know, getting them cleaned, hygiene-hygienist and all this kind of things. Is it the luck of the draw? I had a baby when I was 44, he robbed me of calcium, magnesium, maybe.

Deborah, 72, III, E, 70, ISOD, 3 years

Although participants in Study A had differing degrees of tooth loss, the subsequent emotional disturbances were deeply felt and highlighted great similarities amongst patients of different age groups. They described tooth loss as a stressful and uncomfortable experience which was difficult to tolerate.

In 2005 I got an infection in my tooth and they drilled and tried to save it and it was too painful so they took it out. It was a shock, I was devastated because I didn't want to lose teeth especially the front ones.

Diana, 33, I, Pd, 139, RPD

it's always there in the back of my head like I've actually lost my front two teeth, I remember when I actually saw them, because they put them in a little package and they gave it back to me because they were like, "If you want them you can have them or we can throw them away." I said no I took it I was just holding them like, "They're my teeth" Like they're not going to exactly grow back, that was my feeling really.

For some patients, who had significant emotional difficulties coping with tooth loss, which was clearly reflected in the participants OHIP 49 scores, short- and long-term medication was essential to control anxiety and depression at the time of tooth loss particularly amongst edentulous participants

It was sad time I could not cope with it, even now I am on anti- depressant I don't know what actually happened I don't have any teeth left and I am still 27.

Martha 27, I, E, 158, CD

I had to take diazepam at that day and some days afterward because I was upset to be losing my teeth.

Deborah, 72, III, E, 70, ISOD, 3 years

During data analysis, there were strong echoes of research findings elsewhere related to the functional, aesthetical, social, emotional and psychological impacts of tooth loss and impaired restoration on patients' well-being (Davis, 2000; Fiske et al., 2001; Johannsen et al., 2012; Nordenram et al., 2013; Rousseau et al., 2014), and I clearly encountered some of those in my data.

- ***Traumatic tooth loss among young participants: 'it was a constant reminder of that day'***

Amongst the Study A participants, some young patients had lost their teeth as a result of a traumatic accident. Those patients (n=8) had particular accounts of the emotional disturbance of tooth loss, unlike other patients who lost their teeth gradually or as a result of dental disease. This might have contributed directly to their considerably high OHIP 49 scores. They specifically described their tooth loss experiences as a complete surprise because it was sudden and unexpected at the time of the accident. Additionally, for this particular group, tooth loss was felt to be a constant reminder of the unfortunate accident they had. The motivation for DIT among those participants was based on two concepts. The first was that DIT is a permanent type of replacement which would help them to overcome the memories of their unfortunate life event; the second was that DIT is the type of restorative replacement that best conforms to the needs of their age.

It was deeply painful at the time and they were fractured [after an assault] so they had to come out which was not great at all, I was depressed and it was a

bit of shock I cannot see myself with no front teeth, it was a constant reminder of that day.

James 23, II, Pd, 86, tISFP

I was at a junction, waiting for a light, and a truck wasn't signalling and turned left, and ran over my head twice and it knocked two of my front teeth out, and chipped another one. I feel it is unfair losing my teeth like this, I was really depressed and devastated, I look in the mirror and all I see is my teeth.

Gary 24, I, Pd, 142, RPD.

Those patients discussed their motivation for implants mainly as being driven by their wish to forget their accidents and restore the normality of their life.

After the accident I had the denture, to be honest I wasn't aware, because I thought I would get teeth straight away. Once I actually found out I was getting a denture and it was like you can take them out and that, that's when it started really hitting me and I was like, "I'm going to be stuck with these". It was in the back of my head all the time, it was like, "I can't still believe it, why that accident happened that day.

Gary, 24, I, Pd, 142, RPD

There's nothing you can do about what happened [an assault] it's just like normal life just I need to go on with my life I need to forget; I am sure having fixed teeth after all will be helpful and it may help me to forget at least.

Lawrence2, 19, II, Pd, 44, tISFP

- **Replacement matching age (age suitability)**

In addition, for all young patients, the thought of having dentures at their age was described as hard to cope with emotionally. These feelings motivated those patients to consider DIT. They believed that implants could offer a fixed long-term solution and are suitable for their age. It is also observed amongst the young participants that their OHIP-49 scores were high, particularly for those who were at early stage I when compared with others at the same stage.

It's quite scary [having denture], because I'm quite young. And like the whole stigma of having a denture when you're in your 20s it's quite hard to cope with. At such young age I am in need for implants it would sort my mouth and it is suitable to my age.

Christine, 23, I, Pd, 145, RPD

I think largely of implant because I'm 24 years old, and I think it's the best option for me. No one's told me it's the best option but this is my thought. They're more permanent than a bridge or denture, I am sure also they are perfect I mean from an aesthetic perspective of my age.

- **Self-confidence and difficulties with everyday life: 'my life is restricted'**

Impairments in self-confidence and the consequences of that played a profound role in motivating participants to seek DIT and to think positively about the potential advantages of DIs in restoring their self-confidence. Impairments in confidence during function (self-consciousness during eating and speaking) and appearance (self-image and perceived social image) had affected several aspects of patients' lives. This is abundantly reported in the literature and had impacted on patients' oral health related quality of life (Davis, 2000; Davis et al., 2001; Johannsen et al., 2012; Rousseau et al., 2014). Patients in this study explained how they felt restricted in their daily activities:

If you lose teeth then it affects a number of things, at first it affects your confidence, the way you speak, you look and eat, the way you live will eventually change all over, then that limits your, kind of, social horizon, if you like, if that's the right term. It limits not only what you can do but what you would want to do.

Mark, 68, I, Pd, 120, RPD

With the plate I don't really like going out very much, I feel not confident; I'm scared in case it pops out in front of my friends. I'm self-conscious about how do I look.

Maya, 21, I, Pd, 110, RPD

Some patients at later stages of implant restorative treatment stages indicated that they were able to manage and adapt to their tooth loss. However, replacement with DIs was considered essential to restore what some participants perceived as the social normality and convenience of everyday life. Despite their ability to manage their social life without restriction, they felt that having a stable replacement was important.

Socialising was a bit awkward to start with. But as I say, I'm not a particularly shy person, the fact that I didn't have a front tooth was just more of a conversation piece [Dennis refused to wear RPD and has failure of several adhesive bridges]. It didn't affect us that much, but at same time I won't continue like this, life will not be normal like this.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Losing teeth didn't stop me doing anything or going anywhere but for my self-comfort I wanted something permanent and secure it is difficult to keep thinking about something moving around in your mouth.

Linda, 74, III, E, 30, ISOD, 5 years

- **Tooth loss and social network**

Patients thought that tooth loss had influenced their personal and social relationships. They attributed the social impairments they felt (for example, the loss of personal attraction and disturbance of personal relationships) to tooth loss. These impacts were previously discussed (Heydecke et al., 2005). After experiencing difficulties in having satisfactory dental replacement, patients believed DIs to be the appropriate solution to regain their attractiveness.

I lost contact with all my friends because I don't have teeth, I don't go out, and from school I had a lot of friends when I had my own teeth I haven't got any friends.

Martha, 27, I, E, 158, CD

Since I've had dentures, I don't go out, because I haven't got anybody to go with, and I wouldn't anyway' I don't have a relationship that, I mean because I am divorced, right, I would never dream of entering into a relationship with another man, for the sole reason I would be frightened to kiss him.

Sandra, 55, I, E, 131, CD

I'm quite self-conscious. I want to make sure they're in the right place before I'd in terms of like kissing and things. My boyfriend's been with us well, he was with us for five years, and he's been through saw me from - with my teeth, and then losing my teeth after that we broke up.

Christine, 23, I, Pd, 145, RPD

- **Tooth loss and employment**

Young adult patients in this study considered tooth loss to be a factor that narrowed their career prospects. It influenced their career selection and also their courage and tenacity in performing their preferred jobs, in particular when this required social interaction. They often felt the need to modify their job aspirations to accommodate their tooth loss concerns.

I used to waitress, and I used to work in pubs but I don't do it anymore. I'm now a cleaner which, go in by myself, do it and then I'm out before anybody else is in I cannot be involved in a team I couldn't do that anymore.

Diana, 33, I, Pd, 139, RPD

At the moment I don't know what I'm going to do about counselling because if it carries on like this, I don't know if I'll qualify but I don't know if I'll get a job in it. I don't know if I'll push myself to get a job in it. I mean, at the moment, it's just studying. but when it actually comes down to sitting in a room with clients, and

actually getting a job to do that, I don't know if I'll push myself to do it because of the confidence'.

Martha, 27, I, E, 158, CD

Patients felt a disturbance of their perceived image in social situations. They believed that their failures in pursuing a career are a result of the social stigma of tooth loss. Patients believed that tooth loss is perceived in society as a negative personal characteristic.

It gives a kind of bad image.

Diana, 33, I, Pd, 139, RPD.

It does give a negative social image when a young male comes across, and even if he smiles, he's got a missing tooth at the front.

Gary, 24, I, Pd, 142, RPD

Job interviews, it was a bit tricky, because straight away, that was the first question; you know, when you smile and people says, what happened to your tooth? As many times as you explain, I was attacked and mugged, they always think, you know, drunken bar fight or something like that. So it gives you a bad first impression.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Older participants, in contrast, felt that their tooth loss, and unsatisfactory replacements, limited their willingness to participate in the community and to volunteer. They felt isolated and believed implant restoration would widen their opportunities.

I mean, even as I speak now I can feel it kind of moving slightly. And it just kind of limits you, the things that you will do. And, the things that you can do! It is a continuous concern. Even I am retired I would not stop doing things and helping but now I cannot [Mark is engineer who wishes to volunteer for charities].

Mark, 68, I, Pd, 120, RPD

I love being in school with young children and enjoy it. I retired when I was 60, and, then I went on to do supply work in teaching. When my denture got slack I thought that was the end of teaching, I was sad I could not pronounce certain letters.

Linda, 74, III, E, 30, ISOD, 5 years

- **Tooth loss and sport**

Patients, particularly those with limited tooth loss who had removable dental prostheses, believed that tooth loss and dental prostheses diminished their sporting activities and fitness regime. They described their inability to perform the sports they used to do for several reasons. These were: discomfort from denture movement, worries about losing

or breaking crowns or dentures, and embarrassment. Those patients anticipated that DIT would give them the possibility of having not only stable, but also strong teeth.

So I, I think if I was able to, kind of, get implants, either to, put teeth in or to just to be able to hold the denture in place, it would improve things for me a lot. One of those in terms of, there are certain kind of fitness kind of regimes that I'm kind of reluctant to do, right now um, things like swimming, running you know, you always have a concern, they are not stable.

Mark, 68, I, Pd, 120, RPD

It's just a bit impractical wearing dentures, When you play sports so you cannot use denture I have to take out my teeth, I wouldn't, particularly, want to go running because of the jogging and the movement. Not necessarily that I'd think, necessarily, that I would lose the teeth, but I meant they might break and it hurts because it moves, I don't wear it at all.

Gary, 24, I, Pd, 142, RPD

6.2.2 Possibility of getting free implants within the NHS:

'Getting referral to so-called implant clinics'

In addition to the aggravated impacts of tooth loss on patients' life, the possibility of gaining free implant treatment within an NHS secondary care hospital was a strong motivator for DIT. Throughout patients' discussions it was clear that patients were fully aware of the high cost of DIT. Patients clarified that implant restoration would not be their first option if they needed to pay for the treatment as they considered cost to be the main barrier in obtaining DIT in a private clinic, confirming reports from other research (Exley et al., 2012; Vernazza et al., 2015; Wang et al., 2015).

I couldn't afford it myself. I had no pensions or anything, just a widow's pension so the cost of it was out of the question for me. But when I knew I may have it here for free so I would not say no at all. I was determined to get it any way.

Catherine, 76, III, E, 120, ISOD, 7 years

The involvement of trainees/students during the treatment stages was acceptable for patients, who felt positive about their roles in trainees'/students' learning. This trainee/student engagement was considered by patients, who experienced the stages of DIT and who were at later treatment stages, as a potential reason behind the free implant provision. In addition, the existence of continual supervision eliminated the anxiety of being treated by someone still in training

I don't mind sitting in a room with loads of students watching me. This could be part of the process I am getting them free so I should be grateful for that. Also

Professor X was always supporting them and making sure everything is outstanding.

Deborah, 72, III, E, 70, ISOD, 3 years

When you're getting it free and you're teaching the young ones and the young ones are learning by working with you, I don't think you can argue about the time length of treatment. I had no concern about students they need to learn and Dr Y was supporting them and looking after them

Alice, 70, III, E, 80, ISOD, 2 years

For some patients, their motivation to seek free implant treatment encouraged them to pursue referral for free NHS implant treatment from their primary care practitioner (this is explored further in Chapter 7). There was a presumption amongst patients at early periods of stage I that they only needed a referral to SDC within the NHS to obtain DIT.

6.2.3 Trustworthy NHS dental care

The majority of this study's participants indicated that they were motivated to seek a referral for DIT not only because they are provided free at SDC within the NHS, but also because they trust clinicians at SDCs and felt they would be qualified to solve their dental problems. Most of the participants had experienced periods of difficulty with conventional tooth replacements. In addition, they had encountered several previous unsuccessful attempts within primary care to get satisfactory restoration. Those repeated unsatisfactory attempts gave the patients a belief in the complexity of their dental conditions.

Normal dentists outside probably, someone like me with, with quite severe kind of dental problems, they would struggle to cope with that. I think the dental hospital, obviously, has the ability, and specialised Doctor at NHS, has had the ability to maintain, if that's the right word, my kind of dental hygiene and dental appearance can be sorted, if you like, at, at as good a level as I think.

Mark, 68, I, Pd, 120, RPD

They are qualified for this so that is why I trust them. My dentist may not have this ability to treat difficult cases like me. Here, they know what they were exactly doing they look well after you.

Lora, 65, II, E, 98, tISOD

I feel much more comfortable coming to the dental hospital. I am not saying outside they are not good but maybe not more qualified, but I just think they put you more at ease here. I don't know if it's because they're all a team. The teamwork and they're quite ordinary. Feeling here are more I feel more confident I do trust them because they make you feel like that you feel you're part of the process.

6.3 Patients' expectations of dental implants

The current literature reports that patients' expectations of implant treatment are high. By exploring and investigating patients' understanding and expectations of DIs throughout the treatment pathway, it may be possible to determine the possible reasons behind patients' high expectations of DIT, in order to improve clinicians' awareness and develop strategies for managing these in the future. To understand patients' expectations of DIs, Study A first investigated patients' personal understandings of DIs as a kind of tooth replacement and considered where patients gained implant information.

6.3.1 Patients' understanding of dental implants

Patients' understanding of DIs were influenced by their hopes and anticipation of the treatment outcomes. Among participants from different age groups, there was considerable interplay between motivation to, expectation of, and the hope of DIT outcomes. However, patients focused their thoughts of DIT on three main principles.

Firstly, an implant could restore the 'naturalness' of their teeth because, unlike other types of replacement, it is rooted in the jaw bone.

Implant is rooted in my jaws bone and implant tooth stays alone without need to hold into other teeth so I feel it is like my tooth

George, 28, II, Pd, 77, tIC

Secondly, DIs are perceived as a permanent restoration that has high longevity because of its uniqueness ('it is recent technology') and its expense. It is known that when the price of a treatment is high, patients' expectations of outcomes may be increased (Yao et al., 2014).

It is a recent technology; highly priced it should stay for long

Alexander, 25, I, Pd, 120, RPD

Thirdly, patients believed that the implant restoration has less potential to fail because it is made of metal and this gives strength and stability, and, unlike natural teeth, this eliminates the possibility of decay.

It is fixed sort of option you know and I believe implants are made from metal, are more strong than normal teeth.

Diana, 33, I, Pd, 139, RPD

Patients have differing degrees of accuracy in their understandings of DIT. By asking all patients, irrespective of the stage of their clinical consultation, to describe DIs and the implant restoration, it was seen that participants' accuracy of knowledge depended on three factors: first, the stage of their DIT; second, whether the clinicians at primary care had offered discussion about various aspects of implant treatment; and third, patients' past personal information and experiences. However, there was continuous uncertainty when describing DIs, even amongst patients at advanced stages of implant provision.

I think screws will be secured in the jaw may be or the gum

Gary, 24, I, Pd, 142, RPD

I know it's – they are screws and, stuff like that, but I, I don't know. What can or they do for me?

Diana, 33, I, Pd, 139, RPD

Even in the later stages of treatment, some patients were still experiencing some difficulty in distinguishing between the implant fixture and the implant super-structure, the ISP:

I suppose it's like a man who's been, kind of, you know, shot with a bullet

John, 53, III, E, 20, ISOD, 6 months

I really do not know exactly but I know it is just a tooth with metal in the jaw. So I suppose they can be like my teeth.

George, 28, II, PD, 77, ICs

Patients who had investigated DIT focused, in the interview, on their personal requirements for satisfaction with implant treatment outcomes: for example, restoration of function, success, longevity of the restoration, and good appearance. A recent quantitative study by Simensen et al. (2015) argues that patients seek DIT mainly to improve function and appearance. Another suggests that restoring normality of function and appearance are the main motivators for implant treatment (Grey et al., 2013). All of these findings are echoed in the current data. However, the majority of this study's participants focused on describing ISP as potentially having a permanent dentition.

I've made a lot of presumptions about what, what the benefit of having an implant is. I just presumed from what I read in the net it's more permanent and

lasts longer than a bridge or denture. I mean I think there is also an aesthetic element of them.

Gary, 24, I, Pd, 142, RPD

Oh I feel I was well informed about implants yes at that time. My cousin told me everything I need to know. He said it is like eating with your own teeth and this made me decide for it.

Amelie, 71, III, E, 96, ISOD, 6 years

6.3.2 Anticipation of outcome

- **Normality and naturalness of teeth**

It is argued that patients' anticipation of treatment outcomes are influenced by several factors (Janzen et al., 2006; Lateef, 2011). However, the majority of participants across Study A (edentulous and partially dentate) showed a high level of certainty that implant teeth would resemble natural teeth. Three components of 'normality' or 'naturalness' were repeatedly mentioned as being important from a patient's perspective (regardless of what stage of treatment they were at). These are normality of appearance, function and security of teeth.

They should look like natural teeth and they are fixed you know.

Maya, 21, I, Pd, 110, RPD

I want teeth that is going to be natural; that's going to be permanent; and strong that doesn't come out, I mean the joy of like being able to think, "Oh, God, I can brush teeth again." Yeah, I think I would if I had them. I'll be able to talk normal without controlling my tongue.

Sandra, 55, I, E, 131, CD

Normality of appearance, function and a feeling of normal teeth were the main anticipated outcomes of DIT amongst patients at stage I. The results also indicated that these anticipations continued with patients into stage II, some of whom had already experienced some advantages of the transitional implant restoration (this will be explored further in Chapter 8).

I am expecting they [the final ISP] will be just regular teeth, once they're fixed in place and the gum settles, just hopefully as close to real teeth as possible and obviously for eating, nothing is going to move around and obviously I won't have a bit of plastic in my mouth so it'll be a lot more comfortable.. More natural. Just more practical for real life, for eating and drinking and that sort of thing

George, 28, II, Pd, 77,tICs

I just expect it will feel normal, like I haven't got these ones that I've got to take out, they'll just be there. They'll be like in, so I don't have to take them out, I'll just be like a normal person if I'm honest. Just like a normal person with normal teeth, living a normal life, which will be really good.

Lawrence, 19, II, Pd, 82, RPD

- **Permanency of teeth**

The meaning of permanence was explored in detail with patients. Patients at advanced stages of treatment (stages II and III) assumed that implant restorations would continue for a long period of time, seemingly underestimating the maintenance requirements and the possibility of implant disease. The longevity of DIs was explained by patients as being due to the impossibility of DI decay or fracture. However, this was accompanied with awareness of the importance of oral hygiene (but not necessarily awareness of hygiene techniques) and recognition of the need for frequent visits to the dentist for follow up (these aspects will be elaborated in detail in stage III, Chapter 9).

Interviewer; what do you mean by permanent?

I don't think they'll need any maintenance but yap, I will keep them clean and everything, I will do my bit, my best, I am sure will be fine because I don't need any additional treatment like broken amalgam or filling, no tooth decay I believe or gum disease.

Lawrence2, 19, II, Pd, 44, tISFP

I assume they're pretty much for life. Like I don't think they'll need much maintenance but I will have sorts of regular visits to my dentist I assume like my other teeth also implant won't get decay like teeth or infection.

William, 20, III, Pd, 30, ISFP, 3 Months

They should last for at least 20 year which I am really happy with at this age.

John,53, III, E, 20, ISOD, 6 months

Patients continued to be confused about the differences between implant fixtures and implant restoration, and most referred to them as being the same thing.

Interviewer; why do you think implant restoration should last long and they are permanent?

I think because they are rooted in side my jaw I am not even aware of them there I mean inside, I mean after they healed, I've never felt they are inside. I have never felt them.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

What I expect as I told you because they are metal I think I always read they are made of titanium pin you know, it is strong and potentially can live for long that is why I think that.

Alexander, 25, I, Pd, 120, RPD

They told me it will last for as long as I need them because they are metal you know so that is what I think.

Rose, 62, III, Pd, 70, ISFP, 7 years

I think that's the best available treatment option, implants are recent technology. They are having been a thing of the future and always will be.

James, 23, II, Pd, 86, tISFP

- **Stability of teeth**

The nature of implant fixtures (i.e. being inserted into the jaw bone) gave some patients the feeling that the implant restoration will be secure, stable and resemble healthy natural teeth.

They will be secured inside my jaw like teeth I think so they won't move like my plate. I meant they will be close to my teeth yes that is what I was thinking of.

Christine, 23, I, Pd, 145, RPD

Just the fact that they were actually rooted in my mouth and they were permanent and I wouldn't have to take them out and wash them; it was just a stable and normal thing really. I think this teeth should be as close as possible to natural teeth.

George, 28, II, Pd, 77, tIC

Interestingly, some edentulous patients who were in the process of obtaining ISOD believe that their future ISOD will be as stable and secure as natural teeth.

I would say they will be close to the natural teeth so, yes definitely, and they're definitely better than this plate. If I can get them right after my gum heals completely. I think it's worth it. I have gone through a lot of pain, but I think it's going to be worth it in the end

Helen, 48, II, E, 88, tISOD

- **Confidence revival and social life**

Impairment of self-confidence after tooth loss is discussed in Section 6.2.1. Patients anticipated that ISP would improve their self-confidence in different social contexts.

They considered confidence as impacting on most aspects of their life and this impact contributed to those participants' high OHIP 49 scores. Improvements in self-confidence and social confidence were anticipated as important outcomes amongst edentulous and dentate participants of DIT throughout stage I and stage II of the treatment pathway. Patients identified different advantages of improvement in confidence, including improvement in self-image, perceived image and comfort during social eating and speaking.

I am confident that they'll make a vast improvement on my teeth just so I can be sociable, you know what I mean? And go out, and as I said, just laugh without the fear of that my teeth's going to like drop out or somebody's going to see, I mean it has to be better because I, I'll be able to talk normal without controlling my tongue and See, I'm talking all the time and my tongue's permanently on the bottom of my mouth to keep the denture in place. If I wasn't, it would bob up and down.

Sandra, 55, I, E, 131, CD

I think it'll build me confidence and I won't be as aware of having dentures. I'm thinking about it all the time now, when I'm talking to people.

Martha, 27, I, E, 158, CD

It'll just be a nice knowing, I can have them it will be like a little boost for me because I'll know that I'll have them in place and I'll never have to worry about those teeth again, which will be a really good thing.

Christine, 23, I, Pd, 145, RPD

I think it will be a big change after implant, I'll be able to go out for a meal without worrying, I'll just be more confident in myself, and the way I look I'll have more confidence in myself hopefully. If it all works out I should be okay. After all these years I can't wait for it to happen, I'll be a lot happier in myself I think once it's sorted.

Helen, 48, II, E, 88, tISOD

6.4 Sources of implant information

The majority of the current study participants acquired beliefs about DIs which could be summarised as ‘*dental implant is the best treatment option*’ (Diana, 33). In-depth discussion with patients about their sources of information about DIT identified several sources of patients’ information. Specifically, these were clinically based information, for example from their general dental practitioner (GDP), written information and leaflets, NHS secondary care clinicians, the dental practice nurse; and other non-clinical sources such as friends, relatives, and the internet.

6.4.1 General dental practitioner

Primary dentists seemingly played minor roles in providing patients with information about DIT. Data related to participants at stage I indicates that primary care dentists usually mention DI as a potential treatment, often at the point when other conventional options had failed and they decide to refer the patients to SDC within the NHS.

They made me a set for my front teeth that looked like piano keys, you know We’ve always discussed getting rid of the denture but he kept coming up with everything before referring me to here, my other teeth are weak they could not hold bridge. Then he said you need implant and this could be from the dental hospital that was the beginning of all of this.

Diana, 33, I, Pd, 139, RPD

I knew from my dentist, it is metal pin attached to the gum but I don’t have any more information about the type of the things yet. She did not tell me anything.

Martha, 27, I, E, 158, CD

My dentist told me, he told it is the next sort of things to do but he cannot do it [when referral was decided], well, just fairly soon before he sent me to here. I didn’t know anything about implants, at that point and that’s only what he’s saying.

Linda, 74, III, E, 30, ISOD, 5 years

6.4.2 Written information

In general, having written information in the form of leaflets or notes was described as convenient, and regarded as a trusted source of information by patients at different stages of DIT. Patients recognised the multiple advantages of written information. For instance, they indicated it would allow them to recall information when needed at a later

time or after the end of treatment and help them to share their decision about DIT with their families or friends. Although written leaflets were always given out at the assessment clinics at NDH (Appendix 13), participants with different extents of tooth loss stated that the leaflets' information was more generic, and some felt they could not identify their own dental condition and the treatment options for them. They suggested the leaflets would be more usable if they were targeted to their specific condition or particular stages of DIT, and presented options relating to their specific cases. They said that if a leaflet included information about the possible types of ISP for them, this could help them to discuss their thoughts with others to reach a decision, particularly during the first stages of consultation and decision-making.

I pretty like to have leaflets or solid facts about myself what option were for me, to take away or anything like that to read later. It would've been helpful to have like, say "These are your three, two or three options. Go away and have a think about it". It was just a case of her telling me dentistry stuff, and then having to remember what she's told me, and then try and have a think about that. It was just, just sort of her saying, "Look, you know, this is how much bone you don't have to work with and we'd have to" they said they'd pretty much have to do a bone graft and that it wasn't guaranteed to work. That's all she really said. Not like chances, or anything, no. I don't, I don't know I've not decided yet. If I've got enough solid information about fixed option, and the chances of success and things, I think it would've been helpful to have that.

Christine, 23, I, Pd, 145, RPD

I quite liked the leaflet they gave me at the beginning when I first came I remember, but to be honest I could not identify my sort of option, I have some teeth but not too many then it was like me sort of thinking what should I look for fixed teeth or denture. Also in that leaflet there was nothing about implant here is not for everyone I realised after time I need to fit some sets of requirements.

Rose, 62, III, Pd, 70, ISFP, 7 years

6.4.3 Secondary care NHS clinician

It was clear that, after the clinicians' consultation at an SDC and the decision to go ahead with the treatment, some patients began to gain better understandings about DIs and also some of the patients started to distinguish between the implant fixture and the implant super-structure.

I just know from the professor here that that they get drilled into your bone and then you get there's loads of different ones, though, isn't there? You can get like individual ones, or you can get ones that sit a denture on top, or you can like bridge

Helen, 48, II, E, 88, tISOD

I understand that it's like a titanium pin, if you like, that is screwed and fastened into my jawbone, I am then going to have a porcelain tooth attached to the screw implant.

Joy, 45, II, Pd, 96, RPD

Some participants expressed a preference to have their first knowledge of DIs from the clinicians who would decide whether DIT is a possible option at an SDC; this might be attributed to the trust they felt towards clinicians in SDCs.

I'm hoping, when I do get them if we are going to go ahead, I'm hoping we'll – I'll find all that out [DIT information] from the professor on the way through the implant process.

Diana, 33, I, Pd, 139, RPD

Never looked at anything on the internet, I'm not very good at that, I would prefer to wait for the decision first, and then also to know more about it from Dr X himself. So I waited for that.

Angela, 76, III, E, 150, ISOD, 7 years

After the first consultation with a clinician in SDC, patients considered that a discussion with an implant clinician was advantageous and that written information was no substitute for a thorough clinical discussion with practitioners who possibly would carry out the DIT procedures. However, participants still emphasised that well-informed written information should be part of that informed discussion. Patients recounted that those clinicians' discussion would inevitably involve some clinical terms, which could be explained or avoided in written materials.

During the discussion, well, there were a lot of, sort of, dentistry terms which I didn't really understand. So what I catch on I just knew that they were sort of fixed in teeth as opposed to my dentures, which you could take in and out. So I would rather may be read more about the things suitable for me something easy to understand do I liked the fact it will be fixed. So that really my first ideas from her talk.

Christine, 23, I, Pd, 145, RPD

If information before the decision was written about my choices, I guess it would be a bit better because you could go home and read your leaflets and think about it and everything. The one, I had, was not focused it was about dentures and implant and I've nothing to do with dentures. Then I sat and spoke with my mum about it because at first I wasn't too keen about the surgery and I was not sure what the procedures. I could not remember them from her talk but then I decided and it was fine.

Georgia, 20, II, Pd, 88, tIC

I think the two things together are helpful, discussion and written information I don't think you'd want one without the other, because if you only had printed

material, you possibly wouldn't see the importance of reading it that is real, whereas if it's at least briefly explained to you and it is about you in the first place, then you know that you've got to read it, really.

Joy, 45, II, Pd, 96, RPD

6.4.4 Dental nurse

Interestingly, the nurse was also repeatedly mentioned as one of the information sources with whom participants of this study felt comfortable speaking with in order to discuss unclear issues in regard to DIT. Some of the topics raised were the possible duration of DIT, the longevity and the lifespan of the restoration, and hygiene information:

I was not sure how long it would take the whole process. I spoke to a nurse on me last appointment to have more idea about how long I need to get them done, and she says treatment can take anywhere up to 18 months for the whole process. Obviously she said there's ways of if you haven't got a lot of bones, ways to graft, it depends she said.

Martha, 27, I, E, 158, CD

I never felt uncomfortable asking what ever came in my mind really I mean the clinician he was really helpful and listening but sometime you cannot clear all your doubt I would say their time was limited they were very busy or they may have other patients so I felt less embarrassed when I discussed thing with the, with her, the nurse.

Angela, 76, III, E, 150, ISOD, 7 years

6.4.5 Family and friends: 'implants are the best option'

Patients at stage I who discussed their implants with relatives or friends presented raised awareness of the expense of DIT and the relatively short wait for treatment at private practices. Those participants who obtained insight into others experiences mainly referred to the positive aspects of those relatives experiences.

I have a friend that's had, two implants, and I have a family member that actually went abroad because he couldn't afford to get them here. They're just far too expensive, had all of his done he's a priest, obviously he preaches and he talks a lot at church, he was self-conscious about his teeth so he actually very happy now.

Martha, 27, I, E, 158, CD

The other person I know is a girl in my year's Mum who, I think she's had front implant, and I mean, she paid for that, she said it was very expensive but she almost annoyed that she hadn't done it sooner, because she was just, "Well, why have I wasted 10 years of my life mucking about with a denture?". So I've only heard good things about implants, so far so that is what I would think of.

Maya, 21, I, Pd, 110, RPD

There's a girl, my friend she said she born without some teeth so far she's over the moon, because I think implants are just seen as the best option but it is expensive, that's the problem.

James, 23, II, Pd, 86, tISFP

From what I gathered from that friend, she had hers done much quicker much quicker. Within four to six weeks, I think, hers were done, which I did feel a little bit envious of.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

One of the participants described her experiences of attending clinical visits of DIT with her cousin. Despite her fear of the surgical placement of the implant fixture, she felt that it was a motivating experience and it encouraged her to seek DIT for herself. She interpreted the hardship of the surgery and the pain she witnessed as a possible way to end her current dental difficulties (this is discussed further in Chapter 8).

I mean I've seen them [implants], and I was like quite shocked when I did see them [clinicians] doing things during the procedures and I, was "Oh, ooh, waw" and then he explained to me everything he was doing at the time. So, and then I thought, it doesn't frighten me surgery and the pain. It's a means to an end, and if I have to go through some pain, I'll go through any pain whatsoever, right, to have normal teeth, and to be normal person.

Sandra, 55, I, E, 131, CD

After witnessing the outcomes of DIT for her cousin, Sandra was inspired by the positive aspects of her relative's account and insisted on finding out how she could get access to DIT. Despite the fact that her relative had implant-supported overdenture and she knew that this was removable, she was still referring to that as normal dentition.

After he used them he said they well worth it, He's so over the moon with them and that and he said, "Yeah, you'll have your teeth again" normal teeth. So I've always said 'I wish, that's my wish. If I was to have one wish before I die'.

Sandra, 55, I, E, 131, CD

In contrast, having insight into implant complications or hardships from close relatives did not discourage patients from seeking and requesting DIT. Rather, they were optimistic and influenced more by the positive side of their relatives' experiences and accounts. Patients mainly presumed that implants would improve their personal appearance.

There was one of my friends did have a bit of trouble with his implant treatment. I think an infection with his implant. I don't know whether that was to do with his

oral hygiene or the procedure itself, but he had a bit of trouble with an implant, but I have spoken to him and he's now fine, and he's still, they're definitely the best, the best thing to have. He wouldn't, he wouldn't sort of regret having an implant.

James, 23, II, Pd, 86, tISFP

I think my brother had a car accident and he's got the dental implant as well I think they did a couple of back teeth. He was just telling me they don't feel right, I don't know if he's serious or not, but he says he can't feel comfortable. I think he's just joking around but I'm not sure. He had a car accident a few years ago and he got his straight away.

Lawrence2, 19, II, Pd, 44, tISFP

I mean my dad's got an implant in I think, in a similar position. He had his knocked out at work, and his was done may be 25, 30 years ago and he said it's, it's very good. He had to have his re done, again, because it failed but I never known why it failed

Dennis, 20, III, Pd,36, ISFP, 9 months

However, it should be pointed out that when patients recounted relatives' or friends' experiences of dental restoration, there were always doubts (during data analysis) about whether those treatments were DI or other types of fixed conventional restoration. There were maybe some confusion in patients' understandings of DI and other fixed restoration.

6.4.6 On the internet: 'implants are successful'

Not all patients wished to search for information on the internet; rather, they preferred waiting for information from the clinicians (see, for example, Angela, Section 6.4.3). However, patients who searched the internet for more information about DIT tend to be from younger age groups, and usually described implants from the aesthetic perspective and in terms of naturalism of appearance of the implant restoration and novelty. Also, they were more likely to have acquired inaccurate information. This might reflect the emphasis on beauty in advertisements on the internet.

All what I want to know It's in the internet, people with Hollywood smile cause like I wanted to do it as much as I could to, I know pretty much about how it looks how its successful and everything.

Christine, 23, I, Pd, 145, RPD

I searched online and looked at every aspect of it, and therefore I know how you know what they look like they're successful and pleasant yes they can be.

Georgia, 20, II, Pd, 88, tIC

A preliminary investigation of implant information on the internet was conducted by the researcher and is provided in Appendix 14.

6.5 Demands for particular knowledge

The topics that patients from different stages were uncertain about, and on which they were trying to gain more information, were the longevity of the implant, the implant's capability to ensure secure teeth during function, restoration tolerance, and how to care for the implant after its provision. This echoed some findings of a recent parallel study, which reported that prior to DIT, patients lack information about the longevity and the hygiene requirements of implant-retained restoration (Simensen et al., 2015).

I asked my relative about eating because it is important for me and it needs someone who tried it.

Sandra, 55, I, E, 131, CD

Just maybe a little bit more information of what I should expect after having them, and I'm still not sure, it is my own fault for not asking the clinician as well, what my teeth should be able to tolerate eating, and what not.

James, 23, II, Pd, 86, tISFB

I am still trying things sort of soft thing and hard things I am not sure if I can eat everything I forgot to ask I am worried about if I hurt them

Andrea2, 50, III, E, 30, ISFP, 7 weeks

Uncertainty about the longevity of implant restoration, and the implant itself, was another topic which patients tried to investigate further and requested more knowledge of.

Although they're like they give you like a lot of information they don't like guarantee it to be a success either. I've wanted implants because they are permanent. That is what I know but it seems like from their talk they do not guarantee. Are they not permanent? I want to know about this. Do you think I can find on the internet?

Christine, 23, I, Pd, 145, RPD

People always say it is the best thing, I can see what they mean but I am concerned 'will they stay for long'? My friend who is hygienist said it is recent thing and they [the clinician] still doing research about that.

Gary, 24, I, Pd, 142, RPD

6.6 Discussion

The previous data analysis intended to investigate patients' thoughts and understandings of DIT and explore in depth the reasons behind patients' current high expectations of treatment outcomes. The upcoming section will summarise and discuss the findings against the literature.

6.6.1 Patients' motivations to seek dental implant treatment

The hope of eliminating the impacts of tooth loss and restoring naturalism and normality of life were described by patients as the main motivation to pursue DIT, particularly after failure to obtain a satisfactory conventional dental replacement.

More specifically, in relation to seeking a referral to an NHS secondary care centre, additional local motivating factors were related to the elimination of the expense of DIT and the opportunity of being treated by a specialist and more experienced clinicians. Despite involvement of patients from different socioeconomic backgrounds (employed, student and retired participants), patients indicated that expense is the key barrier to obtaining DIT from a private practice. This is also reported elsewhere (Exley et al., 2012; Vernazza et al., 2015; Wang et al., 2015). The previous local factors might also have influenced patients' accounts of the impact of tooth loss on their life in an attempt to highlight their implant treatment need, and these patients might still feel that they have to make a case for treatment and/or justify why they deserved DIT.

Participants at all stages lacked clear insight and knowledge about the long-term maintenance of DI restoration which might need to be carried out by a GDP and that this would impose additional long-term costs. These results are again consistent with previous research which showed that patients are likely to underestimate the cost of DIT because of their lack of awareness of the long-term maintenance requirements (Rustemeyer and Bremerich, 2007).

Despite trainees and students being involved in patient care, the presence of experienced specialist clinicians to support and supervise students eliminated concerns about being treated by less experienced clinicians.

- ***The younger participants***

Younger patients have been particularly under-represented in previous qualitative research into tooth loss and replacements. In this study, it is observed from their OHIP-49 scores that those patients seem to be affected by their condition, and there were several interesting findings related to the experience of those particular patients. Firstly, these patients perceived tooth loss and unsatisfactory replacements as having a significant influence upon their social image and future careers. They believed that their tooth loss would influence not only their choices of disciplines in studying or their career selection, but also their willingness to perform certain jobs that necessitate social interaction and team working. Secondly, among partially dentate participants, uncomfortable tooth replacements were considered a hindrance to sporting activities and fitness routines that they used to perform and enjoy in their daily life. More specifically, they perceived dentures and conventional crowns as potentially weak during sports activities, and hence more susceptible to fracture. Thirdly, implant restoration was considered among young participants as a type of replacement that matched their age, based on the assumptions that an implant restoration will last *a long time*. Lastly, younger participants who had lost some of their front teeth as a result of trauma considered DIT as not only a dental replacement which could restore normality, but also as having the potential to eliminate the memory of the trauma they had experienced.

These results from younger participants who lost their teeth mainly as a result of trauma further support the association between tooth loss and biographical disruption proposed by Rousseau et al. (2014). Biographical disruption may be caused by or lead to illness (Williams, 2000). Rousseau et al. (2014) argued that although tooth loss is emotionally stressful, when tooth loss is a consequence of physical trauma, patients seek replacement not only to restore dentition and oral health, but also to eliminate the impact of the incidence on the normality of their life. In addition, the current findings confirm the need to target young patients when delivering information on implants as it is this group that seems to have the lowest level of accurate implant information (Pommer et al., 2011).

6.6.2 Patients' knowledge and understanding of dental implants

The results of this study indicated that patients held potentially inaccurate information and uncertain knowledge about DIT, which at many times led to establishing unrealistic

expectations of treatment outcomes. This continued at advanced stages of treatment and was particularly observed amongst the younger participants. The results also indicated that there were certain topics and information on which patients were interested in gaining more accurate knowledge. These topics included the longevity and functional capability of the implant restoration and the ways of maintaining optimum hygiene of the ISP. Accurate knowledge on these topics would without doubt eliminate some misconceptions about the long-term potential of ISP.

Findings from a cross-sectional study relating to younger participants are contrary to current research which indicates that younger participants were more likely to show realistic understandings and minimal expectations (Yao et al., 2016).

In addition, in the current investigation two main types of information sources were identified as contributing to patients implant understandings: clinically based information, and general sources. Patients considered clinically based information as informed, targeted and clear, but insufficient. Additionally, the role of the practice nurse was acknowledged positively in clarifying uncertainty regarding aspects of the treatment pathways related to the sequences and duration of stages of DIT.

Nevertheless, participants welcomed the enhancement of information that the written leaflet can deliver; they did, however, think it was too generic and short to inform patients' personal interests during the decision-making process of implant treatment. The written leaflet is widely available source of patients' information, recent assessment of the content of implant leaflet provided to patients in the UK raised doubts about the quality and reliability of their content and illustrations (Barber et al., 2015) particularly in relation to the maintenance and care requirements and limitations of ISP. This led some patients to seek additional information from other accessible sources: for example, the internet, family and friends.

In contrast, other sources (such as relatives or the internet) seemed to be useful and convenient, despite not necessarily being accurate, particularly about the expense, appearance and function of implant-supported restoration. Most patients' misunderstandings could be related to these sources of information, including the anticipation of perfection of aesthetics, the short duration of DIT, perfection of function, and the lack of need for future maintenances. These findings seem to be consistent with earlier research in the literature which suggested that media such as the internet (Pommer et al., 2011), and recently social media, may provide misleading notions about

the appearance and the longevity of DI restorations (Rustemeyer and Bremerich, 2007; Wang et al., 2015).

To investigate current internet information on implants and to explore the viability of the internet as a source of patient's information regarding DIT, a simple search was conducted via Google in September 2014 (updated in April 2016, with no fundamental change of the result). The search was carried out with the use of what could be considered as lay-people terms (*dental implant* and *implant restoration*). This investigation is attached in Appendix 14, and its findings support three main concepts. Firstly, the result of the 'first click search' prioritises pages and websites owned by implant companies, manufacturers and private providers, rather than scientific groups or public-funded webpages. Secondly, information on the advantages and the indications of DIT was communicated more clearly and efficiently than the disadvantages and contraindications of DIT. Thirdly, the length of the treatment pathway was usually minimised and DIT was often presented as quick type of treatment with immediate outcomes.

It was clear from this investigation that there was wide availability of implant information on the internet but with no professional quality assurance, which is in harmony with a recent debate at the House of Lords (HL Deb (2014-15) 755 Col GC494). The quality of information provision regarding DIT available on internet was raised in a debate at the UK House of Lords by Baroness Gardner of Parkes, who said *'when I googled "dental implant", as a patient often would if they had heard about this treatment, I was disturbed to read the advertisement: "Get smiling again with our same-day dental implants"'* (HL Deb (2014-15) 755 Col GC494).

Furthermore, it is observed throughout this study that the GDP who refers patients to an SDC plays a potentially limited role in educating patients about the possible advantages and limitations of DIT, but they were able to consider the individual's needs as they had better knowledge of the patients. This observation is in agreement with a recent study. Vernazza et al., 2015 reported that a GDP would largely depend on subjective measures based on assumptions about patient characteristics and the availability of dental implant in their practice when deciding whether to inform patients about DIT as an option for replacement during the decision-making process. By adopting this approach, GDPs may undermine the amount of information which should be provided to patients. Also, they

are likely to follow a paternalistic model of decision-making, which is currently not preferable based on evidence practice research (Rapley, 2008).

It could be claimed that although different sources of information may contribute to participants' thoughts, non-clinical-based sources of information such as the internet may have a greater influence in promoting the advantages of DIT without taking individual needs and variables into consideration, and therefore potentially lead to establishing misconceptions about DI and raising patient's motivation for DIT and expectations of treatment outcomes.

6.6.3 Why patients have high expectations of dental implant treatment

In relation to patients expectation of DIT at stage I, the results of this qualitative investigation further support previous quantitative research findings which stated that patient's expectations of DIT are high (Allen et al., 1999; Yao et al., 2014; Atieh et al., 2015). Patients indicated that they perceive DIs differently to other types of restoration and even natural teeth. The dental implant is regarded by patients as immune to decay and infection, and as a cure for tooth loss which is able to demonstrate security and stability in three ways. First is the belief of delivering naturalism by the use of implant fixtures as these are 'rooted' and secured in the jaws; hence, their security would resemble that provided by natural teeth roots. Second, the dental implant is a recent technology and its strength is inherited from the reality of its metal integrity ('*the titanium*') which is regarded by patients as immune to dissolution and decay. As a result, implants were considered as a superior long-lasting replacement, and their possible continual maintenance needs were underestimated (this is considered further in Chapter 9).

Third, there is patient confusion between dental implant fixtures and the dental implant restoration super-structure. The high success of osseointegration of DI fixtures may fulfil patients' anticipations of longevity if they were placed and maintained carefully by clinicians and patients. Nevertheless, for the super-structure of implant-supported and retained restoration to achieve longevity, constant and periodic maintenance, replacement and care are required. This is particularly the case with overdenture attachments.

These three perceptions potentially played strong additional roles in motivating patients to seek DIT and in developing patients' high expectations of implant normality and naturalism. A possible cause of those thoughts about DIT, as discussed earlier, might be related to patients' prior understandings of DI as a type of tooth replacement, as knowledge and understanding of a particular treatment is considered as a key factor in shaping patients' expectations of health care outcomes (Janzen et al., 2006).

It could be acknowledged that this study's findings are broadly in harmony with those of other recent qualitative research, as the participants believed that an implant restoration would be able to restore *normality* of aesthetics and function (Grey et al., 2013); it represents a *process of normalisation* (Lantto and Wårdh, 2013); and it is a *panacea* for tooth loss treatment (Wang et al., 2015)

For clinical relevance, there are recommendations in the literature to address different aspects of patients' expectations of DIT and to establish ways for more effective clinician–patient communication (Grey et al., 2013). This study identifies several areas which can be investigated and developed to enhance patients' understandings and expectations of DI as a type of tooth replacement. There are several ways in which the quality and content of current sources of patients' implant information could be improved. Clinical-based sources of information should be tailored towards personal patient treatment needs and their stage of DIT. Greater involvement of practice nurses and GPs in developing and delivering patient information would be advantageous in improving patients' pre-implant understanding and their subsequent experiences of the DIT pathway. The benefit of this is reported elsewhere (Wagner, 2000) including, saving clinicians' time and ensuring important information for patients' care is provided.

Written information tailored to consider patients of different ages, extent of tooth loss, stages of treatment, or aspects of DIT when relevant and ongoing for maintenance of DI restoration should be considered. This written information could be further personalised to include some of an individual patient's needs as informed by implant clinicians. This could be facilitated by computer programmes (Bental et al., 1999). In addition, consideration should be given to the timing of information. Clearly it would be impossible to provide pre-scripted leaflets that allow for all combinations of circumstances, but the development of computer programmes that would allow a clinician to select from a menu of 'data' could be feasible. Lastly, the internet is seen as

crucial influencer of patients' expectations and may reinforce implant misconceptions. Clinicians should consider directing patient to well-known trusted sources and webpages.

The data analyses strongly suggest that patients need reliable information to allow them to differentiate between DI fixtures and super-structures in term of their longevity and long-term requirements. These should be also considered during patients' preparation for DIT at stage I. Furthermore, patients may need to be aware that DIT's outcomes may be different between individuals, and this can be affected by general and oral conditions. This should be addressed particularly when patients have based their knowledge of DIT on a successful history from friends or family.

Following the development of improved patient information, further research should be undertaken to investigate whether there is improved understanding and more realistic expectations of DIT. These studies may need to take into account the differences between patient's hopes and expectations and investigate these as potential components of health expectations (Janzen et al., 2006; Leung et al., 2009).

6.7 Conclusions

Multiple factors contributed to motivating patients to seek implants at SDC within the NHS. Besides the hope of eliminating the burden of tooth loss, patients' trust of NHS clinicians and the elimination of costs were key motivating factors. Whilst clinical-based sources could contribute positively to patient's knowledge and understanding of DIT, they are currently limited when compared to the widely available information from other sources. This necessitated enhancing the accuracy and delivery of clinical sources to overcome the current gap of patient implant knowledge and to cover topics that patients felt important. In addition, patients may consider dental implants as a permanent cure for tooth loss due to their inherit strength and stability. The use of metal ('*titanium*') and their fixation on the position ('*rooted within the bone*'), along with the concept that they are an advanced technique ('*recent technology*') may lead patients to underestimate other long-term biological factors that are influential in implant survival (Grey et al., 2013). DIs have limitations of which patients need to be informed at early stages of treatment planning. Correct and tailored clinician-delivered information is essential to ensure realistic expectations of the implant seeker.

Chapter 7 Data and discussion: Study A, stage I, patients' experiences of referrals and the decision-making process for implant treatment

7.1 Introduction

This chapter will report the remaining themes of stage I related to patients' experiences of the referral and decision-making processes.

The objectives of the data analysis in this chapter are to explore:

- 1) The main reasons for patient referrals for implant treatment provision within NHS secondary care, and,
- 2) Patients' thoughts about, and their roles in, the decision-making process in the context of 'restricted' NHS implant provision.

A number of themes evolved, which will be presented and discussed under the following headings:

- 1) The referral process from PDC to SDC within the NHS:
 - The triggers for patients' referral and the criteria for access to DIT
 - High expectations among patients of gaining DIT within SDC, under the NHS
 - Frustration with the length of the referral process
- 2) The decision-making process:
 - The length of time required for the decision-making process to be undertaken
 - The ambiguity of the patient selection criteria
 - The 'risk' of ineligibility for implant restorations within the NHS and the subsequent impact on patients' quality of life and tolerance of remaining treatment options.

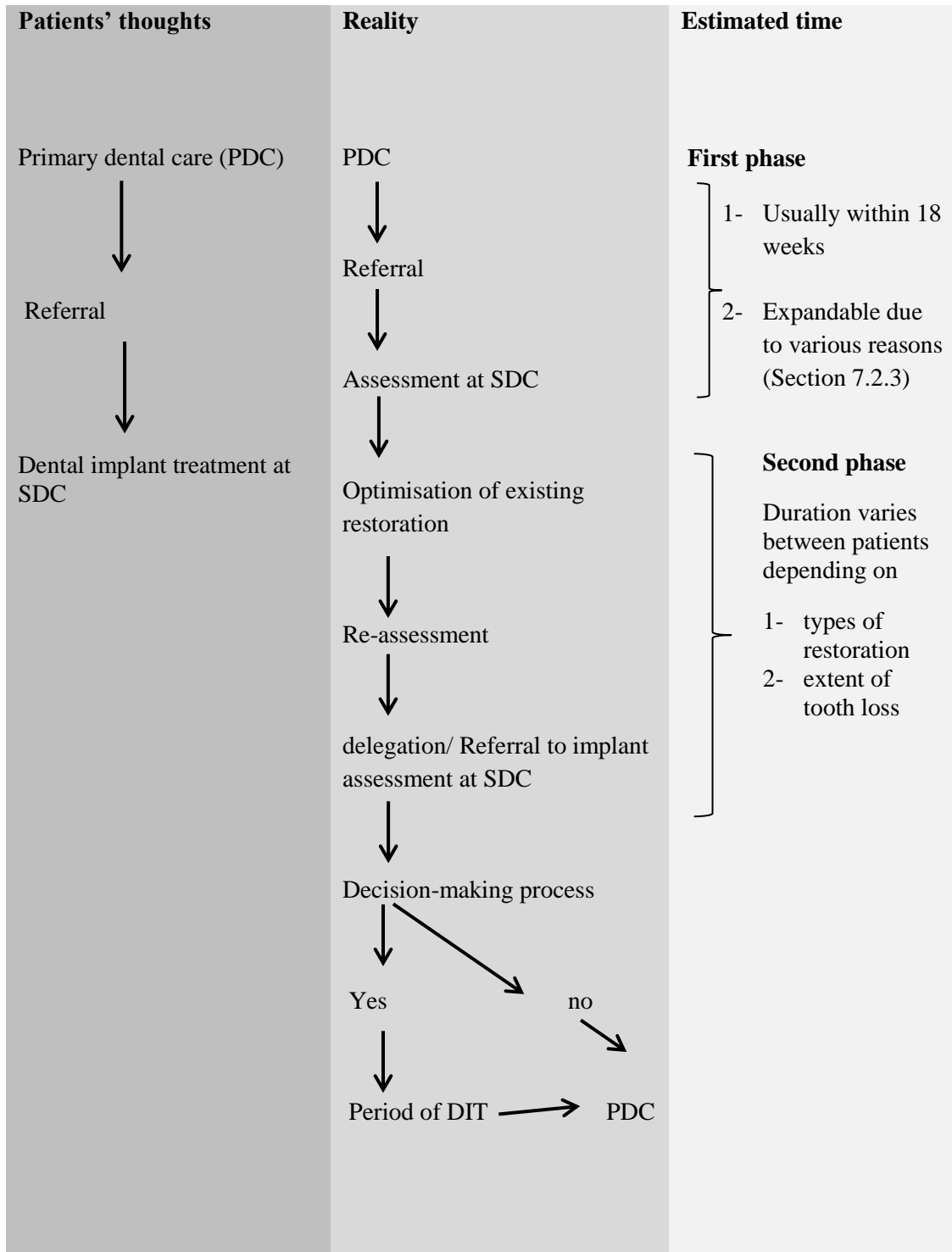
Interest in dental implant provision is growing, and patients are becoming increasingly aware of this type of tooth replacement (Wang et al., 2015). DIs are indicated in many

clinical scenarios to replace missing teeth, particularly when other options fail to perform satisfactorily. However, within the NHS, implant provision is restricted in order to manage a limited resource and prioritise patients with the greatest need. For this reason, guidelines for selecting patients have been published by the RCS (Alani et al., 2012). These guidelines reflect the need to ration implant provision. RCS guidelines and local hospital regulations on implant provision at SDC are discussed in detail in Section 2.4.4 and Appendix 2.

Briefly, the RCS clinical guidelines indicate that patients with certain conditions might be given priority with regard to the implant provision within in the NHS. Nevertheless, patients matching these criteria are not guaranteed DIT, as there may be other local resource considerations and conditions that impact on the decision-making process. The possibility of offering DIT depends on local commissioning and funding of dental services. Postgraduate and undergraduate courses may also provide additional resources that may facilitate the acceptance of a larger number of patients at different times of the year. Other considerations are related to patients' personal, dental and oral characteristics where there may be general or oral limitations on the feasibility and appropriateness of DIT.

Referral in healthcare is broadly defined as liaison within a network between the primary care practitioner and specialists (GMC, 2013). The aims of health-care referral are to facilitate effective communication between different levels of the healthcare system and to provide people with the best possible service by making effective use of hospitals and primary health care services. Another advantage of the referral procedure is that it supports primary care providers by giving access to experienced clinicians from secondary care (Stainkey et al., 2010).

Figure 7.1. Dental implant treatment pathways; Implant patients' thoughts and reality



7.2 The referral process from a primary dental care to secondary dental care within NHS

Analysis of the first phase of the patients' journeys revealed that during the initial time period following referral the majority of patients who had been referred specifically for dental implant consideration thought that they would be immediately assessed for DIT within their first appointment at SDC. In reality, patients could have several appointments, including assessments and optimisation of conventional restoration, before they were considered for DIT at an SDC within the NHS (see Figure 7.1 for 1st and 2nd phase of referral). The overall patient's pathway at NDH is in Appendix 15.

This study found that waiting times experienced by the participants following referral (first phase) was approximately 3 months, but on rare occasions the maximum waiting time was 18 months. Furthermore, the duration of the second phase varied greatly between patients, but could possibly be between 4 months and 2 years. This is influenced by the types of conventional restoration and the extent of tooth loss (i.e. fixed or removable prostheses).

7.2.1 The triggers for patients' referral and the criteria for access to dental implant treatment

Several triggers were observed for initiating a patients' referral to SDC; however, from patients' accounts at the point of referral, they believed that the referrals were driven by clinical guidelines, used by their GDP. This belief developed after discussion with their primary care practitioner about the possibility of implants for patients with particular conditions. This resulted in raised expectations among patients with regard to their eligibility and suitability for implants within the NHS (this will be further discussed in Section 7.2.2).

In general, patients may be referred by their GDP when they broadly fit into the categories of the RCS clinical guidelines (Alani et al., 2012), there are difficulties within patient management within PDC, and referral might be prompted by unresolved patient concerns surrounding an unsatisfactory new restoration. It was observed during participant recruitment that the main RCS guideline categories used during referral related to the edentulous mandible, tooth loss caused by trauma and congenital hypodontia.

In these situations the GDP act as a gatekeeper for referral to the SDC implant service provision (Field et al., 2009). In general, gatekeepers in healthcare systems are positioned between primary and secondary care to control access to advanced types of treatment and they mainly use judgement criteria when determining any grant of access to these resources (Forrest, 2003).

My dentist tried several things and he said that he couldn't really do anything more. She would send us to the hospital and said only implant can help you and it is free for cases like you and then I says 'oh yes I'll have them.

Sandra, 55, I, E, 131, CD

He [GDP] said that the way my mouth was, the gums down on one end, they said they did try making a denture for me, but it didn't work. It was still rocking in my mouth and it kept digging into my gums and it was so painful. He said, I think it's going to have to be implants, and then he said it can be done through the NHS because they got fund for people like me I mean who has sort of same problems.

Lora, 65, II, E, 98, tISOD

I've still got a few baby ones [teeth] on the bottom. I ended up taking four out, I had a palate in for six months and then the dentist, he said I can get them replaced by implants here because I had no adult teeth in place, because I born without those,

Georgia, 20, II, Pd, 88, tICs

For about half of this study's participants, the referral was initiated by their GDP because of skills or practice limitations. For the others, referral was initiated after patients' requests, and for a minority of patients self-referral was attempted and succeeded when patients instigated initial contact with the dental hospital based on prior knowledge of implant availability from a friend or relative.

I was referred to the dental hospital, actually from my dentist at the time, with, you know, these kind of problems that I was having [ulcers] And there were one or two areas of concerns, I think, that he wouldn't've been capable of doing that they were able to do here. And he mentioned implants I remember at that time as an option here for people like having the same sorts of my troubles.

*Mark, 68, I, Pd, 120, RPD, **Referral initiated by GDP limitation***

I was referred by my dentist because she made me one and were not stable it was moving all the time. So I was not satisfied and then I ask her to refer me to specialist so she decided to send us here.

*John, 53, III, E, 20, ISOD, 6 months. **Referral initiated by patient's requests***

He [GDP] was un-able to make it better. I contacted the dental hospital, just rang them up out of the blue and you know, said that somebody [relative] told me you do implant for patients who had no bottom teeth, in the bottom jaws and

you need patients I think at the time, possibly, they were looking for people, I was lucky that way.

Deborah, 72, III, E, 70, ISOD, 3 years, self-referral

7.2.2 High expectations among patients with regard to gaining dental implant treatment at secondary dental care, under the NHS: ‘Like a child waiting for Christmas’

As previously highlighted, the majority of patients had a high level of certainty and pre-assumption about their eligibility for the provision of DIT during the first phase of their journey (Figure 7.1). These anticipations may subsequently introduce difficulties in the long-term management of patients and may also place some restrictions on decision-making regarding the suitability of other conventional options of tooth replacement when DIT cannot be provided.

Oh this hospital does implant? I can't believe that there, when she said [patient's GDP] to me and I was like, and I went home and I was like on that high. I really was on a high, and I said to my daughter, I said, "I will get implants," and she said, "Mum, you can't." I said, "But yes because the, the dentist said." She said, "But Mum, it'll cost you a lot of money," and I said, "But no, I haven't got any money so I'll get it on the NHS".

Sandra, 55, I, E, 131, CD

When I got referred by my dentist for implant, it was like a black cloud had been taken. I could, I could see this, it was a like a child waiting for Christmas.

Diana, 33, I, Pd, 139, RPD

7.2.3 Frustration about the length of the referral process: ‘a long wait’

There were two main concerns identified by patients in their accounts of the early referral stages. One was related to the length of time spent waiting for an appointment from the SDC and another was realising the need for assessment of eligibility and the need for optimisation treatment before the decision on DIT could be initiated (Section 7.3.1). The waiting time for a first appointment following referral should be no longer than 18 weeks, according to the clinical referral guidelines of the NHS. Two-thirds of patients' referrals were within the NHS guideline's time limit. Yet, this was considered by some participants, particularly those who had deteriorating dentition and

unsatisfactory replacements, as stressful and frustrating and it led to thoughts of being forgotten.

I waited for long time, it was difficult to manage my plate at that time I remember I was desperate.

Nichol, 64, II, E, 76, tISOD

It was hard to wait. I thought my referral got lost in the paper system. It [the denture] was getting me down and making me depressed, and I lost my confidence, and I didn't like the fact I had a palate in my mouth.

Rose, 62, III, Pd, 70, ISFP, 7 years

To hear back about an appointment from here took four months, just to hear about that. It is the stress one feels usually while waiting for something. Also I was unemployed for four months, when I waited to, to hear about it, job interviews, it was a bit tricky It gives a kind a, a bad image 'young man with no front teeth'.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Among this study's participants, a minority had longer waiting times, extending to more than one year. The actual reasons behind the delay in the referral process (at first phase) could not be fully established from the data in this study, or from the clinicians in Study B (Chapter, 10). However, one of the patients who had an extended waiting time indicated during the interview that there was a change of dentist within her practice because of retirement; another patient mentioned that she had two referrals as the first referral was lost. Other factors that might cause delays in the referral process from primary care to secondary care are discussed elsewhere (Haynes and Thomas, 2005).

I think it was about eight, nine months waiting for the letter from the hospital I was devastated it was very long wait for someone like me with no proper teeth.

Martha, 27, I, E, 158, CD

The referral was a little bit slow took months and months I can't remember exactly but at least it took about 6 months to hear from the hospital.

John, 53, III, E, 20, ISOD, 6 months

I think it was about 18 months or so before I got the first appointment at this hospital. Of course, it takes a long time. Unfortunately, I couldn't afford it myself, so I had to wait.

Catherine, 76, III, E, 120, ISOD, 7 years

In contrast, some patients were accepting of the delay and indicated that, from their experience, waiting time is expected when treatment needs to be carried out in secondary care within the NHS.

Well one accepts that it's a dental teaching hospital and things do take time because things are planned around term time and things like that, when the students are there. It's not as one would if one went to a private dentist obviously.

Diana, 33, I, Pd, 139, RPD

I can't complain, I found all the procedures, the paperwork and everything takes time and this is something usually expected at the NHS service.

Amelie, 71, III, E, 96, ISOD, 6 years

- ***Inadequacy of information during the referral and waiting time: 'my dentist had no idea'***

Patients highlighted that there was a lack of information about the referral process and in particular the anticipated wait following referral from the primary dentist (GDP). Once the GDP referred the patient, they also had a limited role in assisting and reviewing the patient's dental condition during the waiting period, given the fact that those patients had unsolved complaints around mainly functional and aesthetic difficulties related to conventional restoration. Patients argued that GDPs should have a clearer understanding of time taken for the referral process for DIT before considering referral. In addition, the majority of the participants in this study indicated that an improvement in communication between the GDP and the SDC during that time would have improved their experiences and reduced their frustrations.

My actual dentist couldn't really set expectations because he didn't know what the wait time was with the dental hospital; didn't have an idea of how long it would all take.

Christine, 23, I, Pd, 145, RPD

The work on his behalf was fine [GDP]. It was what you'd expect from the dentist; but when he referred me he wasn't in contact with the dental hospital, while I am waiting, and he had no idea what so ever he did not know the process her for example for how long I need to wait with those teeth.

Liam, 32, II, Pd, 88, tISFP

He [GDP] didn't seem too clear on the referral process, or how long everything took. So he just said he'd have to send away for a referral for an appointment, and, he said, "It can take a month, two months" he's not sure. So it was after he said I was getting a referral, I was optimistic. I thought, "Yeah, excellent" I was expecting a letter within two or three months, but it was a, a long wait. I called the dentist a couple of times to see what was happening; whether it had been sent. So like he wasn't too sure on the process, how long to wait was completely unhelpful for me it was difficult that way.

Dennis, 20, III, Pd, 36, ISFP, 9 months

7.3 The decision process

At the first SDC assessment, participants realised that they needed to go through several stages of assessments for implant eligibility and optimisation of conventional tooth replacement as a part in the decision-making process for implant provision. Three broad themes emerged from the analysis related to patients' experiences of the DIT decision-making process.

7.3.1 Unpredictability of time required for the decision-making process: 'Hidden wait'

The length of time required to verify whether other options were possible in resolving patients' complaints was described by patients as an additional '*unexpected*' period of waiting time. Three factors contributed to the length of phase two of the referral (delegation within the SDC). Firstly, the numbers of appointments for assessments, investigations and optimisation of previous replacements; secondly, the involvement of a trainee or dental student in the optimisation process; thirdly, judgements needed to be made regarding patients' eligibility for referral within the SDC to the specific local implant team. From patients' encounters, it seems that the time required for phase two of the referral (Figure 7.1) cannot be predicted. Additionally, clinicians were unable to give patients advance estimation of the timeframe required for the clinical stages before delegation with implant team, and because of that patients may have experienced uncertainty about the timescale of their own treatment.

I am not sure of how long this will take but up to now from January. The first time I came, it is more than four months and it seems it is going on forever because I have another appointment after three weeks I think to have a new denture made.

Mary, 72, I, E, 88, CD

When I first went [to the dental hospital] they said it would take about 12 months to decide that they were going to do possibly implants. That was right at the beginning when I first come. But actually I had to wait a long time longer than anticipated. It is sorts of hidden waits. I am not sure of how long this will continue.

Alexander, 25, I, Pd, 120, RPD

I was seen by a lovely student I forget her name now. Actually there were two students, not sure from the names. She had to make for me plate before they consider me for implant. My appointment was not quick enough to finish

everything quickly I think three weeks in between and sometimes more because she had to fit the appointment between lectures and exams and it was long and I am not sure up to now if I'll get them [implants].

Elizabeth, 65, I, E, 125, CD

There was a long period of waiting until I could get my treatment I think it was about eight, nine months.

Georgia, 20, II, Pd, 88, IC

The time-frame extended to four years for one patient because of multiple failures in providing satisfactory denture before the beginning of DIT.

It is too long I've been coming nearly four years now and I still haven't got my teeth yet [patients at surgical placement stage]. I did have one set made that were completely wrong because they were miles too big for my mouth; I couldn't even open my mouth with them in. I've just been coming back and forward for the last three-and-a-half, nearly four years to have proper sets of dentures.

Nichol, 64, II, E, 76, tISOD

For some conditions, additional delays during the decision-making stages may happen because of required delegation within the SDC itself. Occasionally, patients might be assessed by different clinicians as a part of the decision-making process. When these factors were not clearly discussed with patients, this might create further vagueness around the patients' understanding of the treatment journey.

I've had two referrals there now, but I mean I, I, weirdly I, the last time they didn't indicate that they were going to look to see me again. But I know that they're very busy and you know, it's a, it's, it's not the, I don't think it's the biggest section in the dental hospital and time is always an issue with NHS.

Mark, 68, I, Pd, 120, RPD

Maybe a couple of years ago they said, "No" I thought that was, kind of, the end of the line for this kind of referral. But they are seeing me again in July.

Elizabeth, 65, I, E, 125, CD

It was explained, (particularly by younger participants), that difficulties in predicting the timeframe of the treatment pathway had further impacted upon their ability to make arrangements in their life, in terms of work and education. Employed patients were clearly affected as the times of their clinical visits were during working hours. . Multiple appointments, lack of flexibility of appointment time and the unpredictable length of time an appointment might take, all caused problems for individuals. Participants reported having to use holiday and special leave and being concerned about the impact of their repeated absence for job security.

Work is quite, sort of problem and they sort of allowed time for me to take - to go to appointments, and then make up the hours 'because obviously, like I - my hours were between line 7:00 and five o'clock. So coming here was sort of any time in the day and it is difficult to predict for how long.

Christine, 23, I, Pd, 145, RPD

I'm not going to lie, it [appointments] does affect my college and my studying time. All the teachers are like, "Why don't you book appointments out of college times?" I'm telling them it's not up to me, they give me the appointment and I've just got to attend to it. So I've told them that and they were just like, "Okay we see, we understand where you're coming from." If you just tell them I guess they understand, but you still do miss out on quite a bit, like today I was supposed to be at college but I'm missing out.

Lawrence, 19, II, Pd, 82, RPD

I was apprehensive telling my employer that I had to keep getting the dental appointments. I think they've been quite accommodating, but I have had to use up holiday pay, and use up sick pay, and special leave. One time for e-example, an appointment was changed at the dental hospital- it changed here on a few months ago and I didn't have enough time to give my employer notice. Some time I felt I may lose my job because it's very difficult to get a job up here especially when there's, I have - well, a limited skill base, when it comes to the northeast.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Patient's concerns related to the length of the treatment may be exacerbated by their earlier underestimation of the time required for the whole process of DIT. Patients may establish their primary assumptions on the basis of private practice plans or previous treatment experiences.

I assumed treatment may take four months. But when you're getting it free, I don't think you can argue about the time length because it will be long.

Christine, 23, I, Pd, 145, RPD

It was longer than I thought it was going to be, I didn't really expect it- because I know a couple of my friends as well, had implants as well, but had them a little bit they were a bit quicker. They had implants they, in private practice they were allowed to put the crowns on maybe three, four months after they had the implants in.

James, 23, II, Pd, 86, tISFP

Patients worried that the length of time required for the decision-making would adversely impact on the possibility that they would be offered implant treatment as they anticipated that there may be possibility of their oral health deteriorating during that time to a point where DIT would not be an option for them.

Because it is [jaw] kind of continuously degraded over time. I am scared there will be no bone left to hold them so I will fit less in with their list of criteria when they want to make decision on dental implants.

Elizabeth, 65, I, E, 125, CD

I think there is a much broader picture to be considered. I spent about a year and half just a lot of time a lot of effort and nothing guaranteed to work at the end. Will they consider putting implant now? I think my chances have reduced because of the, my mouth has changed and my remaining teeth also.

Diana, 33, I, Pd, 139, RPD

- ***The length of time required for treatment ‘Is it worth that much another a bout of time to go through?’***

After experiencing a lengthy time between referral, assessment and pre-implant treatment, patients then considered the length of time that might be required for implant placement and some patients reconsidered their decisions about whether to continue with the process after the end of the optimisation stages. The time period required in identifying patients’ eligibility for DIT potentially influenced some patients’ thoughts in the decision-making process regarding DIT.

She made us quite aware of the like risk and the benefit of the implants and a bit, bit of a sticking point, when she said it needs long time of waiting and treatment, she wasn’t certain how long oh when I thought, ‘Is it worth that much -another -a bout of time to go through?’.

Christine, 23, I, Pd, 145, RPD

It’s another period of time [patients had two attempts of dentures] where I’ve got to come back and forwards, and it’s just too much for one at my age so I need to think about this further.

Mary, 72, I, E, 88, CD

Some participants at the advanced stages of DIT, particularly older participants, pointed out that early estimation and acknowledgement of the length of the waiting time during the referral phases and assessment, in addition to the time required for implant treatment, could possibly have influenced their decision about whether to proceed with the referral process at the early stages or choose other types of tooth replacement. This was clearly observed during patient discussions:

It’s been a year and about eight, nine months to get this far. But in another sense if I knew it would take this long I think I would have tried something different.

Smith, 70, II, E, 110, tISOD

I'm appreciating what they're doing for me, really appreciating it. Their time, kindness so attentive and effort, I can't blame them. But if I knew it would take this long and it needs waiting I mean waiting list and sort of I need to wait ah for...and things I could think about other sorts of things.

Lora, 65, II, E, 98, tISOD

Is it worth that much - another - a bout of time to go through?" I just thought it was best to stick with what I've got, and deal with it, so I am not sure what to do I mean to say in my next appointment? The time to come here and there, and back and forwards is my main concern.

Christine, 23, I, Pd, 145, RPD

In contrast, for other participants who believed that there was high chance of them obtaining implant treatment and benefitting from ISP, the length of time was not an issue, as they were less concerned about the stages of the whole procedure and more motivated to experience the treatment outcomes.

I know it's painful and it's gonna be a long process, but, I am sure it'll be worth it. If I can get them, it'll be worth it. It's gonna be a massive thing for me. So I does not matter how long it would take.

Martha, 27, I, E, 158, CD

At the beginning, obviously when I got told I would be able to get put forward for the implant treatment I got told more on how it works and the possible timescale of how long everything happens, I realise now it was not so accurate I mean. Timescale. But time is not a big issue for me as long as it will be sorted at the end.

George, 28, II, Pd, 77, tIC

Look as long as, at the end I get, them the implants they will make me feel better and they will hold those [the dentures], and time is an issue I am working but we have to compromise you know. If I can't pay for it privately then I must wait for it.

Sandra, 55, I, E, 131, CD

7.3.2 The ambiguity of patient selection criteria

Participants in this study, who were motivated to obtain DIT (Section 6.2), felt that there was vagueness in the patient selection criteria used by the SDC clinic during the decision-making process.

I don't know how they make the decision, that's the thing. I don't know what, who says, "Yes, you can have implants"; "no, you can't have implants". I don't

know what the decisions are based on, and that would be nice to know, how people qualify for them; what's the criteria fit into that would be beneficial. Why are they so expensive and why aren't they more widely available for people like me? I think implants need may be viewed almost kind of patient by patient. I would actually, yeah. I would like to know what's entitled, what's out there, yeah, because I don't actually know a lot about it. They are not clear about that.

Martha, 27, I, E, 158, CD

Oh I don't know, maybe a couple of years ago, they said, "No" and then again quite recently, this year, earlier on this year sent appointment and again they were kind of not clear.

Mark, 68, I, Pd, 120, RPD

My dentist said you are going to get them from the NHS But when I first went to the hospital they said implants were a possibility but it was the last resort.

Maya, 21, I, Pd, 110, RPD

- ***Limitations of DIT selection criteria from patients perspectives***

Patients occasionally experienced disappointment during the decision-making stages when a conflict of information existed between the GDP and the SDC clinicians. This feeling of disagreement in clinicians' judgements of suitable treatment might further complicate the decision-making process.

I will tell you again, the only reason why I'm here today is because my maxillofacial surgeon at city Hospital, who did all of the kind of fixing my face [after trauma] that wasn't my teeth Dr said that dental implants would be part of my treatment and then I went to a follow-up appointment with someone at the dental hospital and they weren't particularly interested, and told me that I wasn't eligible for implants. And then the dentist here told me I wasn't eligible for implants over and over again. By practice dentist said I can get them here. So yeah, no one's really tried to clarify.

Gary, 24, I, Pd, 142, RPD

The first doctor I saw, he thinks that I would definitely benefit from them, with my age, my lack of confidence and the amount of bone level that I've actually got, he thinks I should be on the priority side, rather than not, so he said that more than one time. But the next appointment the other team [implant assessment clinic] tend to be hesitant and they said I may not get them because I may be not eligible. So why.

Diana, 33, I, Pd, 139, RPD

Some older participants thought that during the decision-making process clinicians were hesitant to offer DIT to elderly patients, and that DIT may be mostly offered to younger patients with limited tooth loss. In addition, they believed that there was a cost-

effectiveness element in the decision-making process, which might be a barrier to them obtaining DIT.

They were explicit about how much is this going to cost the hospital and what the profits are. When I asked I mean they say that age isn't a consideration, but, you know, maybe they think, "This is an old lady so." I don't know, but either way, the doctor sees the value in doing implant and he said I should have implant. But the implant people seems to be less, their thoughts seem to be more about, for how long will it stay?

Elizabeth, 65, I, E, 125, CD

It is really making no sense but I don't know, if, say I'd lost, kind of, four or five teeth in an accident and I was younger girl, then I think, probably they would, you know, say yes she needs them consider me consider that be reasonable and ideal criteria for implants placement. Ah do not they think I might suffer more than someone who had accident or lost only some teeth.

Sandra, 55, I, E, 131, CD

For the individual, someone like me who's, you know, sort of advanced in years and, uh...they think implant is not beneficial But for me if I could secure this lower denture that would open up a, a great many other kind of opportunities for me and would not, not only do that but would manage a big part of the risk that I still have in my mouth because of the induced ulcer I am having.

Mark, 68, I, Pd, 120, RPD

7.3.3 The 'risk' of ineligibility for dental implant treatment within the NHS and the subsequent impact on patients' quality of life and tolerance of other treatment options: 'I'm scared I don't qualify'

Patients were informed, mainly verbally, about the policies relating to the selection of patients for DIT at SDCs within the NHS after consultation with the implant team specialists, and at that time they realised that DIT might not be obtained. At that stage, their thoughts were mainly focused on the risks to their oral health if they were not offered an implant restoration. Patients identified that they perceived the decision-making process in a different way to the clinicians. They proposed that implant providers and clinicians should consider the impact on the patient's life of denying DIT rather than considering the risks and costs of providing the treatment.

They [clinicians at SDC] have got this narrow set of vague criteria here. If it fits, okay. If it doesn't, you're out it is really not considering individual need. I felt really restricted sort of tried I tried to speak up my points and give them some of my thoughts, they were listening.

Alexander, 25, I, Pd, 120, RPD

Well I think there is a, another consideration that is, "What are the risks if we don't do implant? What is what the quality of life is for this person if we simply do nothing and if we simply say, "No" and that doesn't seem to be there, to me.

Mark, 68, I, Pd, 120, RPD

I've got no teeth, so it's just hard to cope with and the cost is real obstacle. That is why I am really worried don't know what to do if implant was not an option.

Elizabeth, 65, I, E, 125, CD

Participants felt they were preoccupied by thinking about the consequences of not obtaining DIT, particularly after the experience of several previous failed attempts at conventional restorations. Some of the participants thought that they could have acquired a malignancy due to repeated traumatic ulcers induced by unstable RPDs. In addition, doubts about their ability to perform in particular jobs had increased (work and tooth loss is discussed in Section 6.2.1)

I worry that, maybe, I might get something serious inside my mouth, because of ill-fitting denture. I mean you do, you know, I read information. And if you get repeated mouth infections, particularly in the same place, then you can develop some kind of oral cancer it depresses me a little bit sometimes., if I could get rid of this, kind of, denture movement and stuff like that, then I might not get as many infections as I get now. Clinicians here have considerations seem to be, be more about, "How successful would this implant be?" Rather than, you know, "What is what the value of this for the individual is? What is the value of this for this patient?"

Mark, 68, I, Pd, 120, RPD

I'm scared in case I'm not allowed them, or I don't qualify, Actually working with clients in a counselling profession, you've got to be confident in yourself to do that job, and I'm not at the moment. ,

Martha, 27, I, E, 158, CD

Participants appreciated the fact that DIT could not be offered to all patients within the NHS. Yet, they argued that the selection criteria should be based on different parameters with respect to individual patients' needs rather than predefined protocols. Participants proposed that consideration of patients' financial limitations should play a clear role in the decision-making process by distinguishing patients who were unable to pay for private DIT and prioritising them.

It shouldn't be available for everyone I agree. It is expensive, and everybody in this world has a budget, and you can't fund everybody who wishes to have them. So you have to look, as far as I'm concerned, at each individual case and their needs, ability to pay for private treatment and is it necessary for this

patient? You can't just have dental implants because you want them. If a plate can do the job, then fine. But for me I am suffering.

Diana, 33, I, Pd, 139, RPD

Where do you go after dentures? There's nothing – there's nowhere else to go, really, is there, apart from implants? So, that- that's how it ended up coming about, is the next step from here is implants so if they say no I can't pay for it and I can't continue like this.

Martha, 27, I, E, 158, CD

Patients believed that a decision against the provision of DIT would impact on their psychological well-being and quality of life. Therefore, they suggested that during the decision-making process the possible impact of not offering DIT on a patient's psychological and emotional health should also be considered and addressed.

I don't know if they considered "Will he become more and more depressed?" what is the quality of my life if I continue like this? I can't wear the plate the one they gave me. I am already depressed spending most of my time indoor.

Gary, 24, I, Pd, 142, RPD

So to me consideration, it goes on the mental state of the person and how it's affecting the person. Therefore, you then feel like you have a responsibility for the mental side of this patient. It's mentally affecting me, and I'm getting down and depressed, and you know about it, and you know how bad it is for me. Then the likes of that should be taken on board, because you partly have a responsibility to try to help that person. So to me, it's all about the needs. When you have a budget, and the hospital is giving a certain amount of money for implants for that year, you have to decide which are the needy, and which are not the needy not who fit or does not fit the protocol.

Rose, 62, III, Pd, 70, ISFP, 7 years

- ***The restriction of a fully shared decision***

In general, the decision-making process regarding DIT may be shaped by three main elements: motivators for DIT, barriers to DIT, and dentist--patient relationships (these have been discussed in Section 2.4). In Study A, patients thought there were restrictions on their role in the decision-making process because of the ambiguity of the selection criteria for DIT. Clinicians' considerations during the implant assessment influenced patients' ability to participate fully in the discussion during the decision-making.

Patients believed their roles with regard to implant provision were shaped by factors other than their biological (oral and general health) suitability and need to gain DIT. These were mainly around 1) eligibility to access free DIT at the SDC, and 2) the selection criteria in the SDC within the NHS, which, in some ways, replaced the cost

factors and acted as a barrier when patients had no other health restrictions for implants. In addition, the decision seems not only to decide for DIT versus no DIT but also to choose from different types of DIT. Patients might clearly prefer fixed but have to accept what they are offered.

You need to pass the test, literally every single stage of it. It is about the Drs or the hospital or whatever I don't know who has ability to provide. Whatever you say it won't count. It is still an option for me if I can pay they said.

Alexander, 25, I, Pd, 120, RPD

So it is restricted [dental implant] they have to select what is justifiable they said I suppose because its cost wise may be and I understand that. So like if they ask I should accept what is made available for me it is not what I want but it is available.

Elizabeth, 65, I, E, 125, CD

This is what you've got to think of. I mean, it like I say, if I could get permanent, fixed permanent teeth, I'd love that, They cannot listen to you to what you want,, there is constraint. So you cannot choose what you want you need to accept what they could provide.

John, 53, III, E, 20, ISOD, 6 months

I am fit and well and my oral hygiene is great now, and I told them my considerations I wanted something fixed and they said it is an option, but it is impossible here it may cost awful lots, obviously they could offer only these if there is a place

Sandra, 55, I, E, 131, CD

Occasionally, participants felt that the criteria for patient selection for DIT do not consider the long-term impacts of tooth loss and less satisfactory restoration on a patient's life.

During the assessment time, I don't think that a great deal of that is, "What does this patient think? What is the value that will be added to this patient as a result of this, this treatment- this particular procedure? My thoughts were, "What will happen to me if I don't have implant done?" my condition will continue to, kind of, probably, get worse. It's almost, kind of, a cost/benefit analysis, you know? They did understand my concern but they went back to their sets of roles.

Mark, 68, I, Pd, 120, RPD

In contrast, some patients, seemingly the elderly, were not keen to participate in the decision-making process. They preferred to follow the clinicians' decisions because of their trust in the clinician in secondary care. This might be related to their initial motivation for DIT.

They are lovely people they knew what they were doing I left it up to them, I mean I told them I want proper teeth so I can speak and eat; I know they will do what they can do.

Mary, 72, I, E, 88, CD

Patients fully recognised that the decision depended on the funds available. But they continually argued that they could be part of the decision-making process and clinicians should consider patients' disclosed needs.

I know it comes down to budget and money. But in between clinicians have to try fit in some customer care and understanding of the patient's need. Why do they need to walk away and decide who can have the implants and who can't? I tried denture and they did not work why should I try again the same thing, and spend more

Elizabeth, 65, I, E, 125, CD

- **Patients' refusal of free implant treatment**

Patients' refusal of provision of free DIT has been reported in the literature (Ellis et al., 2011). Other research findings are echoed at this study. Patients' decisions to refuse were related to several factors: anxiety and fear of pain, consideration of their suitability for DIT due to their age, and the requirement to stay free of teeth during the healing period. Interestingly, participants in the current sample also identified that they were hesitant about accepting DIT; that this continued within the decision-making process; and how their thoughts changed and they reconsidered their decision after obtaining more knowledge. The patients' primary concerns concur with the literature.

I refused at first because I was a bit scared, I thought having a foreign thing in my mouth, and the pain of the procedures then I came home and I went on the internet and I read about all these people that had had implants and they said it was the best thing they ever did. At my next appointment I told them I had changed my mind, I was still nervous when I went but they made me feel so at ease.

Lora, 65, II, E, 98, tISOD

My husband first died I thought "Well, how long have you got to live" you know, is it going to be worth it, type of thing, you know? and then some of the people that I know are like in their 80s, I'm thinking, you're going to have a long life and if you've got no teeth at all, and it's just, your [ridge] is just gonna get worse as time goes on, you know? And I'm thinking probably should think about it now and have it done if possible.

Mary 72, I, E, 88, CD

At first I wasn't too keen on being without any bottom teeth for three weeks. That was the thing that put me off. So I decided against it. And then I was still

having that much bother with ulcers and things. So I approached him again and asked if I could go on to it. He said, yes, there was a place. So, yes, I suppose it was my idea.

Alice, 70, III, E, 80, ISOD, 2 years

7.4 Discussion

7.4.1 The Referral process

It is observed in this study that although self-referral was occasionally observed, the usual triggers for patients' referral for DIT within the NHS were mainly facilitated by their GDP in accordance with RCS guidelines, or when greater skill level was needed to pursue patients' treatment. These are in agreement with other research by Field et al., 2009. In addition, when patients first approached the SDC, they strongly believed in their entitlement to implant treatment. This initial high expectation of implant provision potentially introduced difficulties in waiting for assessment, decisions related to patients' treatments and their satisfaction with other types of more accessible conventional dental restoration.

Data analysis of this study identified two main issues in relation to patients' experiences of the referral process for DIT at an SDC within the NHS. The first was related to patients' perceptions of the length of time to be seen at an SDC, for assessment and decision-making; second was the lack of clear and rigorous referral guidelines and communication between GDPs and SDCs in relation to DIT. The need to improve communication between primary and secondary care was previously highlighted (Fairbrother and Nohl, 2000).

There is a lack of research regarding the referral process in dental care services within the NHS, which makes relating the experiences of current patients in this study to others from the dental literature difficult. However, previous study conducted in the northeast found that majority of GDPs who facilitate implant provision at PDC prefer to refer patients to SDC rather than other primary care practice (Field et al., 2009). A delay in the referral process is reported in some medical NHS secondary care services and suggestions for solving this issue were made in relation to other patients' medical care (Brealey et al., 2012). Nevertheless, after obtaining referral from a GDP regarding unsatisfactory dental replacements, particularly when the suggestion of implant provision was discussed, the waiting time (even when within acceptable NHS limits) was considered by participants to be frustrating and long.

The reasons behind these patients' perceptions could be related to the primary patients' high expectations of obtaining DIT within SDC (*'like a child waiting for Christmas'*),

the impact this waiting had on patients' lives (*'a long wait'*), and insufficient patient assistance by GDPs (either in terms of information or treatment). The quality of life of those patients, who were mostly experiencing hardships with their oral health and restorations, was potentially affected. However, this study cannot argue that such waiting has an impact on patients' oral health or general well-being as those might be potentially linked to the consequences of tooth loss (Nordenram et al., 2013).

On the other hand, the reasons behind some occasional lengthy waits for appointments (i.e. more than 4 months) have not been clearly established from this qualitative investigation. It could be proposed that several factors contribute to this delay; some of those might be related to GDPs in PDC and others to the SDC. Those include delays in making and/or processing the referral, high volume of patient referral and long waiting lists, lost referrals, and other factors (Haynes and Thomas, 2005). Additionally, when patients accessed the SDC directly, this may have contributed to increased demand for the service, as self-referral attempts were observed in this study and in another study conducted at the same hospital (Exley et al., 2012). The roles played by GDPs in NHS dental care as gatekeepers of SDC resources could be enhanced in relation to referral for DIT.

The experiences of potential implant patients during the referral process could be improved in several ways. The introduction of clearer referral strategies and better patient tracking facilities could ensure more efficient inter-professional communications and relationships between GDPs and SDC clinicians. This is to improve patient information and assistance during waiting for assessment. Furthermore, improved referral guidance could facilitate predicting the timeframe that might be required for assessment and decision-making for DIT, and therefore patients would be better informed and their concerns acknowledged in advance.

One strategy suggested elsewhere to improve referral guidance is to share the referral decision between the GDP and the SDC when the patient's condition is diagnosed (Forrest, 2003). This could be achieved by using electronic systems that integrate clear guidance regarding the possibility of providing DIT within SDC on the NHS. With continuous updates, this guidance could identify information about the timescale required to process the referral, the investigations that should be done before the referral, and expectations of the possibility of DIT within SDC for individual patients (in accordance with patients' personal characteristics and preliminary dental condition).

Further possible information that could be shared (between the GDP, the SDC and therefore patients) relates to the possible involvement of students in some stages of the treatment at SDC and the impact that that this could have on the duration of the treatment.

The advantages of using e-referral in dentistry include improved security and delivery in an efficient and reduced timescale; superior documentation, liaising and reporting; effortless identification of priority patients (Gu et al., 2014); and increased patient involvement. Therefore, it could be suggested that using well informed e-referrals may influence patients' initial decision of referral by two ways. First, it would allow patients to clearly anticipate the stages and the timeframe required for treatment and therefore give them the opportunity to decide whether to proceed with the referral or decline it. Second, it would provide patients with a clear concept about the possibility of obtaining DIT at SDC within the NHS. Further study might be required to investigate the influence of RCS guidance on GDPs when deciding referrals to SDC within the NHS dental treatment framework.

7.4.2 The decision-making process

Patients' and clinicians' roles in decision-making for treatment is widely debated as patients increasingly desire active involvement in decisions about their healthcare (Rapley, 2008). It is important to refer the reader here to the literature review (Section 3.6) in which the framework of the decision-making process is provided, and also to Chapter 6 (Section 6.2) where the main local motivators for patients seeking DIT within the NHS were identified and discussed. Briefly, they can be summarised here as being mainly related to the impact of oral condition and restoration on patients' lives; the elimination of implant treatment costs in SDC within the NHS; and the trust that patients, most of the time, afford NHS clinicians.

- ***Implant decision-making and the barrier of DIT at NHS SDCs***

Despite patients admiring and trusting clinicians at SDCs and their ability to establish partnerships with the patient, the findings of this study indicated that patients perceived multiple obstacles to persuading in favour of their preferred treatment and getting involved during the DIT decision-making. Those obstacles were firstly related to the patient's perception of the vagueness of the implant selection criteria at SDC. The

participants in this study felt that they were offered conflicting information by different clinicians about the possibility of DIT, which additionally raised patients' frustrations and hindered them from identifying and understanding their eligibility for DIT. This inconsistency may be due to the fact that the current RCS guidance is open to subjective interpretation by clinicians, which can raise conflict in the information offered by GDPs, and clinicians at SDC, to patients.

Secondly, there was a lack of reliable early acknowledgement related to 1) the length of time required for the whole implant treatment pathway '*a hidden waiting*', 2) the possibility of implant treatment with DIT, and 3) the impact of a negative decision on patients' quality of life. When a decision is more likely to be against the provision of DIT, patients' concerns about age-related discriminations and developing serious illness should be properly addressed via better clinician communication and through monitoring and collaboration.

During the decision-making process of DIT it is known that it is the clinician's responsibility to assess the patient's understanding of DIT in terms of information about the treatment stages, restoration types and expectations of treatment outcomes (Narby et al., 2012). However, locally at SDC within the NHS, supplementary information related to: 1) the scarce possibility of considering DIT in the first instance on assessment and consultation, and 2) the length of the stages for optimising previous restorations and the chances of future DIT provision should be shared transparently and honestly with patients at early assessment stages and before the commencement of work on other restorations. An initial formal judgement of implant eligibility might influence patients' decisions about whether to proceed with the subsequent treatment at the SDC and is important to avoid future disappointments. A burden can possibly be placed on patients by proceeding with treatments that they may not be satisfied with, if these are offered when they are anticipating the subsequent acquisition of DIT.

Supported by data from this part of the study, there are two main limitations of the current RCS guidelines for prioritising patients for DIT at SDC within the NHS. First, the guidelines are loose and can introduce contrasting interpretation between the GDP, SDC clinicians, and patients. Second they also give less consideration to individual patients' needs, for example patients' quality-of-life measures. A loose referral process can result in high referral rates and lead to inappropriate demands on consultants at SDCs (Brekke et al., 2008).

7.5 Conclusions

The results of this part of the study suggest that clear information provided in advance about the whole treatment process in SDC should begin at the GDP before the referral is progressed. Patients were mainly concerned about the length of time of the treatment pathway, their role in the decision making process and their eligibility for obtaining implant provision. Clear referral guidance and robust clinical communication about the implant decision stages would resolve patient uncertainty and ensure an SDM environment.

Chapter 8 Data and Discussion: Study A, stage II. Patients' experience of implant placement and the healing process

8.1 Introduction

This chapter reports the findings of patients' experiences at stage II (period from beginning of the IPS and lasting up to the placement of the TIRP). A substantial amount of the data and findings in this chapter has been published recently (Kashbour *et al.*, 2016) (see Appendix 16).

The views of the participants regarding the surgical placement and the immediate implant restoration were explored in addition to patients' earlier anticipations related to stage II.

The objectives of the data analysis at this stage were to explore:

- Patients' thoughts, feelings and expectations of their surgical implant placement
- Patients' experiences of the post-surgical healing stage
- Patients' experiences of the TIRP

The themes were sub-grouped according to the treatment phase as follows:

| Aspect of treatment | Themes |
|---------------------------------------|---|
| 1 Surgical implant placement | <ul style="list-style-type: none"> • Overestimating the difficulties and the trauma of the surgery • Being sedated |
| 2 The healing | <ul style="list-style-type: none"> • Underestimating the morbidity of the healing stage • Impact of IPS on patients' daily activities • Support after IPS • Being without teeth • Oral hygiene |
| 3 The transitional implant prostheses | <ul style="list-style-type: none"> • The fixed restoration <ul style="list-style-type: none"> • Hypodontia patients • Overdenture • Another period of waiting |

Table 8.1. Themes framework of stage II

As discussed in Chapter 4 (Methods and Methodology), stage II is defined in this project as beginning at the time of the IPS and ending after the placement of the TIRP. Clinicians further define the two-stage and delayed implant loading technique into two surgical phases (Byrne, 2014). The first phase involves the surgical procedure of implant placement into the jaw, and the second phase involves exposing the implant and placing the final abutment. Subsequently, the restorative phase may include two main procedures, the TIRP and definitive implant-retained restoration (which will be considered within stage III in Chapter 9). The TIRP will therefore be considered as part of this stage.

Data relating to stage II of the procedure forms the basis of this chapter and was collected from patients at stages I, II, and III in the following manner. Patients' retrospective accounts of their experiences of dental implant surgery were gathered from 11 interviews at stage II (undertaken between 3 and 18 weeks after the surgery) and 16 at stage III (at least 6 months after the surgery). In addition, patients' prospective expectations of implant surgery were collected from 11 interviews at stage I of the implant treatment pathway.

8.2 Patients' anticipations of implant surgical placement

8.2.1 Anxiety and thoughts of pain

Patient had implants placed under local anaesthesia, and more than two-thirds of this study's participants chose to be sedated during the implant surgery. The implants were placed using a two-stage and delayed implant-loading technique (Misch, 2014). In relation to patients' experiences of IPS, patients identified that they had overestimated the amount of pain they would experience during surgery, which in turn resulted in them being anxious about the IPS. Nonetheless, they reported having not been very interested in obtaining in-depth information about the surgery until the point where a decision had been made to proceed with implant provision. This avoidance of obtaining information about the surgery was seemingly an attempt to avoid further anxiety and fear of surgery. Patients also sometimes related this to the trust they had in their clinicians.

I was scared at the beginning, I really was not, as I say, I was not interested in knowing more about the surgery beforehand.

Liam, 32, II, Pd, 88, tISFP

I didn't want to know about surgery, what happened and how the implants came about to eventually go into your mouth and things like that. I didn't really want to know any of that side of it. I didn't, may be because I trusted in them 100%. I could put my complete trust in them.

Andrea1, 50, III, E, 120, ISOD, 5 years

Not bothering, I had no interest in knowing the details at that time you know, I was not interested in knowing about the surgery.

John, 53, III, E, 20, ISOD, 6 months

The majority of the patients anticipated that whilst there would be pain associated with the surgery, this could be tolerated in order to achieve the goal of the treatment and thus put an end to their oral and dental challenges. These patients mainly focused on the pain and discomfort during the surgical procedures as being short-term in nature.

If I have to go through some pain, I'll go through any pain whatsoever, right, to have, to be normal again, it doesn't frighten me the pain and surgery, and that, it's a means to an end

Sandra, 55, I, E, 131, CD

I just think to myself, "This is something you have to go through". I know it's painful and it's going to be a long surgery, but, it'll be worth it. If I can get them, it'll be worth it.

Martha, 27, I, E, 158, CD

Obviously it's a little bit of pain and a little bit of suffering for a great operation and the chance of having permanent teeth.

George, 28, II, PD, 77, tICs

It has been reported in the literature that the acceptance of pain and the consequences of implant surgery can be associated with patients who reported less satisfaction with conventional dentures and who show high motivation regarding the provision of DIs (Hof et al., 2014). This is echoed in the views of this study's participants.

I haven't thought about the surgery, to be honest. It's just one of those, I've always thought I don't want a denture because it is, it's spoiling the roof of my mouth and I'll do anything to get rid of it. The pain even going through pain, which I, I've never, ever, ever liked going to a dentist because I've always had problems getting teeth out. it scared, scared me to be honest, but now I realise I'd rather have a healthy, a healthy mouth.

Diana, 33, I, Pd, 139, RPD

I'm not really concerned about the pain, or the difficulty in terms of actually getting these implants in there. I would just like them in there. Well no, the

surgery and the pain weren't my concerns. My concerns are that they won't do it, because what I was saying to them is, "If there is a risk, I'm quite happy to accept that there is a risk".

Mark, 68, I, Pd, 120, RPD

I know about the surgery, I'm not really bothered to tell you the truth. They can do anything. I'm just hoping that the implants will keep my teeth (denture) in so I can lead a normal life.

Mary 2, 72, I, E, 80, CD

Concerns related to the post-surgical consequences and the healing stage were disclosed on several occasions. Some of those related to the success of the surgery, the length of time that the patient would be without dentures or dental restoration and post-surgical infection:

Will My Surgery Be Successful?

Maya, 21, I, Pd, 110, RPD

I'm not really like bothered about the surgery and stuff, if I could get implants but I think it would be like the afterwards; of healing, and thinking, has it gone okay?"

Christine, 23, I, Pd, 145, RPD

The possibility of acquiring infection after the surgery was considered as one of the ultimate risks that might necessitate management; however, whilst patients recognised that infection was a possible consequence of surgery, they anticipated being able to overcome this. Patients indicated that their knowledge of the possible surgical implications would not deter them from accepting implant therapy if offered.

Infections are my main concern, I mean, which is a, a major risk with any type of surgery or anything like that, which I'm well aware of and whatever else goes with it, goes with it, you know what I mean? I'd hate it if I did get an infection but I mean if I got one, I mean we just deal with it. Whatever problem arises, you just deal with that problem and move on to the next.

Sandra, 55, I, E, 131, CD

The surgery doesn't frighten me. I'm not saying I won't be nervous, but I do accept it is something I need to deal with. So for example it is possible to end up with infection afterward but everything could be managed isn't it?

Maya, 21, I, Pd, 110, RPD

Once a decision to provide implants had been reached, patients felt more interested in obtaining more information about the IPS.

But after they had made the decision and then decided to go ahead, yes I wanted to know more about it [the surgery].

Dennis, 20, III, Pd, 36 ISFP, 9 months

When I got referred to level 6, to Dr [at implant clinic], I was interested to have more idea about the whole thing I mean the surgery.

James, 23, II, Pd, 86, tISFP

After that, patients believed that they had reliable and adequate knowledge regarding the technical aspects and the stages of the implant placement procedure. After discussion with the clinician and receiving detailed information related to the IPS, patients felt that they were sufficiently prepared for stage II of DIT.

They said "We're going to have to open up your gums, and if there are not any bones there we're going to have to take some bones from your cheeks or something." Which I was really scared about, but once they found out, when they did loads of x-rays, they were like, "It looks like there's plenty of bone there so we're not going to need it.

Lawrence, 19, II, Pd, 82, RPD

I feel I got all the information, they were like, "This is what's going to happen, this is what's going to happen next, it may take couple of hour, you may feel some pressure and so on

Georgia, 20, II, Pd, 88, ICs

I definitely got the right information. They were telling me exactly what I'm going to go through during the surgery, how's it going to be, I got the exact right information, I feel so I was ready for it

Helen, 48, II, E 88, OD

8.2.2 The real surgical experiences: 'overestimating the implant placement surgery unpleasantness'

After implant surgery, patients felt that although they had been well informed, and were well prepared for the pain, their anticipation of the difficulties of the surgery and the severity of the pain during the implant surgical procedures were excessive. Patients ascribed their positive experience of the IPS to the skill of the clinicians and the effect of the anaesthesia and sedation.

Oh, I think I overestimated the surgery. Definitely a lot easier than what you would think it was, plus, I mean, I was knocked out. Well, I wasn't knocked out, but, you know, you're not all there. The sedation, yes, and it was really good.

James, 23, II, Pd, 86, tISFP

The surgery was fine I was a complete wimp, you know, I'm not brave at all. So it went very well no pain at all, during the surgery they were very

kind, everything went well I was surprised actually. But I could hear them doing things and I was I could not believe when they finished. I thought it is more painful than extraction for example but it wasn't.

Helen, 48, II, E, 88, tISOD

It was fine I did not feel anything they were very careful really very kind. I stayed for one hour after the surgery to make sure 'I was fine to go'. When they had finished the surgery they said umm clinicians said 'it is done' I was surprised, they did very well because I thought, and it would be more painful

Deborah, 72, III, E, 70, ISOD, 3 years

For some participants who had two implant surgical experiences, they identified that the positive experiences of the first implant surgery helped them to be less anxious and well prepared for the second operation.

Really good, I thought it would have been a lot worse, the first time, I didn't know what to expect. The second time, I had a bit more idea, a better idea, and I wasn't frightened. The first time I was obviously a bit anxious and worried and frightened, but then everything went smoothly.

Georgia, 20, II, Pd, 88, RPD

Both surgeries went very well, I was feeling better at the second one, the people that are doing it for you are very helpful, understanding, and they're doing their best. "So I'm grateful. I'm one of these people who is very grateful for everything that's being done

Andrea2, 50, III, E, 30, ISFP, 7 weeks

- **Being sedated**

More than two-thirds of this study's participants (n=26) chose to be sedated during the implant surgery. They felt sedation helped them to overcome their anxiety and fear of surgical difficulties and also to manage the duration of the surgery.

It was fun. I was just asleep; it was great because first time I've had that. I think sedation is necessary for many people, unless if it's bad for some because I know there's a sort of health risk.

Lawrence, 19, II, Pd, 82, RPD

I had sedation, just in the back of the hand; it wasn't like an anaesthetic [patient meant general anaesthesia]. I'm not sure what it was, what they use, but it was great; I loved it. It was a good time, yeah. I can't r- really remember the surgery itself, which is great, no pain, no trouble. But I was very relaxed it went actually very quickly.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Despite the requirement of an additional injection in the hand for sedation, being conscious and aware of some of the procedures, the majority of the patients highlighted that they would recommend sedation for others if they were asked.

I would recommend it, I would say there's multiple injections, for sedation, it's kind of, you've got to compromise kind of thing, because the injections, they're really painful but it sort of only lasts, the pain only lasts really five seconds.

William, 20, III, Pd, 30, ISFP, 3 months

Well I had, it wasn't total anaesthesia, but there was some medication given in my hand it was a bit painful but I was conscious throughout the procedure, But not feeling anything, it was great, but you can still hear them ripping my gum, because they have to open the gum, I wasn't really asleep, you can hear them, then they were sewing it back up.

Lawrence, 19, II, Pd, 82, RPD

Patients who experienced sedation and spent some time during the surgery being sedated could justify their preference for the sedation experience in more depth.

Everything was alright, being sedated, but they didn't expect it to last as long as it did so I woke up, I was awake for the last half hour or so. I would put that it was a lot easier being sedated time went very quickly and I was very relaxed it was easier.

Georgia, 20, II, Pd, 88, ICs

Once the, once I came out of sort of the sedation, cos I got sedated for, and I started coming up out, it wasn't painful but I felt I was more nervous and anxious, I could not stay still, although um the area was um numb I did not feel anything

David, 22, III, Pd, 30, ICs, 2 years

One negative experience related to sedation was repeatedly highlighted by the patients. This was regarding the protective surgical 'drape' placed over patient's faces to maintain optimal infection control during surgery. This caused distress for some patients.⁵

I was sedated. I didn't like the fact that they tried to completely wrap you up so that your face is covered. I didn't like that at all, but the Dr was nice, understanding, and he basically just allowed me to have my head wrapped up, but my eyes were uncovered; I just had the glasses on. Then I was absolutely fine, I was perfectly alright with that,

Joy, 45, II, Pd, 96, RPD

⁵ The patient's face might be partially covered with sterile sheets while sedated and during the procedures as part of patient protection and infection control.

First they tried to cover my face I did not like it. I, personally, have 'claustrophobia' and in fact um I do have it quite badly. I just didn't like the feeling of feeling like I was trapped, I think that was probably my feeling at that time, when they and my eyes were covered, so but other than that it was absolutely fine.

Lora, 65, II, E, 98, tISOD

I can't r- really remember the surgery itself it went quickly, apparently, I had like a, a sheet over my face for a lot of it, that bit was not nice at all. I felt uncomfortable I couldn't tell you [the clinicians], cause I was out of it, good drugs.

Dennis, 20, III, Pd, 36, ISFP, 9 months

A few number of patients chose to avoid sedation. They preferred to be fully conscious, experience the procedure and be aware of the details of the surgery.

I didn't get sedation so – because I did not want to sleep so I kind of hear everything that was happening, the experience was good, cause it kind of gave me awareness of what it was going on, I had no pain In that um sense it was quite my choice to be a wake.

David, 22, III, Pd, 30, ICs, 2 years

Only one patient indicated that they had experienced discomfort during the surgery, which was related to students learning about implant surgical placement.

I didn't get sedation so I wanted to know what was going on, and it was okay the surgery was okay. It was not painful as I thought, but it was sometime uncomfortable not because of the pain I was a little bit aware of the fact that there is students there and then you could hear things, feel things like, not going quite, quite right, and I think there was a few times when Dr [clinical supervisor] had to take over, but I think it went well at the end.

James, 23, II, Pd, 86, tISFP

8.2.3 The healing stages: underestimating the morbidity of implant placement surgery and the healing period

- **Impact on patients' daily activities**

After surgery, many patients realised that they had underestimated the morbidity of the post-surgical healing period in several ways: the severity of the pain after the surgery, the discomfort related to the wound (i.e. bleeding and sutures), and the change in their face shape because of bruising and/or swelling. For all of the participants who experienced the surgery, the post-surgical symptoms or difficulties lasted for between a

few days and two weeks. None of the patients involved in the current study sample reported post-operative symptoms that lasted for more than two weeks.

I expected it to be painful having it done, but as it turned out it was a lot more painful afterwards.

Nichol, 64, II, 76, tISOD

I really quite underestimated the surgery. I didn't know what to expect straight after the surgery. When the injections, were wearing off I could feel quite a lot of pain on my face and on the jawbone, it was too bad, and quite painful. My face came up quite a lot with bruising. I had a big black eye for three or four days I did suffer I didn't get told and. I didn't expect my face to come up so much,

George, 28, II, Pd, 77, ICs

I didn't feel anything during the procedures, but I was very panicked, three, four days after, when I was still waking up with blood on my pillow and whatnot. I didn't know if that was normal or if it wasn't which made things more difficult.

James, 23, II, Pd, 86, tISFP

I couldn't believe the pain about an hour later. I, it was very, very extreme in the jaw bone, you know. I called into [pharmacist] for some painkillers and they didn't work anyway. But eventually it, it settled down and, and my implants have been very successful.

Deborah, 72, III, E, 70, ISOD, 3 years

Two main factors appeared to account for patients' underestimation of the healing stages. Firstly, patients felt that their own interest before the surgery had focused on the surgery itself and they had disregarded the details of the healing period. Secondly, patients claimed that the clinical information had mainly focused on the surgical procedures and there was less detailed information given regarding the severity of symptoms during the healing period. They perceived that they were well prepared for the surgical procedures in terms of the information and knowledge provided; however, this was less so for the post-surgical time.

I would have said that I was fairly well prepared for it [the surgery], really. But what it was really a shock is the swelling and the pain afterward really I was suffering. They said you may feel pain after and sorts of um explained but I felt that was not given in detail.

Joy, 45, II, Pd, 96, RPD

I wanted to make sure it was going to be worthwhile [the surgery], so that's why I checked it all out with them. But I was sorts of focusing on the surgery itself.

George, 28, II, Pd, 77, ICs

- **Support after surgery**

Patients thought that their experiences during the healing stage could have been improved by obtaining a better understanding of the immediate post-surgical period. They also suggested that access to assistance and advice after IPS, particularly in the first few days, would help in resolving some of their apprehensions, particularly when medication failed to work properly. Patients identified different ways in which support could be provided. There was a strong suggestion that communication with clinical personnel, for example the clinic's nurse, would be the best way of providing reassurance. Evidence from previous research (Exley, 2012) suggests that such interaction is common in UK private dental implant care, but is currently not routine in NHS dental implant care.

Support should be given after the surgery, for example by nurse call or any one should call the patient just to make sure everything is fine? it would possibly be a good idea, just to make sure there are no abnormalities and there might have been something like having a black eye maybe because I wouldn't ring up to say, I've got a black eye after the surgery, is that fairly normal. Maybe just a quick phone call to see the effects it's had on the patient and just a nice little step just to make sure they're okay and they're coping with it, sort of thing..

Georgia, 20, II, Pd, 88, ICs

I was helped quite a long way. Just a few, last few that I wasn't – the first few days after treatment and whatnot, I would have liked maybe a little bit more information of what I should expect in that sort of week, week or two of healing. Or may be like a quick visit by a healthcare nurse or phone call.

James, 23, II, Pd, 86, tISFP

It's not easy to get back in contact with people when they've done something in this hospital they are so busy. So if they provided a phone number to call for example if patient had doubts or anything or a phone call from a nurse or the department or the same clinic so I guess that might be very helpful.

Nichol, 64, II, E, 76 tISOD

As long as I know, I think it's the fear of not knowing, so as long as I'm told what's happening, then I'm fine with it, I'll deal with it

Smith, 70, II, E, 110, tISOD

I used pain medication as directed. But the pain also was terrible was not working, then it settled down I think after a week of it, it went. Maybe a little bit more information about the run up may be helpful.

Lawrence2, 19, II, Pd, 44, tISFP

- ***Being without teeth during the healing time***

Patients indicated that they were fully aware that they may need to be without restoration for a period of time. They accurately perceived the purpose of avoiding restoration during the healing period (complete or partial denture wearers). Knowing this in advance helped them to make their personal arrangements in relation to employment and study during the healing time. However, being without restorations had several impacts on the patients' social well-being, as well as their ability to eat and socialise.

The days after surgery I didn't have the denture while I was healing, but after that I got better at it. It was not easy. They told me; I mean beforehand I sort of knew, so I was prepared. I was just trying to sleep as much as possible, yeah, just by myself in my room. I don't think I didn't think I left the room for about four days. I was without teeth & I was in quite a bit of pain.

James, 23, II, Pd, 86, tISFP

For the first two days. I think I was following the instruction and to avoid the spoon denture hitting the, like the, um, the screw bit. I could not eat so I was trying to keep the spoon denture out for about a week or so

David, 22, III, Pd, 30, ICs, 2 years

I think for one week I could not wear my dentures after the surgery and I told my friends and family don't come to see me I could not face people without my teeth may be that my just pride, also I can't eat I was eating only soft and soup

Linda, 74, III, E, 30, ISOD, 5 years

Oh manageable. I could manage that, I can do that myself. Manage it as long as I am by myself, I did not go out, and I would feel uncomfortable if anyone came in. I would say to my husband, "I haven't got any teeth in, don't speak to me." He was marvellous,

Andrea1, 50, III, E, 120, ISOD, 5 years

After healing, some patients realised that even when they were able to wear their dentures, the fit of the previous denture was impaired because of the surgery. This unexpectedly prolonged the time that they had to be without teeth and additionally compromised some aspects of their lives.

Just obviously in terms of getting on with your life, for work obviously but it would be good to know just for your own comfort and confidence if they have a good idea of how long you can't wear your denture properly I think it would help to know that denture might not fit for a period of time.

George, 28, II, PD, 77, ICs

I didn't have anything in for at least two weeks after the surgery. Then I hadn't been wearing it for three months after the surgery because it didn't fit properly, when I went back for my check-up, Mr x altered the plate so that it was suitable for me to wear it, but he has altered it so that it fits.

Joy, 45, II, Pd, 96, RPD

For people who might have to be out and about or still go to work after couple of weeks or so, just to know that you can't wear your denture straight after treatment for duration of time because they won't fit until they adjust it.

Helen, 48, II, E, 88, tISOD

But I realised after couple of weeks I could not wear them not because they were painful but because they were not fitting-well

John, 53, III, E, 20, ISOD, 6 months

- **Oral hygiene during healing week**

In spite of the high awareness of the importance of oral hygiene amongst the partially dentate participants during the healing stage, patients were confused about how that could best be undertaken, particularly during the days immediately after the surgery. This was because of 1) the presence of the stitches, 2) the fear of pain and bleeding, and 3) the fear of compromising the healing of the wound.

I was worried about the stitches, it may fail. Couple of days later, it was hard to brush, my teeth.

George, 28, II, PD, 77, ICs

I was a bit cautious about how I need to keep the area clean and the stitches there.

David, 22, III, Pd, 30, ICs, 2 years

I remember, I wasn't sure how to clean my mouth, I couldn't brush my teeth, the pain was terrible. I tried but there was bleeding and then I used mouth rinse.

Georgia, 20, II, Pd, 88, ICs

I thought 'Is it better to brush' or I mean just 'rinse' I have to keep it clean I remember he said that but I was not too sure How? Because it was painful, look all this area was painful' [patient pointed at his front teeth].

Liam, 32, II, Pd, 88, tISFP

For edentulous patients, maintenance of oral health was of less concern. Most of them stated that they avoided wearing dentures and they used water or mouthwash to rinse their mouths. After they started wearing their dentures they identified that they followed their normal daily routine of cleaning the dentures.

I just used water, wash and rinse my mouth, with, there was some bleeding but only couple of days, When I started wearing them I had to take them out and wash them basically

Helen, 48, II, E, 88, tISOD

I usually clean my dentures in my mouth first, and then I take them out and clean them with a brush and I put them in a solution of 'Steradent' and leave them overnight, after the surgery I used only that kind of mouthwash

Nichol, 64, II, E, 76, tISOD

TIRP⁶ is an often implant-supported and retained restoration that can be used to restore dentition during the healing phase of DIT. This phase might vary in length from four months to more than a year if bone grafts are performed followed by implant placement (Misch, 2007). The complete and partially dentate participants had different accounts of their TIRP in accordance to the type of the restoration: fixed or removable (i.e. overdenture).

8.2.4 The transitional implant-retained prosthesis; the immediate experience

As previously explained, many of the participants in this study had made several attempts to obtain fixed replacement teeth. However, all of the patients, including the partially dentate participants, had acrylic dentures while planning for the implant surgery.

The complete and partially dentate participants obviously had different accounts of their temporary restorations. This section will focus on those experiences separately.

- ***The fixed implant restoration: 'appearance and strength'***

After receiving transitional ISFPs, patients began experiencing the positive implant treatment outcomes and observed some advantages of the transitional restoration. Following a short period of use, patients felt that the fixed implant restoration delivered a normal appearance. However, they still perceived them as unnatural in texture. Occasionally, they recognised that they needed a period of time to adapt to the new restoration.

⁶ The transitional (provisional, interim, immediate or temporary) implants retained (crowns, prostheses, overdenture or restoration) are all synonymous with fixed and removable Transitional Implant Retained Prosthesis (Misch, 2014)

It's okay with the appearance, what they've done is really good. At first, when I do it with my tongue, the back of it, it felt a bit different, bumpy (laughter) but I suppose it just took a bit of time getting used to it. Now after some days, when I look, it just looks normal, really. If I lift my lips up, it just looks normal.

Lawrence2, 19, II, Pd, 82, tISFP

Obviously, it wasn't like the final material; There was quite a large lump at the back, where it was attached to the metal the implant it was, the colour they tried to match the colour. But it was, it was quite white. It looked normal though but a little off for me.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Some patients who proceeded to advanced stages of implant final restoration identified that they favoured the appearance of the TIRP, which was constructed as individual crowns, and this provided a natural look rather than the connected crowns of the final restoration.

I don't really know the full purpose of the temporary crowns, but they look good, they look better than these ones (patient has final restoration as x- unit bridge) I think. I'm not really sure what was that for, because I had, I had gap teeth in the past because when I got the temporaries everyone was like, "Wow, those, those look good, are those your final teeth?" I thought they were my final teeth, but they're not the temporaries sort of fit really nicely, they were separate.

William, 20, III, Pd, 30, ISFP, 3 months

In terms of function, patients were hesitant to eat normally with the fixed TIRP. They perceived them as fragile after experiencing some of the limitations of the temporary material, such as fractures and cracking. Patients indicated that they had restricted their food selection and they mainly chose soft food.

I had a temporary crown for about a couple of month, so that was what kept on cracking off. The other main problem was the temporary crown, breaking. I think it, it was fragile. So I was mainly eating soft food

David, 22, III, Pd, 30, ICs, 2 years

The crown came off, about two minutes later (after the appointment). So I then got that fixed again by one of the clinicians, and then that afternoon it fractured, so then I Superglued it and I just kept on going with the Superglue for, like, four weeks. That was the worst part.

James, 23, II, Pd, 86, tISFP

I've cracked one of my crowns. The temporary when I was eating so I felt they were a bit weak.

Georgia, 20, II, Pd, 88, tICs

- **Hypodontia patients**

Interestingly, for patients who have hypodontia, the experience of teeth with the implant was described as being like having natural teeth in place for the first time. Patients sensed no difference at the time of placement between implant teeth and the remaining natural teeth.

I feel these teeth on implant are my natural one I was quite little and obviously with them being baby teeth and things and then I didn't have teeth in there for years and years so it felt weird obviously, getting them now. They just feel the same as my other teeth.

Georgia, 20, II, Pd, 88, tICs

I born without those teeth I had different sort of replacement before but the only one last was the plate but to be honest with you now at my 19s I was embarrassed of having denture. These new teeth I feel, I mean the ones on implant I feel they are the same as the other teeth, it is surprising but I feel for the first time wow I have teeth.

Liam, 32, II, Pd, 88, tISFP

- **The dentures: 'they are still moving about'**

After experiencing the overdenture (which is supported by two implants), unlike patients with a fixed implant restoration, CD wearers had no particular comments relating to the appearance, as they pointed out that they continued using the same dentures made before the IPS. However, their primary initial experiences were related to the stability of the denture and the ability to function with them. Patients continued having difficulties with denture stability and retention while eating and speaking despite anticipating that these would be eliminated after having the final overdentures:

I'm still wearing my old dentures. After a week, a week and a half but I just I'm not comfortable with them at all, still getting food underneath and could not eat

Smith, 70, II, E, 110, tISOD

I don't know if the implant has done anything honestly, it's just my gums, I think they've shrunk a little bit more. The plate seems a little bit bigger now, it's the bottom one. If I stick it (patient is using denture fixatives) in it's a bit more comfortable, I can manage until it comes out, and then I've got to either take it out and let my gums rest a little. Try and get them to heal a bit more.

Helen, 48, II, E, 88, tISOD

In addition, those patients felt that there was no immediate improvement in the denture stability after the involvement of the implant (by the use of short term denture soft lining material).

I can't really say until I get my new dentures, but this is not helping me I'm not able to eat now things that I could never chew certain foods,..

Lora, 65, II, E, 98, tISOD

It hurts my gums, because the denture I've got keeps moving about, you know? So it is slack, because my gum has shrunk, so when I try to eat it keeps moving about.

Nichol, 64, II, E, 76, tISOD

An implant doesn't improve anything. Well I thought, after implant "Oh, well I'll be able to eat, and chew on a bit of steak or something", but I can't do that. So let's wait for the next one.

Smith, 70, II, E, 110, tISOD

Given the fact that those patients had high expectations of the dental implant restoration, some of the edentulous patients at this stage (after experiencing a temporary denture, which is supported by two implants) considered that having only two implants might not be sufficient to deliver denture stability.

I mean, now, the plates, they still move about, where if you've got six teeth, [Implants] to hold them in this shouldn't happen but they are only two you know. So I'll find out eventually won't I, when I get sorted out?

Helen, 48, II, E, 88, tISOD

- **Another period of waiting after the surgery**

Patients again declared their concerns about the length of time required for healing before beginning the final restorative stage. Waiting after surgery can last up to four months in order to establish healing.

There was the surgery, and then there was a one shortly afterwards, for the stitches,, then I think it was six weeks' time, afterwards that was just to see how the healing was going, and then about more couple of months I mean I'd been on relatively soft foods for quite a while, so it really long time

Dennis, 20, III, Pd, 36, ISFP, 9 months

I still use old dentures, I did, because what I done is, they put two, just over the top of the, the implant, [healing abutment] just made sure they fit over the top of the implants and that was when, they said will send you appointment I think it was about, round about four month before I got one.

John, 53, III, E, 20, ISOD, 6 months

Obviously the hospital must be overrun with work, I don't know, but it always seems a long time for the next appointment.

Smith, 70, II, E, 110, OD

I expected to go in November, because they told me three months from the operation. They said roughly three months, but it means I'll be waiting about five because of Christmas. If that's what it takes then I'm going to have to do that.

Helen, 48, II, E, 88, tISOD

8.3 Discussion

Existing studies concerning patients' experiences of implant surgery focus mainly on the relationship between patients' anxiety and the perception of pain during or following the IPS and/or patients' satisfaction with the treatment outcomes (Hashem et al., 2006; Eli et al., 2007; González-Lemonnier et al., 2010; Fardal and McCulloch, 2011; Weisensee et al., 2012; Gómez-de Diego et al., 2014; Seferli et al., 2014).

The current study aimed to further explore patients' experiences of IPS. The results showed that the majority of the patients felt that they had overestimated the unpleasantness of IPS. Patients perceived that they were well informed about the procedures and with their commitment to implants, had trust in the implant clinicians and had positive sedation experiences, and their encounters of the surgery were favourable compared to their earlier expectations. These findings contrast with the findings of an earlier study, which found that patients described experiences of discomfort during surgery when it was conducted by students (Seferli et al., 2014).

By contrast, despite being informed about the consequences of the IPS, patients underestimated the morbidity of the healing stage (e.g. the severity of the pain and/or the extension of the swelling). This finding is consistent with the earlier research, in which the majority of the patients described the early post-implant surgery time as '*painful*', and that was associated with other healing symptoms, such as fever, swelling, and bruising (Seferli et al., 2014). In addition, there was some uncertainty about how to maintain oral hygiene during the healing phase, with concerns that oral hygiene practices may be painful, because bleeding and/or interfere with the healing process.

This research provides several possible explanations for the patients' favourable experiences during the implant surgery. Firstly, patients appeared strongly motivated with regard to DIT and therefore accepted the relationship between the surgery and pain as a necessary step towards a valued outcome; when patients hold high expectations of DIT, they may more readily accept the '*morbidity*' of the procedure (Hof et al., 2014).

Secondly, participants were satisfied about their understanding of the surgical procedures and felt they were well-informed by their clinicians. Linked with the literature, it is argued that the provision of well-informed pre-surgical information can minimise anxiety-related pain during the implant procedures (Fardal and McCulloch, 2011) and, unlike patients with a low anxiety level, patients with a high level of anxiety

may report more discomfort during surgical procedures (Fardal and McCulloch, 2011). Anxiety and anticipation of pain may be also associated with patients' refusal of DIT (Ellis et al., 2011). Lastly, positive experiences of sedation improved patients perception of the surgery by lessening their anxiety and minimising their perception of the surgery duration, which, when elongated, may adversely impact on patients' experiences (Seferli et al., 2014). Nevertheless, the need to cover the patient's face with surgical drapes was perceived as disconcerting. From a clinician's point of view, in relation to sedation and implant surgery, it is argued that patient sedation can contribute positively to the ability of the implant clinician to perform the surgery efficiently (González-Lemonnier et al., 2010).

Moving on to the healing stage, it is generally accepted that, following IPS, the majority of patients will experience pain and mild to moderate post-operative symptoms that interfere to some extent with their daily activities (Hashem et al., 2006; Bryce et al., 2014). The severity of post-surgical pain is, however, subjective. It can be related to other factors such as the complexity of the surgical procedure, for example when it involves a bone grafting technique (Hof et al., 2014), and also patient demographic characteristics, such as age, sex and socioeconomic status.

In addition, from the current data it could be proposed that the reason for the patients' less favourable experience of the post-surgical healing phase was that patients were distracted by thoughts of the surgery at the time of the information provision. Previous research suggests that patients may fail to recall information given during consent procedures, suggesting that they may not be wholly receptive to all information prior to surgery (Eli et al., 2007). To overcome this issue it is suggested that good and targeted information should be delivered early on during the treatment planning and repeated at later occasions (Pommer et al., 2011; Narby et al., 2012), and that information delivered efficiently by introducing a checklist of advice based on patients' need for knowledge (Seferli et al., 2014).

Surgery morbidity and the inability to wear provisional restoration result in some limitations to daily activities (Bryce et al., 2014) even though in this study patients considered that this was necessary for implant surgery. Still, the unexpected impaired fit of the usual restoration after the healing meant that the time that the patients had to spend without teeth continued for longer than they expected. Patients may need to be

particularly cautioned about this matter, as the need to be without dentures throughout the healing stage can sometimes deter patients from DIT (Ellis et al., 2011).

As the surgery was conducted in two stages and employed delayed implant loading for all participants, patients with partial tooth loss and hypodontia perceived the transition from acrylic removable dentures (which were mainly spoon dentures) to transitional fixed implant restoration positively. There was an improvement in the appearance outcome that was comparable to patients' expectations despite the feeling of abnormal texture. Patients with hypodontia felt as if they had natural teeth for the first time. However, after experiencing some failures, most of the participants considered fixed TIRPs as weak and therefore felt restricted in their dietary intake. In contrast, the complete edentulous wearers perceived the outcomes of the implant-supported temporary dentures less favourably. This group of patients were mainly concerned with the stability of the overdentures and this had led to continual restriction of some of their daily activities.

In general, although patients perceived the IPS positively, they experienced some unanticipated challenges, particularly in relation to the immediate post-surgical symptoms. This was accompanied with uncertainty about maintaining oral hygiene, which continued after obtaining TIRP for partially dentate patients. However, fewer difficulties were experienced by edentulous patients in maintaining their oral and denture hygiene during healing and after wearing the temporary overdentures. These challenges could be overcome by improvement of pre-surgical advice about cleaning and facilitating communication with healthcare personnel from the clinical team during the immediate post-surgical time to assist in resolving patients' uncertainties as suggested by patients. The recent introduction of mobile apps for monitoring the quality of post-surgical patients' recovery at home has proved successful in other disciplines and may be one route to providing additional support (Semple et al., 2015). In addition, the use of internet-based information and/or social media has been suggested as a tool of communication with patients, although this might not be suitable for all patients (Hawn, 2009). Further studies could explore the contribution of post-surgical communication with patients on their overall DIT experiences. Interesting accounts were revealed by patients with hypodontia, yet as the number of those was limited, further study of the experiences of this particular group of patients might be suggested.

8.4 Conclusion

This part of the current qualitative study has addressed the previous lack of research relating to patients' perceptions of dental implant surgery, particularly their experiences related to sedation, transitional implant prosthesis and the associated concerns. Patients found that their concerns regarding the implant surgery were overestimated. They felt the sedation and the informed discussion, previous to the surgery, contributed to their favourable experiences of the surgery. In contrast, patients experienced difficulty in coping with the consequences of surgery during the healing period. Strategies to improve patients' experiences were suggested based on the literature and the current patients' recommendations, and these could usefully be explored in future research. The partially dentate patients could immediately perceive the advantages of fixed retained temporary restoration, compared to the patients with overdentures.

Chapter 9 Data and Discussion: Study A, stage III. Patients' perceptions of the implant-supported prosthesis

9.1 Introduction

This chapter presents patients' experiences of stage III. Stage III commences at the time of the final implant restoration placement (see definition at Section 1.1). Sixteen interviews were conducted with 14 patients (two patients, Andrea and Linda, were interviewed twice, before retreatment with implant and after the end of the treatment; beside their names there will be a number 2 indicating the second interviews). Seven interviews were conducted with patients had been provided with an ISFP (bridge or crown), and had had the ISP in place for between 7 weeks and 2 years, with only 1 patients for 7 years (this will be shown in the quotes from the patient interviews).

In addition, 9 interviews were conducted with patients who were provided with mandibular ISOD, and had had the ISP in place for between 2 and 7 years, with only one patients who had been restored for 6 months.

The analysis aimed to explore both the patients' immediate post-placement experiences (retrospective account) and their later experiences of the two types of implant-supported restoration. The results will be discussed in relation to those timeframes, but also include a section on patients 'hidden concerns' and their perception of the value of implant treatment.

9.2 Patients' perceptions of fixed implant-retained restoration

9.2.1 The immediate experiences

As a result of the lengthy treatment time (see Chapter 7), the majority of the participants indicated that they were happy when they finally reached the end of their implant treatment and the definitive ISFP had been placed. In addition, similar to previous studies in the literature (John *et al.*, 2004; Al-Omiri and Karasneh, 2010), tooth replacement with dental

implant prostheses has immediate positive effect on patients oral health related quality of life scores (i.e. the OHIP 49).

I was elated. Elated that it was finished, that I had the teeth, because in the run-up I thought, "This is never going to happen. This is never-ending! I was just elated when I went home, couldn't wait to show my husband and daughter, you know, just totally, totally at ease.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

At that time I was totally relieved! That it was all over and that I didn't have to come back to the dental hospital for about another year she said. I couldn't believe that my teeth are in.

David, 22, III, Pd, 30, IC, 2 years

During the analysis of the study data it became clear that all of the participants focused their descriptions of their immediate experiences on three components of what they described as the 'naturalism' or 'normality' of the ISFP. These were related to their level of satisfaction with 'the natural' appearance of the teeth ('*natural*'), the feeling of '*secure*' teeth and the function. These aspects, were aligned to patients' early expectations at stage I and their expectation at this time seemed to be largely met. Patients recounted their experiences based on their comparison between implant-retained teeth and natural teeth. Other themes that emerged were self-confidence, comfort, speech, hygiene, longevity and maintenance.

- ***'It looks so natural' and 'it just feels real'***

In terms of appearance, patients felt the appearance of their ISFP to replicate that of their real teeth, i.e. the prostheses could not be recognised by others as such. At the same time, patients recognised a recovery of their self-image.

My new tooth looks so natural; you would never know it's not the original. When the implants were finally in and I looked in the mirror, I was very happy, I was pleased, I really wanted something that would permanent last and now I am so happy everything came out perfectly. Nobody would ever know; it looks and feels so natural.

Holly, 35, III, Pd, 25, IC, 6 months

It feels natural, it looks natural, who would never know it's not a real tooth. As far as I'm concerned now, it's just a tooth like. That's what it looks and feels like normal tooth it's great you never get the colour quite right, compared to what the crown on this implant is. They could put so much detail into a crown at the time so really pleased

William, 20, III, Pd, 30, ISFP, 3 months

Every one of my family was like, "Wow, those, those look good, I mean at, at the start I didn't expect the implants to look really good but I was really impressed when I saw them and happy I made the right decision.

David, 22, III, Pd, 30, ICs, 2 years

- **'They are secure'**

Patients perceived the feeling of the ISFP in the mouth as normal in that they considered them as an integral part of their bodies ('*they are part of me like my other natural teeth*'; Holly, 35). Eliminating the need to remove the prosthetic teeth from the mouth '*like dentures*' enhanced the patients' feelings of normality; they felt the prostheses to be fixed, secure and stable teeth during function.

I feel as if my own teeth have been put back in again, I feel they are my teeth It's because they're fixed. I can't feel the implants at all. I never have been able to feel the implants there. It's always been the teeth.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

I don't have to take them out. Having them in place, that's very important. Since the implants are inside the bone, I feel they are my teeth, natural similar to my real teeth

William, 20, III, Pd, 30, ISFP, 3 months

The implant?, Oh, yes, they don't feel like anything, you don't realise you've got them in. they are rooted inside my jaw like teeth.

David, 22, III, Pd, 30, ICs, 2 years

On multiple occasions patients indicated that their feelings of recovery, in terms of the normality of their appearance (self-image) and function, were a result of the security of their teeth, and this strengthened their feelings of having regained their natural teeth.

They are secure; they are part of me like my other natural teeth, there, inside my gum.

Dennis, 20, III, 36, Pd, ISFP, 9 months

With the impact of several previous failed attempts at satisfactory conventional dental restoration, the immediate improvement after the use of an ISFP made the majority of the participants motivated with regard to their ISFP, and they indicated their determination to maintain and adapt to the implant restoration to eliminate any future dental problems.

I don't know if that's psychological. You know, I think I've got to do it, to make it work, I have got to make it work yes, it's great and I can look at them and think "because they look great when I look in the mirror, they feel right too

Andrea2, 50, III, E, 30, ISFP, 7 weeks

I know I'll like them and I will do whatever I can do to, to keep them healthy forever.

William, 20, III, Pd, 30, ISFP, 3 months

- **Normality in function**

All of the participants indicated that their ability to eat had improved after they had ISFP; they had enhanced ability to select a greater range of food, and had greater enjoyment in eating. In addition, feeling confident and having secure teeth enhanced their ability to eat in social situations and experience enjoyment of eating and food.

I can eat. And eating with those and the feeling that you don't need to take them out and in-Oh, it's marvellous. Absolutely marvellous, I can't believe, still, I don't have to take them out. I really can't, because that was a big issue with me,

Andrea2, 50, III, E, 30, ISFP, 7 weeks

In term of eating it got back pretty much, straight away. It was, a bit odd to get out of the habit of chewing on one side. But yeah, it was an increased dietary selection and enjoyment yeah, yeah.

Dennis, 20, III, Pd, 36, ISFP, 9 months

I can chew it feels perfectly natural it's just perfect. Ten times better eating with the implants, when I was at home I'd just take my tooth out if there was no one there. I couldn't really do that at restaurant or when I was with my family or friends.

Holly, 35, III, Pd, 25, IC, 6 months

- **'Boost up my confidence'**

The feeling of normality of appearance and security of the dentition during function enhanced patients' confidence and consequently led to a recognition of improvements in several other aspects of their daily lives.

Just totally changed my personality; confidence, felt I had real teeth, they looked nice, and I felt better all round. So as far as I'm concerned, they affect your whole persona of yourself, your personality and everything. Dentures are not for everybody, and more so people who take pride in themselves do not like dentures. You do not like to take a set of dentures out and pop them in a cup when you have a husband.

Rose, 62, III, Pd, 70, ISFP, 7 years

I mean, I've only had them a few weeks, as you know. I would say my life has changed, knowing that it's done, it's secure, and it's fixed has made me feel 100% better. So they don't move, because that was the whole problem; they (the dentures) were moving about when I was eating or speaking, and this has just been great.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

All of the patients pointed out that having a secure restoration with a natural appearance helped them to overcome their self-consciousness in social situations.

I was very conscious about smiling or anything like that. I'd have my hand over my mouth if I was to speak at length, or anything. But, once I had a tooth in, that all kind of went back to normal.

Dennis, 20, III, Pd, 36, ISFP, 9 months

Having the implant boost up my confidence and makes my teeth look better, it was aesthetically pretty pleasing I was very conscious when I speak now everything's fine. Yeah, everything's good.

William, 20, III, Pd, 30, ISFP, 3 months

As a result of wearing dentures (spoon denture), I sadly avoided many social situations, my front tooth look odd, and I rarely enjoyed meals the normal foods that others were able to eat because my front tooth popped out. I enjoy my life now.

Holly, 35, III, Pd, 25, IC, 6 months

The participants also indicated that because their life had improved after obtaining ISFPs, they were planning to resume fitness and leisure activities, which they had suspended because of their tooth loss and unsatisfactory restoration.

Because of my implants treatment and because of, well, the dentures it wasn't really, possible to keep on going to my training and enjoy gym but mostly because of the implants, I am planning to start again.

Dennis, 20, III, Pd, 36 ISFP, 9 months

So I haven't done sport in a while, but,, I'm planning on starting again my rugby training program next year and I'm just hoping that nothing will, will be damaged or anything then.

William, 20, III, Pd, 30, ISFP, 3 months

- **Comfort: 'no pain, no soreness'**

Patients felt that their overall oral health had improved due to the elimination of denture-related soreness and ulcers.

Oh, they feel much better, and I said to Dr x when I had my check-up, "There's no pain in the gums or the jaw." You know, that's all gone.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

I used to have soreness because of the plate it was awful. But now because this has not got plate you know it is only the teeth attached to the gum so it feels healthier.

Holly, 35, III, Pd, 25, IC, 6 months

- **Speech**

The majority of patients identified that they needed some time to adapt to the new fixed restoration in terms of speech and the pronunciation of different letters. However, that seemed to resolve in a relatively short period of time and seemingly had no impact on their satisfaction with the treatment outcome.

At the beginning it affected my speech. So I - it took a while to get used to, pronunciation again.

Dennis, 20, III, Pd, 36, ISFP, 9 months

At the start I had some difficulties, slurring my "s" in particular. I had a bit of a lisp but now it is normal I am able to talk right again. That I am actually happy and confident, I love the way the teeth look.

Holly, 35, III, Pd, 25, IC, 6 months

- **Hygiene: 'uncertainty'**

All of the patients indicated an awareness of the importance of oral hygiene and they demonstrated their determination to maintain their implant prosthesis' hygiene. This is in agreement with earlier patients thoughts on the TIRP at stage II. However, there was uncertainty amongst the participants with regard to the best approach to follow in terms of achieving the implant hygiene requirements.

I'm hoping I'm doing them correctly, not sure but I think I am. There's nothing more I can do, apart from flossing and trying to get into them as much as I can. I'm using mouthwash, and when I do that daily, they do feel clean. I think I'm managing alright. Yes.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

I'm careful when I brush that because I don't want any damage. So, 'because even that tiny bit there (gap over a crown), I know you can't see it, it's not an issue, but I don't want it to get any worse, so, but that's it's: no problems

David, 22, III, Pd, 30, ICs, 2 years

No, it's not difficult to clean, it's not painful. It's, it's no more difficult than cleaning your teeth, really. It's, - I never, I never used to floss before but now I, feel I probably should' cause I've got quite expensive teeth. So I should probably floss.

Dennis, 20, III, Pd, 36, ISFP, 9 months

- **Perception of longevity and maintenance needs**

At this last stage of the implant treatment pathway (stage III), patients continued to believe that the implant restoration would be permanent and would never fail (see Chapter 6, Section 6.3). This was accompanied by very little awareness of the possible long-term complications or the possibility of implant failure and the need for maintenance.

They'll be there forever hopefully I have the feeling and I do imagine that because they feel very natural they're so fixed, and strong, Yes.

Andrea2, 50, III, E, 30, ISFP, 7weeks

The dental implants look amazing. I feel it should last a very long time, and that is because they are more solid aren't they? Strength wise is better than other options more secure, not worried you're going to break your bridge Well, I assume they're pretty much for life. Like I don't think they'll need much maintenance

William, 20, III, Pd, 30, ISFP, 3 months

I think once they are attached to your jaw bone they will not fail there might be some issues in term of the crown colour or the crown itself. But strength wise is superior

Holly, 35, III, Pd, 25, IC, 6 months

9.2.2 The late experience of implant supported fixed prosthesis

Data collection and analysis did not reach full saturation as only two participants had the fixed restoration for a significant period of time (Rose and David, for 7 and 2 years respectively). They were however able to identify some aspects of the long-term complications of ISFPs.

Rose, 62, had had several implant infections as a result of inadequate oral hygiene and that had led to bone resorption and gingival recession, which had compromised the aesthetics of the restoration.

But for me, the only back to that was after a couple of years, I lost the - how can I say? the gum? The gap from the implant up, there was no gum. So if you can

picture, I had implants, but I couldn't do a full smile, it had to have a false pink thing on the top. The thread was showing, and it was constantly infected, and I'd lost bone and tissue loss. I had the implant 7 years ago

Rose, 62, III, Pd, 70, ISFP, 7 years

This recession and bone loss had further compromised Rose's ability to maintain oral hygiene around her DIs. She said:

There was never enough room to clean up there, because you couldn't get the floss up there. So I had infection after infection, inflammation after inflammation, and realised that I'd lost a lot of bone, a lot of tissue, and that the threads were exposed on one of the implants, it was something I accepted,

Rose identified that this experience had made her realise that there is possibility of implant failure, which she had not anticipated in the early treatment stages.

It's been ongoing issues, but I realise now the dental implants don't last forever, so we'll just have to take it from there. That's all I really can say, I don't want to blame anyone.

However, she did identify that this complication did not impact on her overall satisfaction with the implant treatment and she still believed that DIs were a successful type of restoration that had improved her life for a period of time.

I was grateful for these implants all those years ago really I would not regret having them, they are still ok but I now know they wouldn't last forever, I know they would be outdated. So over the years, infection set in, lots of food was getting in. So because there was this opening at the top, and a dental implant exposed, and the threads exposed, food would get trapped down there. This bit of information is important I guess.

David also complained of a compromised aesthetic as a result of recession and a black triangle related to the IC and its relationship to the gingival tissue.

Now, I always try to avoid full smile, if I did a full smile, you may see a black area that was the only downside for me I can see it, you may not. I am worried this might get worse.

David, 22, III, Pd, 30, IC, 2 years

David also indicated that he had not anticipated that the appearance of the restoration might change with time.

I don't want to sound like I was placing any blame, but I think I have not been made aware of this.

9.2.3 The hidden concerns

Patients suggested that additional information could be provided early on in the treatment pathway. These issues are discussed in Chapter 6, Section 6.5. However, patients at stage III continued to point out that they had concerns which potentially had not communicated well through patient-clinician discussions. These were mainly confusion relating to the longevity of the implant restoration and to how future failure could be prevented or managed.

The only worry that I would say would be, hopefully nothing happens to them. You know, I wouldn't get a disease or I wouldn't have to, sort of- I mean, I wouldn't mind having to come back for treatment or anything like that. That doesn't bother me, but it would just be if it was my fault that something happened to them, but hopefully it won't, but that would be my only concern. Apart from that, I've got no worries at all.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

I hope they will not fail or something, I can't really see another instance where there'd be damage, unless I got punched or something like that.

David, 22, III, Pd, 30, ICs, 2 years

I'm sort of just by God's grace I don't want anything to happen. I'm not really, sort of, looking. that much in the future. I'm just, sort of glad that I've got the implants really. I hope they will be fine.

William, 20, III, Pd, 30, ISFP, 3 months

Another pertinent issue for patients was the cost of future ISFP care, which was also not clarified enough during clinical discussions.

So the only real concern would be the cost in the long run, who will cover this aspect

Dennis, 20, III, Pd, 36, ISFP, 9 months

Until now I think dental implants are brilliant, and the work I've had done here, at no cost to myself, on the NHS, it's all been good. so I can't grumble, but I know it is expensive and my only concern is the cost of the future if I needed anything, will they pay, the NHS.

Andrea2, 50, III, E, 30, ISFP, 7 weeks

9.2.4 Value

After experiencing ISFP, the majority of patients indicated that they would encourage others to have implant treatment if they were asked. However patients did not make any

financial contribution, patients expressed the opinion that IFSPs are good value in terms of money and time. For the younger participants, ISFPs were perceived as a restoration that was suitable for their age (this is discussed in detail at Chapter 6, Sections 6.2.1 and 6.6.2)

It has been well worth the time and I am happy with my teeth. Yes it's too expensive, If, if you had the money, yes, they worth paying for. They are brilliant because I am young and healthy. I feel I am too young to have dentures,

William, 20, III, Pd, 30, ISFB, 3 months

It is definitely worth it. I mean I, I can say that, because I'd - I'm young enough; I've got the potential to earn back that money if I paid for it and it's worth it more, because I am at an age where it would be quite nice to keep all of my teeth for a long time

Dennis, 20, III, Pd, 36, ISFB, 9 months

They are worth paying for. I was lucky to have them on the NHS, but all I'm saying is I would find the money If I had plenty of money, I would have them done privately. I'm that impressed with the dental implant that if I was in a financial position, I would pay whatever it is to have them done.

Rose, 62, III, Pd, 70, ISFB, 7 years

9.3 Patients' perceptions of implant overdenture

9.3.1 *The immediate experiences*

In describing their immediate experiences of ISODs, all of the patients indicated that there was a substantial improvement in their quality of life immediately after they had the ISODs fitted. Patients began their narratives by comparing their experiences of function with ISODs and their previous conventional denture. The majority of the participants had a history of problematic lower dentures, and they immediately felt an enhancement of function when the denture was supported and retained by two implants.

Absolutely was wonderful immediately after I have had them. I come in frequently to talk to the students about the implants. To me, it was the least I could do to show my appreciation for the improvement of my lifestyle. It was fantastic

Catherine, 76, III, E, 120, ISOD, 7 years

Originally, overdenture it was just like having a new firm teeth; it was wonderful. You know, immediately after the treatment it has, it does have a huge impact on your life, confidence and keeping your dentures in.

Deborah, 72, III, E, 70, ISOD, 3 years

They went in and it was just like having your teeth, it was like getting my-self back again. My life routine, eating, my self-confidence every thing

John, 53, III, E, 20, ISOD, 6 months

Deborah gave one example of how she felt improvement in her daily life after the ISOD treatment.

Having implant teeth can affect loads of things, like cuddling your grand-children. Sometimes if you catch your lower jaw on baby's head it can dislodge your dentures (Laughter). Lots of things really, start working again and stuff, yeah.

Deborah, 72, III, E, 70, ISOD, 3 years

- **Recovery of self-confidence**

Patients indicated that the improvement of their self-confidence was the most significant advantage that ISODs delivered to their life. Patients believed that improvements in their self-confidence were mainly as a result of the perceived security of the ISOD delivered by the use of implant attachment, described as the ability of '*keeping your denture in*' during function.

What I wanted from day one is a firm denture it does have a huge impact on your life mostly confidence and keeping your dentures in.

Deborah, 72, III, E, 70, OD, 3 years

Well, it made all the difference to me. since, I got these implants, and bingo, I had a new life because I am confident about my ability to meet people I could talk to anybody, I could go out for meals, I could eat anything I liked. It was absolutely fantastic

Catherine, 76, III, E, 120, ISOD, 7 years

- **Appearance**

Unlike patients with fixed implant restoration, ISODs were still considered by the majority of the participants to be a ‘foreign body’ in the mouth. All patients were pleased with the perceived improvement of their appearance after the use of ISODs. However, they considered that this aesthetic improvement was not due to changes in the denture teeth or the way they were set up, but to the elimination of denture movement during function.

Well, appearance-wise, I, I wouldn't think there was a lot of difference (between her conventional denture and the current ISOD). The only thing is that if, if the denture was slack, then I'd slip and I, I would be aware of that, you know, whereas they never do slip now, even though the top one does.

Linda2, 75, III, E, 35, ISOD, 6 years

I mean it doesn't make us any prettier but, said, I smile a bit more now. Because I am more confident, the denture goes in so no obvious movement Yeah, so that in itself a big improvement...

John, 53, III, E, 20, ISOD, 6 months

They look good. Sometimes I think the, the pink plastic they use is the wrong colour She (clinician) said there's no choice, you know they are, it is a denture.

Deborah, 72, III, E, 70, ISOD, 3 years

- **Eating**

Patients indicated that having ISODs enhanced their quality life with respect to eating. Three aspects were identified: food selection, food enjoyment and chewing ability.

It improves my eating mm as far as eating's concerned, I couldn't eat nuts. I couldn't bite into an apple before I had the implants. Anything hard, it was impossible. But now I can do all those things, so it's definitely improved my life

Alice, 70, III, E, 80, ISOD, 2 years

I can eat the things that I want to eat without any problem. I mean, a lot of the time, if you're eating steak and that, and chewing it, it was just, just wouldn't - wasn't working with me old denture. But now with the implants, you can chew down on it basically like an apple, an orange, a pear. Something, I can bite into and, without any worry,

John, 53, III, E, 20, ISOD, 6 months

With respect to the improvement in the ability of patients to select food from a wide range was felt to enhance patients' general health.

Before the implants I had lost weight, I was really down and I was probably depressed. I didn't want to eat anything; I wanted to be able to eat an apple even if it was just cut into pieces. I wanted to go out and have a steak, I couldn't do any of that. Now I am able to have what I wanted to eat a better food.

Linda2, 75, III, E, 35, ISOD, 6 years

Obviously, I can eat more easily and with comfort now. The implants have improved my ability to eat. I am eating healthier and I am eating better foods now. Before I had the implants my dentures jumped around in my mouth and I was anemic.

Amelie, 71, III, E, 96, ISOD, 6 years

- **Speaking and socialising**

All patients pointed out that their ability to speak clearly was enhanced after obtaining ISODs. They related this improvement to the security of the ISODs during speech, which helped them to be more confident in social situations and also improved their performance at work.

I can speak more clearly now and I am more confident when I speak. Obviously my main concern was that when I'm doing public speaking, speaking to a group of people, which is part of my voluntary work, the lower dentures were very unstable, and I was finding it difficult to control and it was limiting my vocabulary.

Amelie, 71, III, E, 96, ISOD, 6 years

I am more confident and I can speak without the fear of not being understood, it is wonderful.

Catherine, 76, III, E, 120, ISOD, 7 years

When I did have the implants put in, and I've never looked back since I had those in and I just think it's marvellous, you know?, it's made a big difference, and certainly to my speech, and that is important, being a teacher of young children, It is very important to me that I can speak properly and get all the sounds properly. The letter F is the one where I have had problems in the past but at the minute I'm not. Since I've had the implant I seem to have overcome

speech problems, with the slack denture I didn't get the 'S' sound right and, you know, I certainly haven't had any problem with speech since I had that in

Linda2, 75, III, E, 35, ISOD, 6 years

- **Elimination of pain**

Patients indicated that unlike mandibular conventional dentures, ISODs deliver comfort, eliminate pain during function and reduce the possibility of the traumatic ulcers induced by conventional dentures.

I used to get a lot of ulcers at the bottom of my – you know, on my bottom teeth. I think the bottom teeth are the worst if you're going to have any pressure points.

Alice, 70, III, E, ISOD, 80, 2 years

I certainly don't have any pain there, haven't, and haven't had pain since I have them in place.

Linda2, 75, III, E, 35 ISOD, 6 years

It was just, there was no comfort. I had no comfort at all. My mouth was sore constantly, breaking out in sores, just the gums, and the bottom. The jaw was sore. But now I feel a lot better.

Angela, 76, III, E, 150, ISOD, 7 years

Because ISODs are secured with the use of implant-precision attachments, this security could help patients manage their maxillary conventional dentures.

Even though the top one is, is what I think a little slack at the minute. This one (ISOD) keeps it in, in position. So, I'm, very happy

Linda2, 75, III, E, 35, ISOD, 6 years

Because the bottom one is in place, the, the top ones don't move around. Because most of the time you're teeth are together, you know? Hold them there.

Deborah, 72, III, E, 70, ISOD, 3 years

- **Limitations of the prosthesis**

After experiencing immediate improvements in function with the use of ISOD, patients described the recovery of several other aspects of their quality of life which they ascribed to the enhancement and improvement of ISOD security compared to dentures. Whilst ISOD prostheses were perceived by all patients as an improvement, they were still incomparable to natural teeth, contrasting with their initial anticipations for several

reasons. These were: 1) the need for occasional denture removal from the mouth; 2) the consequences of tooth loss which impacted on the anatomy and the shape of the patient's face and oral cavity, and 3) the minor and frequent movement of the ISOD over the ridge which was still felt by patients.

Definitely not like my natural teeth. If I had my own teeth – I'd give anything to have my own teeth again. I mean the fact that your mouth shrinks. You know, the shape of your face changes. You know, and I always say to everybody, "Look after your teeth because, you know, it's not the same having dentures. You can't replace your own teeth with dentures at all and yes this is better than the old denture but it is a denture by its nature, colour, shape and you need to click it in and get it out.

Alice, 70, III, E, 80, ISOD, 2 years

Yes, it did improve my life. But no matter what you do, other than get your teeth screwed in permanent, nothing can replace your own teeth, your natural teeth.

Angela, 76, III, E, 150, ISOD, 7 years

I have had better life, They stay in place and they look normal, I speak better and eat better but I still feel them (the ISOD & the upper denture), trying to control them, you know in my mouth

Catherine, 76, III, E, 120, ISOD, 7 years

It is dentures, because fake teeth are never as good as the real.

John, 53, III, E, 20, ISOD, 6 months

Minor movement:

Patients indicated that having their ISOD supported by implants limited the dislodgement and reduced the movement of their ISOD. They repeatedly referred to this as the 'security' of the restoration or dentures. However, the majority of participants pointed out that ISODs did not fully deliver the stability that they expected by the use of implant-supported restoration because there was still constant minor movement of the denture during function.

They don't fall out like they used to. Yeah, very good. But I mean it, it like, I mean I expected probably no movement at all but I could feel them moving. At first it was hard to believe because I felt that maybe I hadn't given them enough time. I didn't know if it was going to get any better.

John, 53, III, E, 20, ISOD, 6 months

I'm wondering if she [the clinician] was aware of this rocking motion because it isn't obvious. To me, it's obvious because it's my mouth but Dr x said, "These clip on fine, now. Just you need some time. That's all she could suggest then the implants, they're rock solid, my trouble is with the denture. I'm still

conscious of using different muscles to keep my lower denture firm in place, never popped out like my previous ones, but it keeps moving and I feel self-conscious sometimes.

Catherine, 76, III, E, 120, ISOD, 7 years

It is not like what I expected because to me even when it is in place it is instable in my mouth and I just wanted them firm, stable. That is all I wanted if they were stable. In my mind if they were a little bit tighter and they fit better that is all I want, so I don't have to keep taking them out frequently.

Andrea1, 50, III, E, 120, ISOD, 5 years

Despite the unexpected minor movement of the ISOD, patients continued to consider ISODs as superior to conventional dentures and they considered their experiences as *positive* and *constructive*. The reasons for this were, firstly, the ISOD is retained in the jaw and this eliminates the dislodgement of the lower dentures, which is obviously experienced frequently with a mandibular conventional denture. This security was much appreciated by all of the patients.

I'd, I really do appreciate having, having that done and even though now obviously there is a bit of slackness, but because it is secure, it stays in position. And now that I've got teeth that stay in place. It's been very good. Well, I mean it's, certainly makes a big difference to my self-comfort and my entire life.

Linda, 74, III, Pd, 97, ISOD, 5 years

They are moving, probably a couple of times I have been frightened in case the teeth popped out. They probably would never have done that, this was after sometimes of having implants if I was talking to somebody or on the phone, but that has never happened.

Andrea1, 50, III, E, 120, ISOD, 5 years

Difficulty of removal:

Immediately after having an ISOD, some patients recounted their experiences of difficulties in removing the overdentures. They pointed out that those difficulties, related to ISOD manipulation, had only lasted only for few days.

I think at first I used to think, "I'll pull the implant thing out of my jaw" you know. Because it was very firm And I was a bit scared of that. But then you learn, after a couple of times, that that's not going to happen.

Deborah, 72, III, E, 70, ISOD, 3 years

Since getting home and having them done, I was really struggling to remove my lower one. A few times I had spent long time fighting with them (attachments), it came out with force.

John, 53, III, E, 20, ISOD, 6 months

At the beginning, pretty hard to get them out, because at that time I was still rinsing my gums with mouthwash and doing that a few times a day.

Amelie, 71, III, E, 96, ISOD, 6 years

9.3.2 The early patients' concerns

After a short period of use, from a week to several months, patients revealed that they began to have some concerns regarding the ISOD. These will be illustrated in the following sections.

- **Gap between the base and the ridge**

Patients indicated that after a short period of use they became aware of a gap between the denture base and the ridge, which they recognised to be one of the reasons behind the minor instability of the overdenture (Section 9.3.1), which in turn lead to minor soreness and food trapping.

There's a tiny little space between the palette and the gum; consequently, they move upward when I bite, I feel it

Catherine, 76, III, E, 120, ISOD, 7 years

Well, you see, the whole thing was that the denture rests on the two implants. There was a space at each side, and no matter how hard I tried, I kept thinking, "Oh, they're going to come out." I mean, they wouldn't have come out, so it was just soul-destroying.

Andrea1, 50, III, E, 120, ISOD, 5 years

There's a space between this and my gum; when I bite at the front, they clip on, but if I bite at the back, coming down it lifts the front up. I don't know if you can understand.

Deborah, 72, III, E, 70, ISOD, 3 years

Minor soreness

This minor ISOD movement resulted in infrequent development of traumatic ulcers and soreness.

Occasionally I got sour spots I used little something it heals ulcer and I have got them here it is like yellowy creamy and I put it on and within half an hour I have feeling that more comfy. I don't need to do that ah that very often.

Linda2, 75, III, E, 35, ISOD, 6 years

Because of this little space and movement, I've had a little bit of rubbing and a couple of ulcers and – but apart from that, not, not a great deal.

John, 53, III, E, 20, ISOD, 6 months

Sometimes I got ulcer at the front because of that movement.

Alice, 70, III, E, 80, ISOD, 2 years

Food trappings

In addition, patients described that the presence of this gap had led to food being collected and becoming trapped beneath the overdenture. This occasionally led to discomfort during eating. Patients highlighted that they managed to deal with this food collection and that it rarely had effect on their acceptance of the ISOD.

I got food beneath it is annoying specially if it is hard food obviously, there have been maybe a few little bits stuck, but I've always managed to clean That side of it never bothered me, really, because I knew that I could clean them.

Andrea1, 50, III, E, 120, ISOD, 5 years

Getting seeds underneath the denture and all that kind of, that actually doesn't bother me a great deal because I can soon deal with that. I can go to the bathroom and deal with it. That isn't a big deal for me.

Deborah, 72, III, E, 70, ISOD, 3 years

I now find that I get food in, under both the bottom and also the top denture the only thing better will be that food won't go underneath, that's a natural thing, isn't it, for, for a denture? You know, for your gums to sort of compressed down and then leave a little gap, you know, and food can get in. I've been really noticing it so very occasionally I've had to get up from the table and go and, you know, rinse them, if something's, something that's sharp that, you know, sort of hurt if I, you know, put my teeth together. If there is food under the denture all the time. Well obviously after I've had a meal. If I'm at home and have the opportunity, I have to go and rinse my mouth out and get it out, and brush around the implants.

Linda, 74, III, Pd, 97, ISOD, 5 years

- ***Confusion about how to maintain the ISODs' hygiene***

As discussed previously, it is observed throughout the analysis that the majority of the patients were motivated to keep their oral hygiene optimised in order to eliminate future hygiene-related complications. However, they described that they felt uneasy about how to carry out ISOD hygiene. Patients stated that, from their experience, information about ISOD hygiene should distinguish between the hygiene required for implant abutments and the hygiene required for the ISOD base and attachment housing.

I am not quite sure how to clean them perfectly. Obviously, I've got to clean the implants because you can have a build-up of plaque if you're not careful. And also the dentures, I have difficulty – I like to keep my dentures perfectly pristine. I don't like to have any marks on them. I always have a build-up of plaque and that is hard to get off no matter how hard you scrub.

Alice, 70, III, E, 80, ISOD, 2 years

And I am doing well with the denture I mean I was working well with them but not the implant I have built up of tarter probably a little bit on each side of the other implants.. But I am unsure how to prevent that in the future. I have always focused on the denture hygiene.

Deborah, 72, III, E, 70, ISOD, 3 years

You've got to just keep them clean– but you brush them every day, it's just, it's like normal teeth, basically. Take them out and give them a good clean. Give them a good scrub, but we've got also the metal in the mouth the cap? I am unsure.

John, 53, III, E, 20, ISOD, 6 months

Patients had doubts about the suitability of using different types of denture cleansers. Some of the participants had experienced complications due to incorrect use of the cleansers. This impacted on the ISOD precision attachments and the denture base. Patients stated that the denture hygiene instructions were unclear in relation to denture cleansing solutions.

Is it good to use cleaner? I am not sure. When I steep them in the cleaner, I think they've changed over the time. The material of the dentures have changed they do not keep as clean as long as what they used to.

Alice, 70, III, E, 80, ISOD, 2 years

There were mouth washes and things I have bought and they have really helped. I didn't think on cleaners until they mentioned it, but they didn't pursue it. She said "Why don't you use Milton?" Now, nobody had ever mentioned that before, use Milton, and just take like half an hour during the day, I've got to leave them out overnight. So that's what I'm doing. Previously, they told me not to use any kind of cleaner, just to use water and I've kept to that

Linda², 75, III, E, 35, ISOD, 6 year

I used to, um, soak them in Steradent but I realised that's not a very good thing to do because I think it eats into the plastic. Um, so why are we encouraged to do that. Anyway, I've stopped using it for the last, I haven't used it for a couple of years now I clean them with water

Catherine, 76, III, E, 120, ISOD, 7 years

Before when I used to use a solution to clean them they were fine, they were really squeaky clean and, I kept doing that with those but now they soon got marked and scratched and stuff and the colour has changed. So you, so I was not aware that wasn't a good product before that he told me

Deborah, 72, III, E, 70, ISOD, 3 years

In addition, some participants pointed out that they were uncertain about the possibility of using an electric brush to clean the implant abutment and the ISOD.

I've stopped using my electric toothbrush, because I suppose when I read the information, how to clean your dentures. There was nothing about that?

Linda2, 75, III, E, 35, ISOD, 6 years

Because of my age I used to use electric brush to clean my dentures but not anymore with those.

Amelie, 71, III, E, 96, ISOD, 6 years

9.3.3 The late experience of implant-supported overdenture

After a significant period of using ISODs (more than 6 months), patients began to experience long-term ISOD complications and maintenance requirements. The majority of the participants were able to reflect on some additional disadvantages/drawbacks, which started to impact on the performance of their ISODs. These were mostly wear and tear of the attachments, changes in the fit and adaptation of the ISOD base, the development of instability of the maxillary conventional denture, and the need for frequent maintenance. In addition it is observed that the majority of patients had a high OHIP-49 score (worse quality of life), possibly reflecting the impairments of their OHRQOL.

Patients described that when the ISOD's attachments (such as locator inserts) began to wear, this had direct impact on the security and stability of the restoration during function and they felt as if they were returning to the experiences of their old conventional dentures. After significant period of using and experiencing the drawbacks of the ISOD, patients' oral health related quality of life seemed to be impaired again and this was apparent in participants' OHIP 49 scores.

That clips only lasts for a very short while before it wears off again and I'm back. I'll be back to square one. I'm going backwards again and I'm getting to where I was when I had ordinary – the lower palette

Catherine, 76, III, E, 120, ISOD, 7 years

Eventually, I ended up getting the implants which were wonderful, I was so happy everything had improved, But now it starts to move again all the time, they don't click in as, as firmly and then gradually they don't click, click in at all.

Deborah, 72, III, E, 70, ISOD, 3 years

The connection, connection to them, they're like a press stud, um, it doesn't, it does- they don't, oh, it seems to soon wear off after maybe about, I don't know how long you see, maybe about, is it a year or it could be even a year and a half. I don't know.

Alice, 70, III, E, 80, ISOD, 2 years

The implants are in, that is it and I have got to get on with trying to manage them." Then I went downhill again a little bit thinking they haven't worked.

Andrea 1, 50, III, E, 120, ISOD, 5 years

People experiencing these issues had a desire to re-establish the primary positive experience of an enhancement in their quality of life, which they felt before the wear of the attachment.

I'm prepared to do anything to sort this out if it means I'm going back to being able to talk to people. I don't feel at one with the world at all. And, and the firmness is, is desperately important, yeah. Um, is, um, people bang on about, you know,

Catherine, 76, III, E, 120, ISOD, 7 years

I will do what it takes to get them click in firmly again and to delay this from happening again

Alice, 70, III, E, 80, ISOD, 2 years

One patient, who was 6-months post-restoration phase, explained that he accepted the fact that the attachment might wear because of the material. However, he was unsure about the cost of repair and the frequency with which this would normally happen.

I mean, you might get a little bit of wear on them. I mean, but over how many years, you know? How much does repair cost. This is the thing. You've just got to, you know, try not to keep putting them in and out. Stop- stopping wearing them you're always going to get a little bit of wear.

John, 53, III, E, 20, ISOD, 6 months

Participants additionally believed that after a period of use the tissue adaptation and firmness of their ISOD had altered. They related that to ageing of their oral cavity, specially their gums.

I think the trouble is that my gums at the back are receding even further they're starting to jump around now. I always think the problem, it is not the denture it is my ridge

Amelie, 71, III, E, 96, ISOD, 6 years

Don't know whether it's just me or whether this is across the board. People, I see, are getting older, they're finding more complications. I don't know. It is related to age.

Some participants indicated that they had begun to feel impairment of the upper conventional denture retention and stability. After experiencing the advantages of using ISODs and the improvements in the security of the lower ISODs, patients identified that they had developed difficulties in controlling the maxillary denture and this led to difficulties during function. The positive experiences of ISODs encouraged the patients to consider having implants in the maxillary jaw if possible.

In fact the top was quite good before I had implants, you know, but now the suction is not as good, I have difficulties to keep it in place it became difficult to keep in I would have implants in top jaw as well, If I was able to.

Deborah, 72, III, E, 70, ISOD, 3 years

It was a top set (agonist to ISOD) that was a little bit loose so they've tried to remake them, to get them a little bit tighter, so they don't move around when I'm eating. But there is still little bit of movement on the top if it doesn't work, I mean, they did say they might think about putting implants on the top which I mean would be a lot better and then, then you've got no, no worries then, because they're clipped in, they don't move. I just hope that we get the top set sorted and then, we'll then live a fuller life with a bit of luck. You know, so, without any stopping now.

John, 53, III, E, 20, ISOD, 6 months

Now the top one particularly is slack, I'm conscious of that, and although the bottom one is secure, I'm fine with the comfort of it but I am getting food underneath. The top denture is slack now. Sometimes when I'm talking I catch the front teeth, it loosens it down.

Amelie, 71, III, E, 96, ISOD, 6 years

One participant experienced a repeated crack on the upper denture. This required retreatment with ISODs.

Since I've had the implants, it's been marvellous. And I came back, they had to remake them to do another sets, because I did have a crack in the top denture, a crack, two times

Linda², 75, III, Pd, 35, ISOD, 6 years

- **Preference of fixed option**

Patients with ISOD showed their desire to obtain a fixed restoration and they repeatedly described the fixed restoration option as real teeth retained by DIs. They believe that the

only barrier to obtaining fixed restoration was the possible cost of the treatment, thereby underestimating other factors relating to their clinical suitability for the fixed prosthesis.

I mean, if, if, to be quite honest if I could have made them better, then I would have - getting them all done, as individuals. But it's just, as you know, it's a very expensive process, so it's just you can't afford it.

John, 53, III, E, 20, ISOD, 6 months

I mean, I prefer fixed teeth but you know, it's down to cost. And I mean, if you want to put, what is it, six, seven implants in, it's a lot of money isn't it?

Amelie, 71, III, E, 96, ISOD, 6 years

If I could get permanent, fixed teeth, I'd love that, but unless I win the lottery it's never going to happen.

Deborah, 72, III, E, 70, ISOD, 3 years

I would hope if I could have something fixed rather than denture with implant. But obviously these what they could offer I mean.

Alice, 70, III, E, 80, ISOD, 2 years

- **Value**

All of the patients would recommend ISODs to other patients with the same dental status if they were asked. Despite experiencing some long-term complications, patients still considered their experiences of ISODs as positive because of the improvement in their oral condition and quality of life for the period they experienced the advantages of the restoration.

It's definitely, as I said, worth having implants. Obviously there must have been a little bit of – you know, for to cause ulcers and things. But, you know, no regret.

Alice, 70, III, E, 80, ISOD, 2 years

I can't fault it, it's made a difference to my life, my whole life. I would never say, it was a horrible experience because my life has improved.

Amelie, 71, III, E, 96, ISOD, 6 years

They've improved me – improved us quite, I mean, considerably, you know, from having the ordinary denture. You know, so they have, they have improved life a little bit. Just it's, you know, but hopefully, you never know, I might get the top ones done. I'm quite satisfied with the, with the treatment I've had

John, 53, III, E, 20, ISOD, 6 months

9.3.4 The hidden concern: 'will they last'

Patients valued the enhancement in their quality of life delivered by ISODs, and the majority of patients' ongoing concerns were regarding the long term success, longevity and future maintenance needs of the ISOD restoration. Patients recounted that early in stage III of the implant restoration, they were expecting the restoration to last for a long time, with no complications or only minor maintenance needs. This is also highlighted in Chapter 6.

So I was expecting them to stay forever, forever. Now I am not sure if this will be the case?

Amelie, 71, III, E, 96, ISOD, 6 years

Again, I think everything will be fine, I'm not quite sure if I need to replace them or will have trouble I haven't been told about any future requirements of maintenance.

Deborah, 72, III, E, 70, OD, 3 years

I don't think there is going to be many complications. You know, the, I mean, I don't think there is any complications, is there?

John, 53, III, E, 20, ISOD, 6 months

In concordance with patients with ISFPs, patients indicated that to overcome their doubts and concerns, more in-depth information about the longevity of the restoration and long-term management needed to be given at the earlier stages.

It's just a question; some sort of information, just to give to the patient that in the long run might be after one, two, 10 years or 15 years, they might experience some complication. So they need to come back just to – so you haven't been given this information in this hospital?

Alice, 70, III, E, 80, ISOD, 2 years

But I need to know that. I was not expecting, if they'd said to me, "Eventually, you might go back to square one," I'd say, "Well, I'm prepared to put up with that because I've had years of normal life. To me, I was so desperate I didn't care. If they'd said to me, "Well, after umpteen years they might start jumping around again," I would have said, "Yes, fair enough. Just go ahead, do it, because it means I'll have umpteen years of normal life."

Catherine, 76, III, E, 120, ISOD, 7 years

Patients who had been using ISODs for a period of time indicated that, from their experience, they thought that two sorts of information should be emphasised and highlighted to patients at the earlier stages: the long-term maintenance needs, and the

costs of future maintenance. This is consistent with other patients' requests regardless the stage of treatment and the type of the prosthesis:

Well, the important information should be this time, I'll be able to say to them, "Long-term, you can't guarantee." I don't think you can, anyway. The way I am now. It was never discussed before and I just assumed they'd be there until I popped my clogs. The clinicians should speak with the patients about the long-term complications, Now, I think it wouldn't have made any difference to me but it may do to some people.

Catherine, 76, III, E, 120, ISOD, 7 years

I would say that it won't be always be funded by the NHS, because if it was private I couldn't afford it. Also maybe as I get older, um, the implants will fall out maybe, or, I don't know, or I won't be able to get here so I couldn't face that

Amelie, 71, III, E, 96, ISOD, 6 years

Before they use them people didn't realise the long-term complications there could be clear information about this bit, for me it could be because I'm getting older. My bone mouth structure's changing. The main thing is I didn't know whether I had to go and see my own dentist to have this checked out every year or every six months and I was not told, how frequent I didn't know I need to know before things go wrong because I hadn't been told last year that once the implants were in, would always check them about once a year or so to make sure that everything was alright. That's one concern because around the denture where the implant fitting goes in that always has a build-up. I don't think I have been made aware of the problems before treatment began

Angela, 76, III, E, 150, ISOD, 7 years

No, no one has ever discussed these sorts of problems, with me I've had no problem at all previously, they start moving and the troubles began last year

Linda2, 75, III, E, 35, ISOD, 6 years

Patients highlighted that their expectations at the beginning of the treatment were higher than what was achieved. Nevertheless they were still satisfied overall with the treatment outcomes.

When I had the first implants done I probably expected a lot more when I think back.

Angela, 76, III, E, 150, ISOD, 7 years

I expected them to last for many years to give dentures a firm grip. But now I am struggling again.

Alice, 70, III, E, 80, ISOD, 2 years

I was expecting much more to be honest with you and when I came here, I just kept wanting them to say, "Yes, we will accept you." Because the dentures were

horrible, I don't think people with their own teeth realise what a difference it makes your whole life when you have teeth that won't stay in place.

Catherine, 76, III, E, 120, ISOD, 7 years

9.4 Discussion

Recently, the widespread take-up of DIT has been accompanied by an increasing number of complaints, mainly relating to dissatisfaction with treatment outcomes (RCS, 2014). Thus far, little research has made in-depth examination of patients' experiences after obtaining dental implant restoration using qualitative research methods (Atieh et al., 2015; Abrahamsson et al., 2016).

- ***Positive experiences***

In general, the results of this study indicate that patients from the two groups of dental implant restorations (ISFR and ISOD) regarded their implant treatment encounters as positive and advantageous experiences. This reflects patients' acceptance of the treatment outcomes when they compared their post- and pre-implant dental and oral health. Despite experiencing some drawbacks associated with implant prostheses, the majority of the current participants expressed their willingness to recommend implant treatment to others with the same dental condition, and they argued that DIT is appreciated for the period that they did have good function following treatment.

Furthermore, the two patient groups believed that obtaining implant restoration enhanced several aspects of their quality of life, including confidence, particularly in the short-term period after the treatment, and this further supports previous abundant quantitative and qualitative research findings (Feine et al., 2002; Thomason et al., 2009; Eitner et al., 2012; Fillion et al., 2013; Wolfart et al., 2013; Kashbour et al., 2015; Misumi et al., 2015).

- ***Expectations***

Participants from both groups who did not experience significant issues continue to hold unrealistic expectations of DIs, even at the later stages of the implant treatment pathway, and strongly believed in the long-term success and permanency of the implant restoration. Those patients' anticipations were usually associated with uncertain knowledge and under-rating of issues pertinent to 1) the long-term implant care and maintenance requirements, confirming recent findings (Wang et al., 2015; Abrahamsson et al., 2016; Atieh et al., 2015), and 2) ISP hygiene requirements, which are without doubt a key factor for the long-term success of implant-supported restoration. Patients'

uncertainty about hygiene issues related to ISFPs have only been raised previously by Lantto and Wårdh (2013) in relation to patients with disabilities, and no reports in that study related to patients with ISODs.

- ***The perceived quality-of-life changes and satisfaction***

This study's findings confirm that patients experience enhancement of their quality of life following the placement of ISPs. However, as the time progresses, patients undergo several unanticipated drawbacks of the prosthesis that may impact on their perceptions of the treatment outcomes. Most of the recent longitudinal studies investigating implant treatment and patients' oral-health-related quality-of-life changes followed patients for a short period of time (compared with the implant lifespan) of up to 6 months (Eitner et al., 2012; Furuyama et al., 2012; Hultin et al., 2012; Kriz et al., 2012; Fillion et al., 2013; Patel et al., 2015); only one considered experiences after 3 years (Petricevic et al., 2012), confirming positive post-treatment improvement compared to the baseline; and one study claimed that patients with ISODs reported lower overall satisfaction and quality-of-life changes compared to patients with IFSP (Brennan et al., 2010). In contrast, no investigation has been found that reports on patients' quality-of-life changes after a long period of experiencing implant restoration complications and maintenance requirements. Long-term implant complications might occur biologically (for example, peri-implantitis) and/or mechanically (such as screw or restoration failure). Patients' experiences of these long-term drawbacks are not represented in previous studies, with the exception of (Abrahamsson *et al.*, 2016).

- ***Experiencing implant fixed prosthesis complication***

In this study, patients with ISFRs and implant crowns regarded their restoration as a true resemblance of their natural teeth ('*real teeth*'). This finding is coherent with those observed in earlier studies (Johannsen et al., 2012; Grey et al., 2013; Lantto and Wårdh, 2013). The possible explanations for these thoughts, supported by the data of this study, may be patients' thoughts of the implant being embedded and secured in their jaw bone and, as a consequence, regarded as part of their body. Interim difficulties in speech and pronunciation were encountered in this study and elsewhere (Trulsson et al., 2002; Narby et al., 2012), with no apparent impact on patients' immediate experiences of implant outcomes.

After a period of use and experience of some ISP complications, patients seemed to begin to realise the possibility of implant failure and admitted that was not considered or acknowledged earlier. However, this finding may be somewhat limited by the number of ISFP patients, as only two examples of complications could be explored. This accords with a recent study which reports that after patients had experienced peri-implantitis, they became less satisfied regarding the care provided, doubted the effectiveness of future care, and blamed the clinicians for not being clear about the possibility of long-term implant complications (Abrahamsson et al., 2016).

- ***Experiencing implant overdenture complications***

On the other hand, despite the acknowledged enhancements in quality of life, ISOD restoration was interestingly regarded as ‘*a foreign body*’ as it is necessary to frequently remove it from the mouth, and in this sense they resembled conventional dentures. Similar patient perceptions were previously reported by Rousseau et al. (2014, p. 468), who stated that ‘*There was a strong sense that dentures were “other”; an alien intrusion into the body*’. Patients recognised that the security of the dentures, which is delivered by the implant precision attachments, was the reason behind the immediate improvements in their quality of life, confidence, function and aesthetic.

In addition, at this study several immediate patients concerns were reported relating to continued minimal movement of the ISOD base over the ridge (described as *minor instability*), the reduced stability of the upper dentures and short-term difficulties in manipulating the overdenture. However, in the long-term, the frequent wear of implant attachments had an apparent impact on the overdenture performance, which clearly influenced patients’ perception, quality of life and long-term satisfaction: ‘*clips only lasts for a very short while before it wears off again and I’m going backwards again*’. Patients with those concerns begin to think about the superiority of an implant-supporting fixed prosthesis: ‘*I would hope if I could have something fixed*’.

- ***Clinical implications of findings***

The majority of patients’ concerns are potentially caused by a lack of relevant information during the treatment pathway, which possibly focused less on long-term aspects of DIT. It is necessary to inform patients that even though DIT is able to provide a valued tooth replacement, patient selection and continuous care and maintenance are

essential for their long-term performance. Therefore, patients' concerns could have been eliminated by robust clinical communication, early acknowledgement of the possibility of complications and a proper long-term care plan.

As the major concerns of the patients were related to thoughts surrounding longevity, the permanency of the implant restoration, and oral and restoration hygiene, a robust strategy should be implemented to ensure proper patient education in relation to DIs, with a particular focus on topics of patient interest. For example, acknowledgement of the possibility of complications and the availability of the ISFR option for the older population should be considered. Patients' awareness of appropriate techniques and regimes of oral hygiene and implant care should be clearly established, enhanced and continuously enforced to eliminate patients' doubts and uncertainties and hence eliminate future hygiene-related complications.

Nevertheless, the current study at stage III eliminated the limitations of previous qualitative studies by involving more participants in possession of ISFPs, including crowns and ISOD (Kashbour et al., 2015). Recruitment at stage III was particularly difficult. This is possibly because after patients have been discharged from hospital care at the end of their implant treatment they are less motivated to participate in research. Therefore, the data for stage III in this study are unable to demonstrate a breadth of views on certain topics, which need to be explored more extensively: for example, the experiences of ISP failure and the long-term complications and maintenance. Further studies may need to explore those issues and the possible ways of educating patients about DI care.

9.5 Conclusion

Although the immediate implant outcomes can be felt greatly, it is essential that patients considered the need for continuous management, including professional care and home care. This study found that patients strongly believed in the long-term success and permanency of their implant-retained restoration. These patients' thoughts were usually associated with uncertain knowledge and under-rating beliefs pertinent to long-term care and hygiene regimes. While enhancement of patients' quality of life were observed, confirming reports from quantitative researches, after a long term use these improvements seemed to be influenced by the long-term complications, limitations and

maintenance needs of the implant restoration as compared to the treatment outcome at baseline. No investigation has been found that acknowledges consideration of patients' oral-health-related quality-of-life or satisfaction after a long period of using implant restoration involving the impact of maintenance or failure experiences. This should possibly be the focus of future research.

Chapter 10 Data and Discussion: Study B.

Clinicians' views and reflections

10.1 Introduction

Study B is based on clinicians' perceptions of dental implant patients' experiences in a secondary care environment within the NHS. Study B was undertaken after the identification of the main themes to emerge from study A. A qualitative approach was undertaken to investigate clinicians' thoughts and experiences, particularly those related to the themes that emerged from Study A. In addition, the analysis of the data sought to explore clinicians' thoughts and reflections on their own roles in patient management.

The topics that were explored were:

- Clinicians' approaches to communication
- Provision of information
- Clinicians' perceptions of patients' expectations
- Clinicians' perceptions of treatment duration
- The decision process and clinicians' thoughts regarding their role
- Flexibility versus ambiguity of RCS clinical guidelines
- The decision and the local resources

The presentation of the data analysis in this chapter is structured according to the chronological sequence of clinicians' approaches to patient management. It begins by assessing patients' requests and expectations and providing information on implant treatment pathways. It then goes on to outline the initial stage of optimisation of existing restorations and the challenges that clinicians face when planning the primary treatment. This is followed by clinicians' perceptions of the decision-making process regarding implant treatment, and finally the perceptions of patients' experiences of stage II (implant placement) and stage III (implant restoration). The analysis will be concluded by presenting clinicians' suggestions on how to improve patients' experiences of implant treatment at SDC.

Details of the methods used in Study B can be found in Sections 4.6.2 and 5.6. Briefly, 12 clinicians were invited of which 8 participated in the study. Four of these were

clinical consultants; 4 were restorative specialty trainees (StR). Five were female and 3 were male.

10.2 Clinician--patient communication (establishing a baseline)

From the data analysis it is apparent that clinicians, when undertaking initial assessment of patients seeking implant treatment, focused on establishing a good rapport through verbal communication and exchange of information with patients. They aimed to identify three main aspects of patients' previous experiences of dental treatment in PDC: the patient's main complaints, the reasons for the referral and the level of patients' implant knowledge. By establishing this understanding, clinicians then considered making decisions related to patients' upcoming treatment pathway in the secondary care NHS.

The important thing 'as a start', I think, is to try and get to know the patient over a visit or two before engaging in any sort of implant talk.

Consultant 04

I think my starting point is always just to talk and understand why the patient thinks they're coming to see us and what they know about implants and what their practitioner has said to them about implants. I always try and start off with that conversation so that I know where they're coming from and don't make any assumptions about that

Consultant 03

Clinicians identified that at this first assessment visit patients' usually fell into one of two groups, differentiated by their understanding, previous knowledge and anticipation of implants as a potential type of tooth replacement. By establishing the level of patients' understanding, clinicians indicated that the discussion with patients would be modified accordingly.

I think the way that I see things is that, we usually get two groups of patients. We get the sorts of patients that have very little information or very little insight into implants and their practitioner has just said, "I'm going to refer you for implant", and they know nothing about that. Then you have others that have obviously done a little bit of exploration about implants themselves and explored, and maybe been on the internet or had a friend who has implants or maybe have had a fairly detailed conversation with their practitioner.

Consultant 03

We also have two sorts of patients you know, some with no idea about implant and just it was mentioned in the discussion with their practitioners before

referral and the others, usually have had more idea, and understandings of what they wanted

StR 06

10.2.1 Difficulties in managing high expectations: ‘hardship of information provision’

In general, clinicians believed that they experienced more difficulties managing the expectations of patients who had previous knowledge of implant provision from their GDP. Clinicians identified that the effectiveness of clinical communication sometimes depended on the accuracy of patients’ previous understanding and knowledge of DIs.

Certainly how difficult is to interact with patients in my experience, it depends on the discussion they've had with their practitioner. Sometimes the practitioner has led the patient to believe that the next step will be implants. Sometimes, more appropriately, they've said, "This is the best I can do. We'll send you to the hospital, but in fact, here, they'll probably just try and make a better denture first. This is actually what we do a lot of the time.

StR 06

Despite the provision of verbal and written information throughout the initial stages of the assessment, the findings of Study A strongly support the notion that patients’ expectations of DIs continued to be high, particularly in relation to longevity and the need for maintenance. Clinicians related the tendency of patients’ to have high expectations to the origin of their initial interest in obtaining implant treatment. This subsequently led to difficulties in changing patients’ understanding or expectations to more accurately reflect reality, as patients were only focused on receiving implants and less interested in understanding the limitations and the suitability of implant provision for them. This recognition by clinicians aligns with patients’ thoughts of delaying receipt of in-depth information about implants in general and ISPs specifically before knowing if they would be offered implant treatment (see Chapter 8, Section 8.2.1)

My only feeling is that people are so focused on getting it (implant), and again they have an expectation, in most of time, generally, those patients hold firm views and a strong resistance to change them that I wonder if it (information) almost falls on deaf ears. I call it sometime ‘unrealistic’ expectations’.

StR 05

Unfortunately, constantly, we are seeing patients who think of implant as the only option. I feel they are so focused on target ‘if I could have implants’, it will sort me, my shape, my mouth, my job, and so on’, on my clinic today, two

patients wanted to have implants but neither of them were patients that we would see as priority patients.

Consultant 02

I think they do think that implants are the answer for everything. I think patients feel that implants, match natural teeth and match the gum perfectly, quite often it's difficult to get good gingival aesthetic around implants, and patients just don't always appreciate that.

StR 07

In addition, clinicians recognised that there were occasional difficulties in effectively communicating full information about implant treatments to patients as a result of two factors: previous misconceptions (which could be gained before consultation) and clinicians' time restrictions. When patients had previously acquired incorrect information about implant treatment this led to difficulties in persuading them to accept the correct information, particularly if this seemed to exclude the option of implants for that patient.

If they have got a misconception or a preconceived idea that's incorrect before they arrive, that's sometimes quite difficult to turn around in a short consultation especially when they engage with a lot of discussion forums, which happens online now.

StR 06

For some patients I don't think verbal discussion does work and they feel that why isn't the technology available to give me what I want? That is a much more difficult conversation and consultation to have. With those patients it is about modifying and bringing the expectation down and probably empathising as well. I feel for them.

StR 05

When they insist on ideas or views which they have known before the consultation, from friend or internet, I think that is a really difficult situation to manage

Consultant 02

Clinicians believed that unrealistic patient assumptions of implant restoration outcomes prevents them from accepting and understanding information on implant limitations. They indicated that this was observed particularly with patients who were informed that implants should be the next option for their treatment.

I don't think it's helped by a lot of the profession actually, when they suggest that implants might be the way forward next. I think that is a problem, of course. But some of this, again, is about preconceived ideas.

The majority of clinicians were familiar with patients' thoughts about implants as 'a replacement that does not need maintenance'. Clinicians felt that this is a particularly illusive concept and again they experienced difficulties in improving patients' understanding and acceptance of implant limitations during their discussions.

I think, unfortunately, from the patient point of view, sometimes they see implants as being different to other problems. If you say to someone, "If you have a filling done, that filling might break or might leak in however many years and you're going to need it replaced", they'll accept that and they'll say, "Oh yes, I realise that". When you say to them about their implants are going to need similar maintenance issues and problems, they don't always accept it.

StR 07

I think they get some information from their dentist, which sometimes is very accurate; sometimes not so accurate, just depending on how much that particular dentist knows about implant dentistry. I think they get some from the internet as well. So sometime they insist that if they could have implant so they will not have any denture movement or their look, and face will be sorted

StR08

Clinicians identified that clinical time constraints sometimes placed limitation on their ability to improve patients' understanding.

I don't think it's just patients that don't appreciate that. I think the profession doesn't particularly help a lot of the time in providing full view of the concept. Initially at the consultation we're having fairly superficial discussions about implant because of short consultation time.

StR06

I think it's a lot to take on at a consultation, a lot of information. I think some things just get forgotten about. I know we give them the information leaflet, but it doesn't really go through that information of how things might look. It does talk about the maintenance and stuff, but not really the aesthetics of the implant.

StR09

From past experience, there are things that you can discuss with patients, but it's almost how much detail you go into in a relatively short appointment at that stage, where patients sometimes lack the insight into what an implant actually is, let alone how it functions or what its maintenance issues are and its predicted longevity.

Consultant 03

Patients' personality and cognitive and communication abilities could also impact on their understanding, and willingness to understand during the consultation.

I just think some people are just a bit stubborn and they have a mind-set and that's what they think things are going to look like.

StR 09

But we do get surprises sometimes when we've met patients who, it obviously becomes apparent that they have no idea what they're letting themselves into, despite all that, We discuss and provide leaflet, we use model, It's frightening,,.

Consultant 04

10.2.2 Provision of implant Information: current approach

Clinicians identified that, as part of their professional duty, they continually try to ensure that accurate and comprehensive information is provided. The current approach for the majority of the clinicians was to begin with verbal and interactive communication with the use of aids such as pictures, models and sketches, and then follow this with the provision of a pre-structured written leaflet. However, some clinicians believed that additional sources should be considered.

I think we always make sure that information is provided verbally and in form of leaflets and it is documented in the notes that it is provided but I think how we are providing it is still not so effective.

StR05

We'll talk to patients. We'll show them pictures. We'll show them models. We'll try and make wax ups or try in⁷ to show them what the aesthetic outcomes might be. Speak to them repeatedly about what's involved and then copy correspondence to them.

Consultant 04

Clinicians identified that there is not a defined local protocol on implant information provision, and current clinicians' approaches depend on their preferences and the patient's need for information, which is assessed by the clinicians themselves. Clinicians assumed that current patients' understanding might be varied because of the unreliability of verbal communication, which could be influenced by the unintentional use of clinical terms or jargon, clinicians' time constraints and variability in clinicians' approaches.

⁷ Wax up: the final anticipated form of the missing teeth is made in wax on patients' dental casts to give patients an idea about the look of the final teeth. A 'Try-in' is to be fabricated in provisional material, also to give patients a closer look at the shape and the appearance of the final restoration in the mouth.

I guess jargon, you've got to be careful with that. It's hard sometimes to put dental terms into words that patients can understand without taking it away from what it actually is.

StR07

It's rather like the idea of, "You might not be able to have an implant because you might not have enough bone." Again, patients don't necessarily hold this concept that the bone was only there to support the teeth. They don't carry that information around with them either. When you say, "Well, you might not have enough bone," they are often surprised by that and might not understand it

Consultant 08

When you're working on a big, busy clinic with lots of different grades of staff, you hear people speaking. Everyone has got their own style. Some people you think, if I was a patient I wouldn't know what on earth you're talking about.

Consultant 03

While providing patients with information, clinicians suggested focusing on the type of possible future implant-retained restoration the patient was likely to obtain and avoiding other options in order to use clinical time effectively.

To save time, if I'm referring them for an implant overdenture will be to discuss the fact that they're likely just to have two implants. They'll just be at the front of the mouth. The denture will be removable and everything will need cleaning by them and that cleaning will need to be done to a high standard. If it is for fixed implant restoration I usually focus on how the procedures will be carried out and how to clean it.

Consultant 03

- **Information on restoration structure, aesthetic and maintenance**

Clinicians' approaches to providing in-depth and clear information varied. Overall, there was an intention to involve three aspects of implant knowledge: the structure, aesthetic outcomes, and maintenance issues. Firstly, with regard to the structure of the implant and the retained prosthesis, some clinicians considered that differentiation between the implant fixture and super-structure should be made. The intention being to help in the management of patients' expectations, in relation to the longevity of the implant restoration. Interestingly, in connection with Study A, patients were clearly confused when identifying and differentiating between the implant fixture and super-structure and they often mixed these when giving an explanation.

There should be enforcement of information about the implant itself and also the over structure because the implant might last forever, for example, but the

over structure needs to be cautiously maintained. Okay. Those are the main things I focus on.

StR05

I think the other thing that we' should be very good at is, the implants a side, we're not very good at explaining that the super structure, even if the implant is going to last 10,15,20,25 years, the super structure will need replacement and will need maintenance on a regular basis. I think we tend to skip over that a little bit.

Consultant03

Secondly, during information provision, clinicians indicated that information about the implant should clarify the anticipated aesthetic outcomes of the restoration. Clinicians recognised that it is the predictable aesthetic outcomes were likely to be highly influential in patients' decisions making.

For me, when I am talking to them it is often the soft tissues that are missing that prohibits a really good aesthetic outcome. That helps me speak to the patients about the fact that it might not be the best solution for them. If they are missing a lot of pink tissue and gum and they want screwed in teeth that would actually make them aesthetically look far worse than a removable denture

StR06

I usually totally see what patients are saying about implant 'it will look normal' like my tooth' when soft tissue is missing and if they want the best looking outcome, that is not the best thing for you. Getting that kind of realisation across is quite powerful. For some patients I don't think that does work but it should be clear.

consultant02

Thirdly, with regard to patients' desire to have early information relating to maintenance requirements, clinicians had two arguments about the most suitable time to provide maintenance information. Half of the interviewed clinicians believed that clinicians should routinely provide superficial information about implant maintenance at the initial assessment and before the decision, but they preferred not to explain that in detail. Instead, they felt that it is more important to emphasise information on implant procedures and planning at the earlier stages.

Obviously part of your education in even just your initial assessment and talking to the patients about what the treatment involves is going to have a discussion about the maintenance and follow-up that's going to be required but I tend to do more discussion, on the process itself and the stages.

StR07

I avoid those issues I think probably simplifying things down so it is almost I prioritise discussion about the procedures and the principles.

Consultant03

Clinicians assumed that information about maintenance should be provided to the primary dentist as they think they are potentially responsible for maintaining patients' implant restoration in the future. However, while a GDP may undertake some of patients' oral care requirements and maintenance, when they were not trained they may prefer to refer patients again to SDC. In addition, it is not made clear in the information given to patients who provides and pays for the long-term maintenance of implants obtained at SDC within the NHS or the estimated costs of maintenance: for example, renewing ISOD attachments. This is not covered by any of the general dental service fee scales. The patient then has to be informed that this will become, in essence, a lifelong commitment to private dental fees.

Information on maintenance should go to the dentist which explains that the patient will need ongoing maintenance. They should have been provided with a tailored oral hygiene regime and some kind of follow up plan. In that sense, the patient is reminded.

Consultant04

I think talking about maintenance should be a GDP role the GDP gets an information booklet on how to look after the implant and the patient gets all their casts to take with them. In the letter we write back, we give the information, what implant has been used, so the dentists can maintain it.

StR09

Where clinicians stated preference for delaying the provision of information relating to maintenance information they gave two reasons. One was the difficulty of predicting the maintenance requirements at the earlier stages of the assessment when the possibility of implant treatment was yet to be decided upon; the other was concern about providing unnecessary information, which may impact on patients' thoughts and preferences in the decision-making stages.

No information on maintenance should be given at the beginning, I don't think so, and it would actually deter a patient from having an implant. Again, sometimes it's really difficult to understand that and know that, and again, you don't know what's going to happen to the patient medically. So I don't usually bring maintenance in the conversation unless I anticipated that the maintenance aspects were going to be so difficult

Consultant03

You don't want to unnecessarily scare the patient and be incredibly defensive about everything you do, just for medical legal reasons.

Consultant04

But the difficulty is that you sometimes can't predict which patients are going to have the maintenance issues that are problematic, so to not influence their decision with maintenance information, I think, sometimes we, as a profession, discuss implants without making too much of the point that actually they require maintenance and it's not often the only or the best solution.

StR09

The other group of clinicians emphasised that information on maintenance and the potential costs of future treatment should be acknowledged at the beginning of the assessment stages before identifying the suitability of the implant in order to allow the patients to make a fully informed decision and be aware of their potential personal liability for long-term maintenance.

Good information of maintenance should be given as early as it can be. Patients need to know in particular the estimated cost for maintenance.

Consultant02

I think it's from the consultation, from day one you say to them, "It's a bit like your car. You need to get the tyres changed. You need to keep a bit of money aside to look after this implant. Yes, you might get the odd one that chips" and they have to get it replaced, but it's a bit like if they've got a crown and their own natural tooth, it might chip and they might need to pay money out to get it replaced.

StR05

I think a lot of patients, because they get them placed in hospital, think they can just come back here again. It's whether some sort of charge gets put in place, because they are getting a free implant that costs a lot of money and we can't be seeing people that keep coming back with failures. so patients should know before they decide for it that there is a long run cost of maintenance

StR06

- **'Like a natural tooth' is a misleading concept**

Clinicians suggested that in their discussions with patients they should be cautious about directly stating or even implying that implants resemble natural teeth. They considered that this comparison might increase patients' expectations and lead to misunderstandings regarding implants.

I don't tend to relate it to their natural teeth, but rather to the condition that they are currently in and talk about those differences. But I tend only to discuss the

journey from where they are to where they're going, not from where they were to where they are and then to where they're going. For example the different between spoon denture and the implant crown.

Consultant08

When I see the patients, who are already struggling with whatever form of prosthesis they're wearing. So I avoid saying implant will be like the natural tooth you have lost ages ago I would say, "Look the advantage of the implant, it will be less of a problem than what you've got now".

Consultant04

This particular trend of avoiding comparisons with natural teeth was raised by the experienced clinicians, whereas the data analysis for the junior clinicians showed that they tended to imply during the information provision that implant fixed restorations resemble natural teeth.

I would inform them that Implant crown can't be removed and needs cleaning, managed like natural teeth and carry the same risk I think that's very important.

StR06

Patients think implant teeth are strong and won't fail, I always try to remind patients this crown is the same as your other teeth it needs cleaning and it could get disease and then might fail.

StR 07

- **Longevity**

When highlighting patients' desire to have particular information about the longevity of ISPs, some clinicians identified that they feel reluctant to offer information about the anticipated life-expectancy of implant restoration in practice, because of multiple reasons.

Patients sometimes ask about how long implants restoration will last, but I think it's not something that I would offer. I think the reason for that is I think as practitioners we're quite reluctant to pin anything down to a timeframe because there are so many things that could potentially go wrong that might shorten the life of an implant.

Consultant03

I usually avoid misleading patient when it comes 'to how long will it stay in place'? It is really, something we cannot predict. Studies showed us it stays long time or forever may be, but in practice that is only under particular circumstances.

Consultant04

They should have a consultation where it is quite explicitly, specifically, explained that nothing lasts forever and it is a shared cared environment. But honestly I recognise 'implant last forever' is something, sometime they hold on their thoughts.

StR05

I think possibly a question we often come across that how long will implants last. There isn't an absolute answer. There are lots of unknowns, so I think we're a bit reluctant to offer a timeframe.

Consultant08

10.2.3 Clinicians' perceptions of patients' expectations

Clinicians' reflections on patients' thoughts about implant restoration outcomes showed their familiarity with patients' high expectations about the implant treatment outcomes and anticipation of obtaining implant treatment at SDC (some of those were featured at Section 10.2.1). Clinicians identified that initial assessments of patients' expectations of treatment were usually an important priority for them before the decision was taken to commence treatment.

It's really important that you know exactly what they are expecting and that you can tailor your discussions to put them right as to what can and cannot be achieved through the implant treatment.

StR07

I need to know how patient think of implants, and what do they expect first. Then I would take it from there and I will identify what sort of conversation we should follow and also what sort of restoration we should provide. If patients think implant will last forever and will end their problems and so on so I need to have more conversation and consideration.

StR06

- **Reasons for high expectations**

Clinicians explained that, from their experience with patients, there are several reasons for current high expectations of patients' with regard to implant treatment outcomes. Nevertheless, they felt that the main influential factor with regard to expectation issues was related to information and knowledge about implants obtained from the media and the internet.

I think because they hear so much about implants in the media and they read about it on the internet, I think they have a misconception that implants don't get problems.

StR07

Many patients we see feel it is an implant and it should be part of me. It will be a natural thing. For me it feels like, as a woman when you go into Boots and you think if I dye my hair the colour on that packet I am going to look like the woman on the box. You dye your hair that colour and you don't look anything like that woman on the box. That is sometimes a bit like patients implant therapy.

StR05

I think the media message that goes out for those that actually go and scour the media or the internet. It's very much like that I think, in a sense, they come to implants in the same sort of way. They're screwed into the bone, the teeth are fastened into the bone, and they are obviously quite like a tooth. They look like a tooth; they must be like a tooth, a very simplistic pattern with that.

Consultant08

Additionally, clinicians believed that advertisements attempt to market DIs as a straightforward type of tooth replacement, which is stronger and more attractive than natural dentition. In contrast, such advertisements potentially underrate the possibility of failure.

They try to attract people, 'implant is really easy', we just screw it into the bone and we put something on the top and it functions like a normal tooth and it is stronger" That's the takeaway story that people want to give if you are selling an item.

Consultant08

The media message is "implant is a direct replacement, and because it's not made of biological material it can't rot" As you simplify the message of what it is, I think you tend to get that sense of, it's very simple and quick option.

StR06

Linking with the Study A data, clinicians perceptions of the media messages were similar to the result of the earlier Google internet search conducted by the researcher (Chapter 6, Appendix 14). Clinicians were also aware of patients' thoughts on fixed implant restoration as an 'integral part of their bodies' and 'like a natural tooth' (see Chapter 9, Sections 9.2.1).

Clinicians assumed that patients who have experienced several unsuccessful attempts at tooth replacement believe that an ISP is the only replacement that can solve their tooth-loss predicament. In addition to what was previously discussed (see Section 10.2.1), clinicians claimed that these thoughts may raise difficulties during clinician–patient communication.

Patients sometime think implant might be the only solution, those are really difficult people, because of the psychological impact of tooth loss, failure of

restoration and the social rehabilitation aspect of having teeth that are fixed in and part of them, I can totally empathise with them that they think that is the only solution and the best solution for them and they will feel like them again.

StR05

We try to have fair and good discussion with patients. Quite large number of patients think implant is the only way and is going to solve their troubles, cos they tried several restoration sometime they are right but not always that is the case I usually expect difficulties to deal with these type of patients.

Consultant02

Patients' thought implant will be successful yes it would be most of the time, but my concern if they regard success as a restoration that doesn't require any kind of maintenance. Most of these things will require maintenance. When patients have those delusions they will be disappointed.

Consultant04

10.2.4 Assessments of current restoration and optimisation stage

After establishing patients' expectations and presenting complaints, clinicians continue their assessment by evaluating the patient's current restoration and identifying approaches to optimising the conventional treatment before making a decision about whether the patient could be prioritised for implants, and if this could be justified. This stage is designated as an initial stage of patient management before implant provision can be considered.

Our policy more or less is if you haven't had any dentures or bridge made here (at SDC, NHS), I think the starting point for all practitioners here involved in implants is let's see if we can improve on your restoration first of all. Until you've had a replacement made here, no decision of implant can be made.

Consultant02

The first thing we do is to plan for a better restoration here to improve aesthetic function and so on and monitor patients' satisfaction, we cannot make any referral to the implant people before that. And in reality some patients are quite happy to give it a go and avoid implants and avoid surgery.

StR06

- **Justification of the need of restoration optimisation stage**

Clinicians believed patients might not fully understand the reason for remaking a conventional restoration. However, they justified the importance of the optimisation

stage as an essential phase to identify priority patients for implant provision. It was undertaken for two main reasons. Firstly, the optimisation stage is used to investigate patients' tolerance of and satisfaction with their conventional restoration after improving the technical aspects. Following this stage, a patient might be deterred from having implant treatment if conventional restoration outcomes were clinically acceptable:

Well, I think it's difficult for patients sometimes to understand exactly why they may be having problems with their dentures or restoration, and there may well be clinical indications to change features about their denture or to utilise adhesive bridges. If we are able to do that, then that's really the first tack. Some people don't want really to have surgery, necessarily, so for them, they may well accept the clinical findings that we can improve on the current restoration and then they're quite happy to go with that in the first instance.

Consultant02

The world isn't ideal, is it? I know that McGill Consensus came out. I think it's a good idea, but reality is that some people are able to manage their lower denture without two implants if it is improved and indeed are quite happy to do so this is one reasons for optimisation stage

Consultant03

If you just see them and sign them straight up for surgery, you don't really have an opportunity to find out what the patient is really after. Here, it comes the importance; we should provide less invasive treatment to start with and to assess other option and implant possibility.

Consultant04

Secondly, the new optimised restoration can serve as a *diagnostic tool* for the implant position and restoration parameters before beginning the advanced treatment planning if implant provision is considered.

There is no better or greater diagnostic tool than giving the patient something that, fair enough, might not be fixed in as implants are but help them get towards the aesthetic issues later on and if they get away with something less surgically invasive than implants that fulfils all of their functions, then great and on the way.

StR05

Actually, the road that implants therapy, whatever you have in the form of a denture or a bridge, is part of the treatment planning for implants later on." You are deciding where teeth are going to go, what the teeth are looking like.

StR06

The other thing is that a lot of dentures are not made with the view to implants, they're made with the view to just trying to get something to stay in. The actual prosthetic envelope is not correct for an implant-retained restoration.

Consultant02

Clinicians recognised that, again, there are difficulties in dealing with some patients with regard to clarifying the reasons behind the optimisation stage. This concurs with the data from Study A, which showed that patients were frustrated about the merits behind remaking a similar restoration, and the length of time required for the optimisation stage before the decision can be made regarding implant treatment (Chapter 7, Section 7.3).

Sometimes patients come with an understanding and they accept what's going to happen. Sometimes they come expecting implants to be on the agenda straight away those are particularly difficult to deal with.

StR06

Sometimes it can be quite difficult because patients can be a little bit impatient to move on and I think they think that sometimes the initial assessment that I undertake, which is often to do with their current restoration, whether that's dentures or bridge work or whatever – they think it is in relation to implant treatment.

consultant03

Sometime it could be hard, patients don't understand that I need to ascertain whether their restoration can be improved upon before we move onto the next stage of considering implants I have to go back over and explain why that's necessary some appreciate it and some not.

Consultant02

In dealing with those situations, clinicians identified that they usually try to be transparent and use a full-disclosure approach of SDM to guide patients through the treatment stages and also to clarify that implants might not be provided in their long-term management. Clinicians indicated that they ensure that it is made clear to patients that optimisation is a key stage in the decision-making regarding implant treatment and it is one of the requirements of implant assessments.

We live in a shared decision environment and I try to be honest with them and I do try to say to them that given their history, given their past experience, we have to go through this stage to see if we can get a great deal of improvement with their denture, otherwise they won't be able to see you at the implant clinic.

Consultant03

I explain to them that if we don't do that initially, from my past experience I know that the implant team will knock the patient back and ask for improvement. I'm

honest with them, and I think most patients appreciate that. For most, in the grand scheme of things, that first remake can be, not always, but it can be a relatively short pre-referral procedure to go through.

StR06

10.2.5 Clinicians' perceptions of the length of the treatment duration

In agreement with the patients' data in Study A (Chapter 7, Section 7.2.3), all of the clinicians interviewed recognised yet justified the length of time required for patients' assessment, treatment and decision-making in implant provision at SDC. However, from the discussion, the majority of them seemed uninformed about the impact that the length of time for implant decisions has on patients' lives (Chapter 7). Several reasons were proposed by clinicians for the length of the treatment time.

First was the subjectivity of the conventional restoration assessment, particularly with respect to denture assessment and patients' adaptability. Judgement during the assessment can usually support the possibility of improving conventional restoration outcome to avoid implant provision. In addition, the subjectivity of assessments may lead to repeated attempts at treatment if a patient is seen by more than one clinician at the SDC clinic to endeavour to deter patients from DIT if they could adapt to other options.

I honestly believe a lot of initial assessment is based on the subjective assessment of the dentures that they're seeing. It is inevitable that you are going to have different clinicians having different opinions about rehabilitation and this may lead to more than one attempt of remaking.

Consultant03

Sometimes patients get referred back for the correction of very minor things a very minor occlusal error or whatever there or the lip support and I know from past experience that it won't make any difference at all, and this causes delay.

StR09

Several assessment quite often can keep patients cycling because somebody else different will look at them and see something else Its success is very much based on a patient's ability to adapt, their anatomy, the quality and quantity of their saliva, how much they want to actually be able to wear dentures as well.

Consultant02

Clinicians suggested that the second reason for the length of treatment is the absence of clear guidance in the local hospital regarding the length of the treatment stages for patients before a decision on implant provision can be made.

Really, I think, we have not got a standard protocol in the hospital regarding the length of treatment. I think it really depends on the first clinicians, also type of restoration and other things.

StR9

When it comes to how long everything might take, it is difficult to estimate. Yes, the length of time, and things may not quite work out as they had anticipated. Patients need to be informed early enough though as long as they understand that it's normally okay.

Consultant02

Clinicians also highlighted that other potential reasons for the lengthy treatment are related to the need for 1) occasional delegation between clinicians, and 2) students' learning in the clinical environment at the study SDC hospital.

I think there are a number of reasons in this environment. The first one is that there are a range of different operators and skill levels which provide the treatment "student, postgraduate, trainee and so on". We have an inconsistency in terms of who provides the care and that can result in different treatment times. We also have a range, because of the environment that we're in, of different presentations.

StR06

Sometimes you can't make a decision and then say, "Well, maybe we will go ahead or maybe we won't go ahead". Then I'd get a second opinion from a colleague or I would refer back to the person they'd been referred from in the first instance.

Consultant02

The involvement of students during the treatment stages may lead to additional waiting, increase the length of treatment time and cause difficulties in predicting the length of the stages.

I don't think there are possibilities to identify the length of treatment from the onset point. I think it's very variable and I think sometimes it'll depend on what's happening on the day on the clinic, which members of staff are there, and if there is student and so on.

Consultant08

Even myself I cannot calculate how long the treatment may take it depends, whether there is a postgraduate course coming off that needs patients, whether there just happens to be a lucky circumstance, as it were, how well the patient

recounts their history, how well the referral notes and the referral letter have been written.

Consultant03

Students in most of times got involved and that causes additional waiting, and longer time between treatment and appointments

StR06

Additional reasons are also identified by clinicians for the length of the treatment time, which may be associated with several patient factors such as the types of treatment and, most importantly, compliance with attending appointments when payment is not involved with treatment.

Certainly in my experience, I have some cases which have been very quick and I have some cases which you might expect to have been quick, but have lasted a longer time. Also, I think, because patients aren't actively paying for their treatment, we also have some issues with patient's rearranging, cancelling or not attending appointments which pushes things into wider boundaries as well.

StR06

We might have somebody who is having a reasonable amount of diagnostic work done first or adaptive work in terms of soft tissue contour or grafting before they are in a table position to restore. Other cases might be straightforward. We probably see a wider range of anomalies in this environment as well.

StR05

Lastly, the time required between appointments at SDC inevitably elongates the treatment duration. Clinicians believed that a length of time might be necessary when multi-skilled clinicians are involved in patient management, and clinicians felt that this time should be appreciated by patients as it is required to ensure quality during management.

If you are going to do these things properly, it takes time, it takes resource. You have many clinicians inputting into one small implant clinic. Therefore you automatically get the bottleneck set up. There is the initial delay of getting to the clinic. Then if they have got through that clinic and they are going to be allocated, then there is, who is going to provide it? There is a second set of delays.

Consultant02

You gain quality by working with teams that do a lot of the same thing, I think its part of the product of it being led by different teams. If each of us took our own patients through the implant procedure it would probably be a lot quicker. The consequence of it is that if you are going to be really slick at how that's managed. You have to very carefully manage the transition from one pole to the next pole.

Consultant08

When patients get to that station where they know who's going to provide it and then because we don't carry massive amounts of stock, you then stop them again and order things. At every opportunity there is the possibility of delaying progress. Now each time you might only be delaying it by two or three weeks or four weeks, but then you've got four weeks plus four weeks plus three months, plus two months. Already you haven't done anything and a year has passed.

Consultant04

10.2.6 The decision-making process

Generally, clinicians indicated that the decision-making process for DIT at the study dental hospital consists of two stages. First, there is an early stage, which is directed by restorative clinicians; this comes after an attempt at optimising the conventional restoration and negotiating patients' treatment needs. The second stage of the decision-making process is referral to an implant clinic where rationing between patients is required and a final decision regarding implant provision will be made by the local implant team, who will be responsible for stage II of DIT.

- **Early stages of decision-making**

Clinicians at SDC thought of their role as that of gatekeeper of the local resources, in addition to their role as clinicians. Their initial assessment and judgements about the suitability of implant provision were usually based on the RCS guidelines, according to which the referral of patients to the implant team is often made. According to clinicians, they usually followed the sequence of stages when assessing patients' eligibility for implant treatment.

They begin by assessing the patients' general and oral suitability for obtaining DIT.

Obviously I start with reviewing patient history, and the history of the dental condition are very important in making a decision.

StR06

Where it comes into play for me, I usually start by asking patients the ordinary questions of history again and review their medical health, and identify if there is any health issue.

StR05

- **Transparency and full disclosure**

Once more, clinicians identified that they focus on following a transparent disclosure approach with patients about the limited provision of implants before considering a referral to the implant team.

I spend most of my time, very early on in the interview with the patient, indicating that it is highly unlikely we will do any implant therapy because of the constraints that we have here. Very rarely do the practitioners (GDP) make it clear to the patient what the situation is. They tend to say, "We'll send you to the dental school, they can talk about implants with you." So it tends to be very vague with the patients.

Consultant08

The first thing I tend to do is to be honest and to say, "Well, we are incredibly limited in what we can offer"... so they may prefer to continue with the restoration we've made earlier.

consultant02

I think they come in expecting implant is an option so before sending them to the implant team I will say to them, "You might not be eligible for implants" I think communicating with them about why they may not get implants and setting that out before we go any further is helpful because the implant team are very explicit.

Consultant04

Justification for limited dental implant provision at an NHS SDC is explained by mentioning the RCS clinical guidelines, which are usually considered during negotiation of a patient's clinical need for DIT and if this need could be met by conventional treatment. Clinicians believed that communicating restrictions to patients, and negotiating treatment at this stage, should involve not only informing patients about their general and oral health appropriateness for DIT, but also their appropriateness in fitting the RCS guidance categories to justify implant provision and access treatment funds. However, clinicians at SDC within the NHS avoid making private referrals; they felt that introducing other ways of obtaining implant treatment might lessen the burden of a future negative implant decision.

I think communicating our criteria with them about why they may not get implants and setting that out before we go any further is crucial for me. Saying we will have a look at you and deem what is the most appropriate but you may not get implants on the NHS. It might still be a solution for you but you would have to pay for it. So not telling them that they can't have them outright has been quite helpful.

StR05

I must be clear saying "Oh yes, you'd be an ideal candidate for an implant, but you just don't meet our criteria". Then that's obviously when you can say, "It is an option, but it would need to be privately". We wouldn't make a private referral. That's something the patient really needs to discuss with their own dentist."

Consultant04

I think you've just got to be honest with them as to what the criteria actually are and explain to them what the hospital can and cannot do. Quite often they've been misinformed as to what the hospital actually provides and what the criteria are...then they do quite often understand a bit better, yes, when you've explained to them.

StR09

Clinicians identified that some difficulties might be experienced when patients are made aware of NHS implant provision by other patients.

It is difficult sometimes because they have heard through friends how they get these implants and then they will instantly jump to, "Well, I gag and it's really making me depressed and I can't have this." That can be quite difficult because they have already decided what it is and they've heard what it is that they want. Not for all patients, but for some patients that is definitely the impression that I get as they come through.

StR05

- **Gatekeeper role of clinician at assessment stage; initial screening**

The clinician's role as a gatekeeper in the decision regarding the implant provision is highlighted by their intention to ration between patients by considering the RCS implant selection criteria and the outcome of conventional restoration after the optimising stage. This is to identify patients who can be prioritised for implant provision because of their clinical need and not their desire.

I do look at myself as a gatekeeper of the public purse, as an NHS clinician and I don't feel that, because everyone comes in with a little bit of historic trauma and wants implant, actually that tooth could be quite amply replaced. Say they've lost a single tooth via trauma and it could be adequately and aesthetically restored with a resin bonded bridge which exhibits good aesthetics, longevity and everything and fulfils if it's a fixed in option. So I use the RCS to identify who would I send to Mr X at implant clinics.

StR05

Well, it's difficult as a clinician to communicate the royal college criteria with patients, but I think you have to just be honest with what the criteria are and explain that. My role here is to make sure resources and money are spent fairly so it is not for every patient and it's not necessarily us as clinicians who are

making those decisions, it's higher up, i.e. the government side of things and funding issues that are out of our control to some extent.

StR07

Clinicians supported the need for rationing implant provision on the NHS and they defined the RCS guidelines as *a barrier* to implant provision that is used to allocate limited resources. Clinicians believed that controlling implant provision on the NHS has two main merits: the high cost of implant treatment, which makes it impossible to provide it widely, and the limitations of numbers of implant clinicians and resources.

Obviously, we have got a protocol and we can only provide what we can provide, so in that sense RCS is a barrier, in that we can only provide implants for certain people in the hospital setting. But I'd say cost probably is a factor and that is why we have that criteria.

StR07

We try to be quite careful with our criteria. We have very limited resources, and by that I don't mean only money, I mean also people who are able to carry out implant care and treatment.

consultant02

In addition to the RCS guidelines, there are local principles for implant provision, which depend on factors related to the involvement of trainees/students in clinics.

Obviously we have other criteria; it comes into play sometimes during teaching modules patients could be accepted for training... or for the Master's course.

Consultant04

There are occasions where patients don't receive implants that on paper you think they probably should. There are other reasons why we don't. During decision we don't, they don't always cater for everybody's needs. But in other occasion they would accept the same patients when required for implant course or training.

StR06

Some senior clinicians highlighted that their initial decision to consider patients for referral to the implant clinic is not necessarily driven by the RCS guidelines, but is instead based on their personal experiences of two elements in clinical decision-making: the possible advantages of implant treatment, and the long-term cost-effectiveness of implant restoration compared to other options.

I'm aware of some criteria but I tend to be much more function orientated in the way I would do this. I have to say, I tend to ignore those. My feeling is, if it would be cost effective to provide an implant for a patient then...go for it.

Consultant08

I tend to think more rather than focusing on RCS criteria for instance a young patient had a Kennedy 1 lower partial denture, which they have terrible trouble with because they only had three to three anteriorly. Providing posterior implants might actually be cost effective rather than making a new partial denture for the patient every three years for the next 40 years. I would actually put that up my list a little bit.

Consultant04

I would take edentulous patients as example, on the basis that all the studies showed edentulous patients gained from implant treatment in the long term. So I would tend to make the decisions based on the literature and what I know of feasibility rather than it be based on some guideline that the patient had trauma therefore we will offer an implant.

Consultant04

As a result of the involvement of the RCS guidance in the decision, clinicians believed that the decision occasionally integrated elements of clinicians' subjective assessment to prioritise between patients with similar complications:

Sometimes those judgments of whether to send a patient or not to implant assessment clinic are made on very subjective opinions of different clinicians.

Consultant 04

I've always been working on the implant clinic with the consultants or as a team. What I gather from that is that although there are criteria, they are recommendations rather than rules so the decision is not always based on them and also different clinicians send patients based on several judgements.

StR06

- **Second stage of decision-making: the implant clinic**

Patients who are referred to the hospital implant clinic will again be reassessed according to local selection protocols with some consideration of the RCS criteria. However, clinicians at the implant clinic identified that they experienced occasional difficulties with patients when their expectations regarding obtaining implant treatment had been increased by the referral to the implant clinic.

Sometimes some patients it's particularly difficult for because, patients often feel their expectations have been raised by getting an appointment on the so called implant clinic. It's a question of just being fair and sometimes being quite hardnosed about it. Having to have difficult conversations with people about what is and isn't appropriate.

Consultant04

Because they have been referred into the implant clinic in NHS hospital they think they will get funding for NHS implants and it can sometimes be quite a difficult conversation with those patients, when you explain that they need to fulfil other criteria. Having had an oncology or traumatic injury, congenitally missing teeth and all of those things does not mean having approval for funding to get that.

StR06

The local principles that are used in the decision-making at the implant clinic are a mixture of the RCS guidelines and other local clinical considerations, including funding of treatment.

We've drawn up criteria that we use which are based on those RCS really, they're similar and they involve some of other local consideration.

Consultant04

There are guidelines, but they are applied at the discretion of the individual clinician I think. They are just guidelines not absolute rules.

Consultant08

Local principles of implant patient selection are likely to exist in other secondary care environments in order that consideration is given to local hospital clinical factors. This has led to variation in implant patient selection between different NHS trusts in the UK, and when identified by patients this may raise difficulties in sharing and communicating the decision. Clinicians clarified that at the implant clinic they tend to use the RCS guidelines as justification for a negative decision.

Someone might live in one area and their friend who only lives 10 minutes away from that person, just because they get referred maybe to a different hospital because they live in a different county, for example, and then they might not get offered treatment, even though they had the exact same problem, dental problem.

StR07

Quite an awkward conversation at that time I think it's more difficult if they've heard their friend got an implant somewhere else at NHS and then you have to explain to them why they don't fit our criteria. It can be quite difficult,

StR09

I think it helps patients to understand why they haven't been accepted if they know that there's a guideline that excludes them. But again it could lead to difficult decision if they fit RCS (guidelines) and not the local criteria.

Consultant04

- ***Flexibility vs ambiguity of the patient selection criteria***

From Chapter 7, it is clear that patients perceive the selection criteria and decision-making stage as *ambiguous*; they felt there were difficulties to participating in the decision discussion and indicated their desire to have a better understanding of the principles that are used in implant patient selection. Clinicians accepted patients' views, and felt that the ambiguity that patients experienced was potentially related to the local principles of patient selection, which are difficult to communicate with patients while being considered by different clinicians during assessments for treatment need and rationing between patients. The involvement of clinicians' subjective opinions during the assessments and decision-making could lead to patients' frustrations, particularly when patients had previously been informed, during referral or their initial assessment, that their conditions conformed with the RCS guidelines for implant provision: for example, in the case of dental trauma (which is used as an example in previous quotes by StR05, StR06 and Consultant04).

The guidelines are not like a machine where you put in the patient details and it spits out a yes or a no. They are still very much open to interpretation and that might cause patients' misunderstanding.

Consultant04

Yes RCS criteria is clear, but ours here are slightly different from those ones, ever so slightly. I think the Royal College ones, I'd say they are easy to follow, but there's always a bit of leeway or some maybe that are a bit vague, which does make things difficult. Yes, but I guess as well, I think part of the problem at the moment, for patients anyway, is that different units can provide different treatments in terms of implant care and they accept different things.

StR07

Interestingly, while patients perceived the selection criteria as *ambiguous*, clinicians referred to them as allowing some flexibility that facilitates negotiation of treatment need during the decision-making process and helps in justifying the decision, particularly when a negative decision is made, contrary to patients' desire to obtain implant treatment.

For me, the ambiguity is present in the selection criteria but I am happy to use the guidelines to defend it. So for me it is flexibility.

StR05

I think that I am quite happy with the current criteria because I feel that it gives the clinician an element of flexibility and what patients may perceive as ambiguity probably a clinician feels is flexibility, in my opinion. I would like to

have seen people have an attempt at rehabilitation in another way if it is possible.

StR06

It is a tool for us to defend our decisions. It gives the clinicians an element of flexibility to accommodate their opinion.

Consultant04

10.2.7 Clinician considerations during decision-making

There are no local written principles which can accommodate variations in resources throughout the year. Clinicians believed that developing new written guidelines could further complicate the decision-making process for clinicians. They explained that the limitation of the RCS guidance are advantageous as they allow for incorporation of other local clinical considerations based on clinicians' experiences and clinical judgement.

I think we try and judge each patient on their merits and try and work out how much they would benefit. Work with the patient to understand what's involved to the patient.

Consultant08

I think there is the odd case which may give some merit for someone getting an implant. I think it's very dependent on the consultant who's in charge and maybe they feel a certain way for something.

StR09

Other factors that influenced clinicians thoughts during implant decision-making included their subjective assessment of the difficulties of other tooth replacement options and their judgement of the current impact of tooth loss on the patient's quality of life.

You're always making a subjective judgement. I think if I can see a patient whose quality of life is clearly affected and I feel as if I can't do anything to improve the technical aspects of the dentures or that there is something in relationship to the anatomy or the physiology of the oral cavity, then I will be more inclined to make a positive decision than somebody that their quality of life isn't affected that badly.

Consultant03

10.2.8 Clinicians' reflections on patients' thoughts of the surgical stage

In relation to patients' experiences of stage II ('the surgical placement') clinicians identified that, in accordance with the principle of SDM, they routinely seek informed consent for IPS. They identified that they primarily focus on giving patients full information on the implant procedures. However, they reflected on patients' thoughts of overestimating the surgical experience and underestimating the impact of the implant surgery as it could be a result of a patient's attitude and intention to focus on the surgical aspects of the procedures rather than the stages afterward. Therefore, they might be less apprehensive about other aspects such as the consequences of the surgery or the immediate replacement.

Well, I suppose it's all down to the consent process, and we are giving patients full information about not only the procedures, but also what's involved with accepting that type of restoration. I think patients, at the time of the consent, are often focusing on the surgery itself and that is my explanation.

Consultant04

May be they don't understand the consent? The fear and anxiety that comes when patients go into surgery can be severe, even when the procedure is considered minor.

StR09

Some clinicians suggested that this trend might not be applicable to patients who have private implant treatment because patients make a financial payment and therefore they are more focused on every aspect of the treatment information.

I think within a private practice, that's very much built into the contract, if you like, that is taken up between the implantologist and the patient. So because the patients are paying they are more careful perhaps.

StR05

In contrast, some clinicians identified that they may also unintentionally concentrate on the surgery in their discussion with patients at the stage of consent, thereby undermining other aspects of the treatment such as healing, maintenance and hygiene issues, assuming that some of those issues are the duty of primary dentists.

Within an NHS setting, we are very focused on the surgical aspect of the consent and we haven't been that good perhaps about giving them information about future care, hygiene or maintenance issues.

Consultant04

Don't forget that many of those patients came through this system and it's only recently that we've said, "Well, we'll look after the implant restoration for a year and thereafter you're on your own".

StR07

10.2.9 Clinicians' perception of patients' thought at stage III

However, clinicians recognised difficulties in pursuing accurate knowledge in some circumstances which are illustrated in the previous sections. They admitted that sometime they feel frustrated when facing patients at late stages with unrealistic knowledge or a lack of accurate information.

But we do get surprises sometimes when we've met patients who, it obviously becomes apparent that they have no idea what they're letting themselves into, It's frightening.

Consultant 04

I think that's the other problem that patients have difficulty sometimes actually appreciating the long term maintenance implications of these things.

Consultant 02

Clinicians think that the reasons behind patients' desire to have fixed prostheses after they have experienced ISODs are related to the human inclination to think about a possible superior option for an improvement in their condition when they begin to experience difficulties.

They've moved up the slope somewhat. Then from their new vantage point, they say, "Well, actually, I'd like to move up this slope a little bit further." So there is that change in expectation from their new normality. I think that's also part of the complication.

StR 05

It's a normal human tendency. If you look at any of the Pyramids of Need, like Maslow's Pyramid of Need, people aspire to be at the next level. People never aspire to be five levels up because they know it's too far to go. But they very often look at the next level. If you can't find enough food to eat you don't worry about having a fast car. But once you've got enough food to eat and a nice place to live and your house is warm, then you're looking for the next level up.

Consultant 08

To overcome patients' struggles with the long-term requirements of ISPs, clinicians thought that there should be an emphasis on following up patients regularly to ensure

that patients are aware that ISPs require continuous maintenance so that they function properly. However, there was always vagueness and assumption about who would be responsible for restoration after care and maintenance (i.e. PDC or SDC).

When they're actually going down the hill because it is getting worse, you can solve it with that. When everything is being maintained,

StR 07

Yes, indeed that's true there should be an emphasis on future care. They should have regular follow-up, just like anything. Any prosthesis which is permanently in the mouth, be it tooth born or implant born, should be subject to regular review and maintenance because there will be elements that will need revision.

Consultant 02

One of the consultants explained the reasons for patients' early and later concerns related to ISOD stability:

It is a sense of normalisation. You actually get used to the advantages that your thing gave you and then it just becomes part of your normality. You find this with implants too. At the point where you move from not having the implant to having the implant, you notice a massive improvement. Then if you actually look at the level of satisfaction, or whichever measure you're using, it tends to flatten out.

I suppose that's actually slightly different. Once you fix something, that's often when you fix the lower denture the upper denture becomes a problem, so there is that transfer there. But there is also, part of that, we move to a new norm. When this happens with patients, if you say, "I've got real problems with my implant denture." If you ask them, very specifically, the question, "Is it better or worse than before you had implants?" They will stop for a moment and say, "It's better than before I had the implants, but it's not as good as I would like it to be."

Consultant 08

10.2.10 Strategies for improvement: clinicians' thoughts

Clinicians thought that delivering accurate and thorough implant information was the most effective way to manage patients' expectations and to improve implant provision in general. Therefore, clinicians suggested several ways to improve delivery of knowledge.

- **Enhancement of team role**

The first strategy would be to increase the involvement of other patients, GDPs, and dental care professionals (DCPs) such as practice nurses and hygienists during the information provision regarding implant treatment. Agreement and coordination of the information supplied would help to ensure reinforcement of accurate information. This suggestion concurs with patients' thoughts about involving the nurse to provide particular information related to treatment stages and hygiene and to clarify patients' doubts when they arise (Chapter 6, Section 6.4.4).

To help implant patients we may consider involvement of the practice nurse also the hygienist as they might have some spare time.

StR07

Implant care is to be, well most of it will be managed by the patient, but some of it will also presumably be managed by whoever is going to reviewing them in primary care. The roles of primary dentist; the nurse and the hygienist in providing patients with implant knowledge should be clearly addressed.

StR09

Clinicians argued that the involvement of a practice nurse and hygienist in educating patients about the local and general requirements of implant treatment at SDC NHS and the implant hygiene could help in two ways. The first is by improving patients' knowledge and reducing the possibility of frustration during and after the treatment pathway; the second is that nurse involvement could help to overcome the time constraints experienced by clinicians; and the third is that patients might feel more comfortable discussing their doubts with a nurse.

I think there is always scope to be better at providing the upfront information. We probably should use our dental team some more. We should train some of our nurses to be providing some of the patient information at an early stage. There's a benefit there because they're not the dental clinician and I think sometimes patients might feel more comfortable talking with people with that kind of role rather than with the dentist.

Consultant04

I think what we've been doing now is checking the plaque score before they even get an implant and if their plaque score is particularly high then they go to see a hygienist. I think at that point the hygienist is spending some quality time with them going through all the different aspects of implant restoration hygiene and instruments they can use at home.

StR09

I think when it comes to the implant being placed we don't spend a lot of time going over oral hygiene and restoration hygiene, but we do review them. Generally, hygienists should do spend a bit more time with patients about introducing those issues.

StR05

- **Timing of information and clinical team role**

Clinicians identified that the timing of information provision is particularly important. This is because the implant treatment may be delivered over a long period of time, and it consists of several stages of planning and placement. Therefore, information provision may be expanded and categorised throughout the treatment pathway to involve different topics and ensure that robust and sufficient information is given for each stage, as well as to help in making the information memorable and available for recall by patients when needed. This could necessitate the involvement of more clinical personnel to enhance knowledge and educate patients at different stages of treatment.

The timing of the information is important!, information got forgotten, perhaps about care, maintenance or follow-up, The patient might forget, especially if they spent 18 months before getting their final restoration, if there is a plan to educate them as they go through the treatment. Before they have the restoration, to say, "This might fail because of, of, of etc.

Consultant04

It can be a very long period of time. The difficulty, I suppose, is that you would hope you wouldn't have the situation where a patients said, "Crikey, I never realised all that. I never wanted this doing in the first place." I suppose that's no defence for having done it because that should have been established at the beginning.

Consultant08

I think information probably needs to be reinforced alongside treatment. You get that crossover at the beginning. All they want is, they are focused on the end point. They are focused on that, "I'm going to get teeth that are going to be fixed in, I've got the implants. Brilliant." I think that might cloud the other information that they are given at that time.

StR05

- **Upgrading the written information**

Written information is identified by patients and clinicians as one of the important source of trusted information. Clinicians believed that the written information on implants should be improved by categorising the information to cover different issues at different times of the implant treatment journey and focusing on specific aspects of patient interest.

I think a well-recognised method of information on treatment is written, because that's what we do in the hospital with lots of other procedures. For example, very standard written procedures for denture hygiene, denture maintenance, post extraction care at home. Those kinds of sheets that we give out for different treatment. We can also do the same for implant and care.

StR06

We spent a lot of time with various iterations of our patient information leaflet to try and make it readable and understandable. But to improve we should consider what sorts of information patients are looking for and build on them and also to divide them into different leaflet at stages.

Consultant04

Written information and leaflets could be categorised according to their aims and should be delivered at different stages by different sources or different colleagues. For example, hygienist take care of hygiene information, nurses about the appointment and the length, clinicians about the surgery the procedures and the risks.

StR05

As previously mentioned, clinicians suggested that consideration of patient variables in the written information would be more beneficial than generic written information. This might make it more valuable and informed so that patients will better understand the content. Interestingly, this is again in accordance with patients' requests for customised information that fulfils their particular information needs according to their dental condition and type of restoration (Chapter 6, Section 6.4.2).

I think we do have leaflets. I think the leaflets probably almost, at initial stage, provide superficial information and are not set out as explicitly as it could be. To be honest, they describe the different types of implants. There are various pictures of over-dentures. For some patients let's say front tooth missing it is not applicable or it has no meaning at all.

Consultant03

- ***Involvements of phone apps and the internet***

Some clinicians suggested using app technology, as this will be particularly important in order to follow the current advances in care and technology. The advantages of this are that it would ensure the enforcement of correct knowledge and reduce the demands on clinical time; also, it could be accessed by clinicians, patients, hygienists and nurses, and this would help in enhancing the information supply among all of those involved.

A central resource might be better than written information. We could give the patients a leaflet, but you could equally nowadays have a resource. Thinking forward, there are places that offer apps for patients that have advice on them or a central website, which is interesting.

StR06

I think electronic resource such as hospital apps should be considered because they can help patients to see exactly what we mean, and making sure you've got some of the proper terms there so that you're not distracting from what it actually is. Also, explaining in basic terms as well is important. It can be updated and it can involve some sort of communication between all people involved like nurses. Pictures often can help a lot better than words.

StR07

We need information that's not just for the patient, but also some information that's accessible by the practitioner, nurses and hygienist.

StR05

Clinicians suggested that trusted websites should be acknowledged and their details provided to patients. This could potentially overcome the impact of misleading information distributed via the media and the internet and help to manage patients' expectations.

We should direct patients to specific acknowledged and peer reviewed websites like the BSSPD or something like that. Particularly younger patients who usually search internet for information

StR05

We do have resources online that are recognised. The British Society of Prosthodontics, the British Dental Health Foundation, the BDA, they all offer advice, certainly the former two, to patients. Maybe the profession needs to make more of that. Within the different medical specialities we need to make more of the fact that those resources are the trusted resources for patients.

StR06

- ***The use of patients' groups interaction***

Clinicians recommended that the involvement of patients at the advanced stages of treatment in support groups could be used to facilitate patient interactions and exchange information with new patients. This could also help in communicating accurate information and the reality of patients' experiences.

The only one thing which they perhaps use in other centres, are some patient groups where patients could interact or have dialogue or discussion with other patients that have had implants to find out a bit more about it.

StR06

If we do think about having for example patients' support group, is brilliant idea. The benefits of patients participating in discussion may include developing a clearer understanding of what to be expecting, practical advices, or information and so on.

StR09

Clinicians believed that whilst they attempt to provide comprehensive information in order to improve patients' experiences of the implant treatment pathway at the study hospital an early, clear decision of implant provision could be difficult to achieve. To reduce the burden of waiting time on patients, clinicians believed that a reduction in the length of treatment time could be achieved by avoiding more than one attempt at restoration optimisation, because the reasons for failure may be related to patients' adaptation and not to the technical aspects of the restoration.

I don't know whether a timescale would be feasible. You would almost imagine that if you could put in place something that stopped this continual cycling, so whether it's after one attempt at remaking the conventional dentures, then somebody thinks about the implant option very, very carefully at that stage.

Consultant03

We must always take into consideration the history and experience of the patient beforehand and the fact that there may have been multiple other very skilled, very experienced practitioners who've had attempts at this before.

Consultant08

Furthermore, to reduce conflicts of information and the number of patients referred to implant clinics, one clinician suggested introducing a team meeting and improving communication between clinicians to reduce the impact of subjective assessments of conventional restoration on the length of the treatment pathways.

Writing a letter to somebody is not particularly an effective way of getting over your concerns, your messages sometimes. If you could have a team meeting and say, "Look, I've tried to do this. We've made this change, we've made this change. There's this, this and this going on. I really don't think we're going to get any improvement if we keep on going down the technical route. May be having that one attempt at remaking something, but then having a team meeting to understand what's gone wrong, if anything has gone wrong, or what the next step is, rather than just keep on going with this cycle of, "We'll try again, we'll try again, we'll try again.

Consultant03

Other suggested approaches are to develop a preliminary assessment sheet to improve the accuracy of rationing between patients, and informing patients about the future possibility of implant treatment.

I'm just wondering whether a pre-assessment information sheet that is very, very simple in some respects but addresses those key elements could possibly be developed that would be more helpful for patients.

StR06

10.3 Discussion

This part of the overall study set out with the aim of exploring clinicians' thoughts and perceptions of patients' experiences of DIT at SDC within the NHS. In reviewing the literature, no study was found that involved clinicians in investigating in-depth patient experiences of DIT. This has made it difficult to compare the data in this study with other studies. The results indicate that, generally, clinicians at SDC within the NHS who are involved in implant provision were familiar with patients' concerns related to the availability of treatment, expectations of implant treatment outcomes, the length of the treatment, and decisions about patient selection for implant treatment. However, they provide several valid explanations for those patients concerns. Clinicians were less certain regarding the impact of the duration of treatment on a patient's life, patients' thoughts about the surgical stage and patients' uncertainty about the long-term complications and maintenance requirements of implant restoration.

In addition, there was a conflict of opinion when discussion turned to the timing of informing patients about the long-term maintenance needs of their implant restoration. The need for implant care and restoration technical maintenance is possibly inevitable, particularly with ISOD attachments. This conflict might explain the recent reports highlighting a patient's complaint related to implant treatment (RCS, 2014) Without doubt, the immediate outcomes of DIT might be very satisfying, but the long-term success of implant prostheses is highly reliant on keeping up with the maintenance needs and care. Therefore, information relating to maintenance needs, costs and the provider of the treatment should be provided at the early stages of planning and decisions makings. This is consistence with recent report of the Royal College of Dental Surgery in England in which they argued that maintenance information should principally be involved during the early stages of patients' education of implant treatment, with emphasis on the biological and technical complications (RCS, 2014). Also, as treatment cost is eliminated at SDC, the cost of implant maintenance is another crucial issue that should be clarified with patients as it might influence a patient's decision for treatment if acknowledged in advance.

Clinicians identified difficulties in dealing with unrealistic expectations of patients. Attempts were made to develop approaches to ensure effective communication with patients and address different aspects of their thoughts to ensure a high-quality standard of care during provision. These were generally based on transparency and full

disclosure of information (GDC, 2005). However, clinicians faced some hardships in enforcing accurate information, and this was related to differences between patients in terms of their knowledge, the impact of previous misunderstandings, patients' willingness to engage in discussion, and some logistic factors such as restrictions on clinical time.

In general, patient-centred care and patients involvement in treatment decisions have become essential requirements of modern clinical context (Lee et al., 2015), and to facilitate this, the development of different resources of information sources that facilitate the engagement of clinical personnel might be advantageous to overcome clinical time restrictions: for example, phone app technology and trusted internet websites. Those shared sources of information may enable the transformation of care into an effective partnership between clinicians and patients (Lee et al., 2015)

Furthermore, the idea of developing a summary letter of treatment information and a personalised plan for each patient was suggested by clinicians. This method of patient information delivery is reported to be considered in private implant provision (Exley et al., 2012) and was reported to have been successful in recollection and understanding of knowledge when introduced in other medical disciplines (Eaden et al., 1998). In addition, this seems to be in line with patients' interest in having written information that addresses their individual needs.

The use of patient support groups was also suggested by clinicians to assist patients during the treatment pathway. This has been investigated in the literature with diabetic patients and proved to be beneficial (Zrebiec and Jacobson, 2001). Considering tooth loss as a chronic illness (Rousseau et al., 2014), the introduction of support-group discussion could also help patients through their tooth replacement care. Support groups might be also be facilitated via social media (Lee et al., 2015). These groups also may have additional advantages for patients at the surgical or post-implant stages.

In relation to the implant decision procedures, clinicians believe that they act as gatekeepers of implant resources. Although the RCS guidelines could impose some restrictions on implant provision, clinicians embrace these and consider that they provide some flexibility, which accommodates clinicians' subjective assessments during negotiation of treatment needs and allows clinicians to prioritise treatment needs between patients by considering other important issues such as patients' quality of life, the cost-effectiveness of implant treatment, and the need to have additional cases for

training. In addition, as the resources for DIT are limited, attempting conventional treatment seemed to be required in rationing between patients with similar conditions to prioritise patients in need of DIT (Owen-Smith et al., 2015). A previous study indicates that there is agreement between consultants at UK SDC within the NHS about the factors that deter patients from implant treatment, and these were consistent with RCS clinical guidance (Butterworth et al., 2001)

This study has involved a range of interviewees in terms of age, clinical role, career stage and expertise. All of the clinicians interviewed were engaged directly with the process of implant provision in the hospital. However, future studies may consider the involvement of DCPs to further explore their roles in the implant team and investigate the possibility of an expansion of their roles. Several suggestions for improving patients' experiences of implant treatment were raised by clinicians and explained. Those could be considered for future development of patient management and education.

In addition, communication in dentistry could be investigated further in future studies as there is a gap in the literature regarding how dental patients (and implant patients in particular) perceive information which is provided in a dental clinical context. Also, the influence and the advantages of different approaches could be considered in the future to improve patients' engagement in dental care.

10.4 Conclusion

While clinicians begin by establishing a baseline during communication with patients, they experience hardship in communicating to patients information and knowledge related to DIT, particularly when they hold firm views obtained from other information resources. Practitioners developed different approaches to overcome those situations; however, their applicability might be limited by restrictions of clinical time. Strategies were suggested by clinicians that could be implemented in the future, and they were mainly focused on expanding the role of the clinical team, categorising and timing clinical information according to the stages, and involving technology to enhance the clinician–patient partnership during treatment provision. The influence and the advantages of different approaches could be considered in future research.

Furthermore, fully shared decision-making in SDC within the NHS regarding DIT may be restricted because of limitations in the resources and the involvement of the RCS clinical guidance during the decision stages. Clinicians have to negotiate patients' treatment needs (Albrecht, 1977; Doyal, 1998) and prioritise patients who have difficulties adapting to other treatment options when they fit under the categories for the clinical implant provision guidance.

Chapter 11 Overall discussion

11.1 Introduction

This study set out to investigate patient's thoughts and experiences of DIT throughout different stages of the treatment pathway. In addition, it aimed to explore clinicians' views of patient's accounts. The previous five chapters have presented the results of study A ('patients experiences') and study B ('clinicians views'). Several stages of the treatment pathway have been identified and discussed, including pre-implant patients' thoughts, understandings and anticipations of implant treatment, through patients' accounts of their encounters relating to referral pathways, the decision-making process, the IPS and the TIRP through to the lived experience of fixed and removable ISPs.

The following sections will bring together the findings of both studies in order to summarise and understand patients' and clinicians' viewpoints on implant provision and also to identify aspects of patients' treatment journey at which findings from this research could contribute towards improving the current patient experiences and care. In addition, reflection in relation to patients' OHIP-49 scores will be provided.

Following the discussion, in Chapter 12 conclusions related to the initial research objectives are provided and recommendations for practice and further research shall also be presented.

11.2 Patients' motivation for implant treatment at secondary dental care

It is known that the desire to reduce the impacts of tooth loss on patient's quality of life is a primary factor in motivating patients to seek DIT (Grey et al., 2013; Nordenram et al., 2013). Other motivating factors relating to seeking implant provision within the NHS, such as elimination of DIT expense, which is known barrier to DIT (Vernazza et al., 2015) and the opportunity of being treated by a specialist apparently increased patients' motivation for DIT.

The experience of young participants has previously been under-explored and this study has highlighted several aspects of their experience. These patients perceived tooth loss

and unsatisfactory tooth replacements as having negative impact on their sporting activities and fitness, social life and social image, their choices of disciplines in studying, future careers and their willingness to perform jobs which require partnerships and interaction. In addition, young patients considered implant restoration as a type of tooth replacement that was appropriate to their age, based on their assumptions of the naturalism and permanency of replacement. In harmony with other research findings (Rousseau et al., 2014), participants who had experienced traumatic tooth loss considered DIT not only as tooth replacement which could restore dentition, but also as having the potential to eliminate the memory of the trauma they experienced.

Clinicians were familiar with patients' desire to access DIT through the NHS. In addition, clinicians at the implant clinics described how they sometimes experienced difficulties in the decision-making process when patients' forethoughts of obtaining access to DIT had risen when they secured referral to a specialist at an implant clinic (see Section 10.2.6).

11.3 Patients' understanding and expectations, and clinicians' views

A number of previous quantitative studies have focused on patients' knowledge, understandings and expectations of DIT (Rustemeyer and Bremerich, 2007; Pommer et al., 2011; Al-Dwairi et al., 2014). The qualitative findings from this study in relation to patients expectations, in line with other recent qualitative research suggested that patients have unrealistic expectations in relation to DIT outcomes particularly in relation to longevity of the restoration and maintenance need (Atieh et al., 2015; Wang et al., 2015; Abrahamsson et al., 2016). This study's results highlighted how patients in general, and particularly those younger in age, acquire unreliable information about DITs which frequently lead to establishing unrealistic expectations of restoration outcomes. However, while these findings differ from those of Yao *et al.* (2016) which claimed that younger patients may have reasonable perceptions and low outcome expectations, they are in line with previous observations which reported that younger patients may have high expectations of restoration outcomes (Cronin et al., 2009; Baracat et al., 2011). In addition, in another study, this group seems to have the least accurate implant information compared to others (Pommer et al., 2011).

However, what is unforeseen is that, despite clinicians' efforts to establish robust clinical communication and facilitate the acquisition of accurate knowledge through in limited clinical time, patients as they progress through treatment stages from stage I to III and before experiencing complications continue to hold some persistent thoughts and knowledge about the long-term potential of ISPs (sections 6.3.1, 6.3.2, 8.2.4, 9.2.1, 9.3.1). Some of these include the belief that implant prostheses resemble all aspects of natural teeth, consider them novel and immune to disease and think that their strength precludes the need for maintenance or possibility of future failure. These observations are consistent with recent research published after the end of this study's data collection (Atieh et al., 2015; Wang et al., 2015; Abrahamsson et al., 2016).

Holding these views might impact on the long-term biological and technical survival of ISPs and their need for regular professional and home care. In addition, these perceptions might undermine patients' beliefs about the maintenance implication, such as the need for regular professional prosthesis review and management. In holding some extreme views, patient's preparedness and willingness to accept future management of diseases, replacement or failure of restorations becomes uncertain; this has also been recently observed in a parallel study to this research (Abrahamsson et al., 2016). In addition, these beliefs may explain the recent report of increasing patients' complaints in relation to DIT outcomes (RCS, 2014). Patients' acknowledgement of possible complications, maintenance needs of ISP and cost of repair and care are definitely influential for implant survival and also in discerning implants from natural teeth in terms of care requirements (Grey et al., 2013) and cost of repair.

Clinicians who are involved in the treatment stages believed that those understandings reflect the impact of other sources of information, such as the media, the internet, and friends and relatives, on patients' expectations of treatment outcomes. In addition, difficulties were experienced by secondary care clinicians in engaging patients more effectively when they have strong beliefs about implant restoration outcomes and the suitability of their own conditions for DIT. These difficulties were magnified by the restriction of clinical time and coupled with patients' limited interest in gaining information from clinicians about DIT before securing a decision about the possibility of DIT within the NHS.

11.4 Provision of implant information and addressing patients' information needs

Clinical sources of information were generally trusted by patients and clinicians; however, patients clearly lacked information relative to their own interest, specific situation, concerns and preferences, and this may lead to patients' reliance on other general sources of information. In a recent study, however, while the dentist seemed to be the first source of implant information, there were deficiencies in the information provided to patients (Pommer et al., 2011). With growing patient interest in implants for replacement of missing teeth (RCS, 2014; Wang et al., 2015) sound and correct knowledge and understanding of DI should be established with patients, with more reliance on clinical-based sources of implant information. Crucial information on the long-term prosthesis needs are required by patients from all treatment stages. Issues concerning the longevity and functional capability of the implant restoration and the ways of maintaining optimum hygiene of the ISP were questioned by patients and required greater facilitation.

Clinicians sometimes seemed to be reluctant to offer information about longevity of implant restoration. Enforcing pertinent knowledge, particularly about the factors that influence the longevity of implant restoration, would help to eliminate some patients' misunderstandings and improve their adaptation to their ISP's immediate and long-term needs. There was a conflict of opinion among clinicians when the discussion came to the timing of informing patients about the long-term maintenance needs of their ISP. In accordance with the current report (RCS, 2014), it could be argued that maintenance information, including advice on the cost of maintenance, should be clear during discussion at the early stages: for example, clarifying the inevitability of the frequent need to replace worn ISOD attachments. Without doubt, the long-term success of implant prostheses is highly reliant on adapting to their maintenance needs.

Several potential strategies for improving information giving were raised by patients and clinicians and, if adopted, these could improve the current practice of implant information provision during DIT. One of these is enhancing the role of the dental nurse, which was positively acknowledged by both patients and clinicians. Clinicians believed that the involvement of the clinical support team (the nurse and hygienist), and enhancing their support skills would be constructive in patient education about dental implants when the clinician's time is limited, particularly for topics related to

maintaining oral and ISP hygiene. The roles of the supporting team, including the nurse, in the management of patients with chronic illnesses have been acknowledged in the literature (Wagner, 2000). The advantage of this is to ensure that important elements of care that clinicians may not have the time to perform are accurately addressed.

Another strategy is improving the use of written information. While a generic written leaflet can deliver basic information and their quality is questioned in recent research in the UK (Barber et al., 2015), patients and clinicians suggested that if it is personalised, by including individual situations, it could be greatly assist in informing patients during decision-making stages. Also, clinicians suggested categorising implant information based on their topics of focus and the timing of delivery would positively contribute to building accurate patient knowledge along the treatment pathway. This seems to be complicated; however, the development of computer programmes that would allow clinicians to select from a menu of pre-entered 'data' could make that feasible (Bental et al., 1999).

Furthermore, patients indicated the limited assistance of GDPs in information provision and throughout the referral process. Doubts were reported in a previous study regarding the quality of the information and communication of the general dentist with patients in relation to implant treatment (Pommer et al., 2011). Considering this, clinicians emphasised the need to engage with the local GDPs and enhance their roles in patient education about the implant treatment in view of patient's individual needs, which are potentially well known to the GDP, and considering in their discussion the environment of implant provision at SDC.

Clinicians indicated that other general sources of information might have an impact on the accuracy of patients' knowledge. For example, internet information on implants seems to not be professionally monitored, therefore clinicians should always consider advising patient to access well-known and trusted webpages to reduce the potential impact of imprecise information. Additional suggestions were made by clinicians to involve app technologies and community and social support groups involving patients who had previously experienced the treatment to empower patients' roles during information provision. The positive roles of patient internet support groups is acknowledged in other chronic diseases (Zrebiec and Jacobson, 2001).

11.5 The referral and treatment decision-making

Considering the ongoing consequences of tooth loss and that of unsatisfactory replacement on patients' lives (Nordenram et al., 2013), patients face a burden of lengthy waiting times during the referral process, assessment, implant decision-making and treatment when offered this treatment within the NHS. From the discussion, these hardships, particularly on the working life and education of the younger patients, were less well known by clinicians despite their awareness of the length of the implant provision process. The length of time taken for implant provision within the NHS was justified by clinicians, with multiple reasons proposed (Section 10.2.5). Alongside factors concerning patients' compliance with the clinical appointments, other local reasons included the need to optimise the conventional restoration, rationing patients' eligibility for implant treatment, the frequent delegation between clinicians and the need for time to perform the treatment when offered as this involves a multidisciplinary team.

Several suggestions were made by patients and clinicians to minimise patients' concerns throughout the referral process. This should begin with GPs. As gatekeepers for the referral (Field et al., 2009), coordination between SDC and PDC should consider informing GPs about inclusion of upfront information regarding the potential waiting and treatment times. In addition, information on the implant selection criteria should be acknowledged early in the referral. The introducing of electronic referrals and consideration of early decisions on the possibility of implant treatment might potentially enable patients to decide whether to progress with the referral and decision process or consider other treatments at an early stage of the treatment pathway.

Clinicians at the SDC centre thought of their role as that of a gatekeeper for the limited clinical resources. This imposes some restriction on involving patients' desires when they may be an otherwise suitable candidate for implant provision. This has meant that a fully SDM environment might be restricted (Charles et al., 1999). In light of provision restrictions, it is known that the decision process is prone to involve more clinicians' thoughts and judgements when negotiating treatment need (Albrecht, 1977). While patients may be suitable candidates for DIT, consideration must always be given to the RCS guidelines and the local environment to justify accessing funds for DIT. In line with one previous study (Butterworth et al., 2001), clinicians within the NHS secondary care centre always consider RCS clinical guidance to prioritise between patients. While patients perceived the selection criteria as ambiguous, clinicians rely on their flexibility

to facilitate and justify the treatment, particularly when a negative decision obviously runs contrary to a patient's desire to access DIT.

11.6 Patients' experiences and clinicians' views of stage II

One of this study's objectives was to uncover aspects related to patients' perceptions of dental implant surgery, particularly their experiences of sedation, healing, transitional implant prosthesis and the associated concerns. While patients found that their concerns regarding the implant surgery were overestimated, they experienced difficulties in coping with the consequences of the surgery such as pain and swelling throughout the healing period and then the care of their oral and prosthesis hygiene.

Patients believed that the sedation and their focus on the surgery-related clinical discussion had prepared them for, and contributed to their favourable experiences of, the surgery. While clinicians were seemingly unaware of patients' thoughts of stage II⁸ particularly patients struggles during the healing time, they believed that they adhere to the requirements of informed consent for DIT at the time of IPS (GDC, 2005). In line with patients' thoughts, clinicians suggested that patients' attitudes and intentions might be to focus on the surgical aspects of the procedures rather than the stages of healing and provisional restoration afterwards. At the time of consent giving, patients could be less concerned with participating in a clinical discussion about other aspects, such as the consequences of the surgery, the hygiene requirements and the transitional replacement. In line with that it is argued that patients tend to forget a considerable amount of the information they were given prior to surgery (Eli et al., 2007). Clinicians also indicated that such experiences might not be applicable to patients in the private sectors: as they pay for their treatment, they may tend to be more cautious about understanding the whole process beforehand.

In addition, while patients faced some uncertainty about maintaining oral hygiene during healing and for the transitional prosthesis hygiene afterwards, the partially dentate patients could immediately perceive the advantages of fixed retained temporary restoration compared to the patients with overdentures. Fewer difficulties were

⁸ The implant clinic at Newcastle Dental Hospital does not run a patient satisfaction questionnaire routinely but does so as an audit approximately every two years. The last audit is attached to Appendix 21

experienced by edentulous patients in maintaining their oral and denture hygiene during healing and after wearing the temporary overdentures. Therefore, patients' challenges could be overcome by improving clinical information provision, as suggested earlier, and by focusing on information related to the surgery and its consequences in advance of the surgical procedure by using different methods of information delivery. In addition, facilitating communication with healthcare personnel from the wider clinical team during the immediate post-surgical period to assist in resolving patients' doubts was suggested by patients, and welcomed by clinicians.

11.7 Patients' experiences and clinicians' views of stage III

This study's results demonstrated how, as patients progressed to stage III, they continued to strongly believe in the long-term potential and permanency of their ISP. Those patients' thoughts were also associated with a lack of appropriate knowledge relating to the ongoing care and the hygiene needs of implant restorations. While enhancement of patients' quality of life were observed in patients' accounts, thus confirming results of previous quantitative studies (Strassburger et al., 2006; Brennan et al., 2010; Thomason, 2010; Dolz et al., 2014). Patients' accounts alongside observations of OHIP-49, suggest that these benefits may not be fully retained in the longer term. Potentially, this may reflect the impact of the long-term prosthesis' limitations and maintenance needs on patients' thoughts of the ISP. No investigation has been found that addresses patients' quality of life after a significant period of using implant restoration, patients' experiences of maintenance, or failure during assessment. This warrants further investigation. Only one recent study (conducted after the end of this research) indicated that patients struggled to cope with diagnoses of peri-implantitis and had doubts about the effectiveness of the treatment and concerns related to the cost of specialist care (Abrahamsson et al., 2016).

Despite experiencing unsatisfactory immediate and long-term limitations and complications of ISPs, patients with differing extents of tooth loss appreciated ISPs for the period that those prostheses contributed to the enhancement of their quality of life. Patients focused on improving the quality of information on long-term requirements of the prosthesis, including the possible measures that contribute to eliminating complications and future dissatisfaction. On the other hand, clinicians indicated their

frustrations and disappointment when they confronted patients at advanced stages who lacked the necessary knowledge relating to ISPs and implants.

While clinicians recognise difficulties in imparting accurate knowledge in some circumstances, which are illustrated in the previous section (10.2.1), they thought the reasons behind patients' desire to have fixed prostheses after they have experienced ISODs are related to the human inclination to think about finding ways for improvement in their conditions and elimination of limitations. Clinicians support the recommendation that there should be clarity about the needs and the cost of regular follow-ups to ensure that the ISP is continuously maintained so that it functions properly to eliminate future patient dissatisfaction (RCS, 2014).

11.8 Reflection on participants OHIP-49 score

Slade and Spencer (1994) argued that OHIP can potentially be used not only to assess OHRQOL for groups or populations, but to reflect the impact of oral disorder on an individual's life at a certain point in a clinical setting. With this in mind, this research aimed to consider OHIP-49 scores as a descriptive feature for participants reflecting their current status of OHRQOL, in order to contextualise their accounts. Although there was no intention to conduct a quantitative analysis of patients OHIP scores, some observations were built from relating the OHIP scores to patients' accounts and these have highlighted some areas that may warrant investigation in future studies (patients OHIP-49 score can be found in Appendix 12).

In line with the literature, OHIP-49 scores seemed to be high (worse oral health related quality of life) overall at stage I for all participants if they are compared to patients at stage II and stage III, after only a short period of receiving the ISP, reflecting the impact of tooth loss on patients' OHRQOL. However, amongst younger participants OHIP-49 scores at stage I were higher than for older participants, reflecting a sign of greater impact of their tooth loss on their OHRQOL.

OHIP-49 scores for patients with ISPs show a great improvement after a short period of using the prosthesis, indicating the improvement of patients OHRQOL after DIT; this is widely reported in the literature (Pavel et al., 2012; Dolz et al., 2014). However, OHIP-49 scores seemed to be also high (worse quality of life) for patients with a significant period of ISOD use and who were experiencing some of the prosthesis' drawbacks and

complications later at stage III. This might be an area for consideration in future research.

11.9 Implication for methods

While a quantitative methodology in clinical research ideally examines relationships between variables and measures outcomes, qualitative research contributes to improving the understanding of a process (Green and Thorogood, 2009). This research adopted generic qualitative methods of research (Caelli et al., 2003). The following subsections will begin by addressing my reflexive accounts on the research progress; after that, will discuss the usefulness of using such an approach, and then discuss the strengths and limitations of the current research.

11.9.1 Reflexive accounts on the study progress

At the commencement of this study, the aims were to only investigate aspects of patient's experiences of the implant treatment pathway with no intention, at that time, to consider the views of clinicians who are involved in implant provision at the local hospital. As qualitative research methods and questions can be modified while the research is ongoing (Cresswell, 2007), as themes from Study A emerged, the research proposal was upgraded to involve Study B as the researcher's interest had grown to include discussion of some of patients' thoughts with the clinicians. Therefore, Studies A and B can be considered as one continual qualitative study, but for simplicity in reporting they were presented as two studies.

Patient recruitment was challenging and time-consuming, therefore telephone interviews were considered in order to provide a wider ranges of convenient times to patients for interviews and to overcome difficulties of recruitment. This led to an improvement in the patient response rate; however, only a limited number of patients (n=4) were keen to be interviewed more than once.

In term of interviews, the pilot interviews and the qualitative courses which I had undertaken before the data collection contributed to enhancing my interviewing skills. This improvement continued throughout the research process and the ongoing iterative data analysis. I was more capable of engaging with participants, of speaking openly and at the same time remaining neutral, and of keeping interruption to a minimum to enable

patients to reveal their full accounts of the topic under discussion. In addition, as I touched upon patients' interests to gain more knowledge of implants, implant success and failures, the implant provision, and the eligibility and selection criteria of implant treatment within the secondary care, I insisted on my role as a researcher and as a not dentist, and I made it clear before the consent stage that the research is not in any way related to the implant treatment or the implant decision process.

11.9.2 Strengths of the research

The aim of this research was to explore and understand patients' perceptions and clinicians' views of implant treatment and implant restorations. By gaining in-depth understanding of patients' thoughts and experiences, enhancement of clinical practice and patient care would be possible. There was no intention to confirm or prove the success or limitations of the implant treatment and restoration. Instead, the use of qualitative approaches to answer this research questions provided valuable data on a range of clinical topics and enlightened several aspect of clinical reality which might not be amenable to study using other approaches. The current findings could contribute positively to improving clinicians' awareness of patients' thoughts during treatment and enhance clinical care of implant patients to achieve successful outcomes; this was seen in other disciplines (Jacobson et al., 2008; Durham et al., 2011). In addition, several topics have been raised in this research which could be further developed and investigated.

The participants of the research were selected using a purposive sampling technique and incorporated several patient characteristics (see Chapter 4, Sections 4.4.3 and 4.6.1). By engaging those wider patients' viewpoints, transferability of the findings would be facilitated (Dixon-Woods et al., 2004). The sample involved a number of previously under-represented populations: younger patients, patients at stage II of DIT, and those after significant period of using ISPs. Also, it involves both genders, edentulous and dentate patients, differing socioeconomic statuses, and a comparable number of participants from different treatment stages (I, II, III). The data were analysed using thematic analysis, which was conducted rigorously, and the findings were validated iteratively and by using multiple observers (supervisors) to achieve analyst triangulation.

In addition, the involvement of clinicians to reflect on their patients' experiences strengthens the research findings by providing explanations for some patients' concerns and offering ways to improve the current practice. This is to conform to the growing field of implant dental practice and the growing technology of clinical communication and patient care.

11.9.3 Limitations of the research

By the nature of their scope, the aim of qualitative methods of research is not to develop statistically significant and generalisable outcomes, but, instead, to develop theoretical insights that could be transferable to other similar situations (Cresswell, 2007). The general limitations of qualitative research were discussed in Chapter 4; these include the small sample size, the importance of transparency in their conduct and report to facilitate transferability of the research outcomes.

To enhance the quality of this research, recommendations made by Dixon-Woods et al. (2004) were considered. The full account of this research framework has been described thoroughly and transparently in Chapters 4 and 5 and throughout the data and discussion chapters, including research background and stages, the methodology underpinning the methods, the recruitment process, the participants' characteristics, the interview context, and the data analysis stages. This would facilitate judgements by other researchers or interested clinicians about the possibility of transferring the study findings into other contexts.

Nevertheless, it is important to emphasise specific limitations pertinent to the way that this research was planned and conducted;

1. The findings on which this discussion is established are generated from a qualitative study conducted in one particular area of the UK and in a secondary dental care setting where the treatment is provided without cost for a limited number of patients with specific characteristics and criteria. Based on the study environment and the participants, some of this study's findings might be transferable to other secondary dental care settings within the UK but not to primary dental care, for example, the length of treatment waiting; the strategies in place for providing patients with information and the uncertainties surrounding the responsibility for long term maintenance, follow up and

treatment planning. In primary dental care information provision, and the long term planning for maintenance and care might be clearer to patients and more facilitated than in secondary dental care. However, more studies are needed to explore patients' experiences of these aspects of implant treatment in primary dental care.

2. Patients' social classes and the geography of their address was not considered during recruitment. The study hospital covers a large area in the North of England, and therefore patients' accounts might be influenced by the travel distance, the cost of travel to treatment and the length of time required to finish the treatment. This may impact more in particular to themes related to patient's experiences of referral stages, the length of the treatment stages and appointment interval.
3. The small sample size of patients at stage III, particularly those for whom fixed implant prosthesis were provided, limited the ability to fully explore aspects of patients' experiences of restoration maintenance at stage III as data saturation was not achieved. For example, there was difficulties in exploring how patients would experience and react to the technical drawbacks; the biological complications; the cost and the time required for the maintenance of the fixed implant restorations and how the patients' OHIP 49 scores might be influenced.
4. The limited number of professionals, engaged in the implant treatment restricted the ability to recruit a wider clinician sample. Although the number of clinician participants was limited, it was appropriate to address the generic study aims. In addition there was difficulties in expanding the recruitment of clinicians from other secondary care units in the UK because of the limited study time.

Chapter 12 Conclusions and recommendations

The aim of this research was to investigate, and subsequently gain greater understanding of patients' and clinicians' thoughts and experiences regarding different aspects of dental implant provision throughout the implant treatment pathway.

With this in mind, this thesis reports on two studies, the first of which sought to explore patients' experiences, while the second sought to investigate clinicians' views. Findings from this research have provided the following conclusions, which relate to the research objectives.

12.1 The patients' experiences

Objective 1: explore patients' thoughts, motivations, understandings, expectations and satisfaction with regard to implant treatment as they journey through their implant treatment pathway

- After several failed attempts to obtain satisfactory restoration, patients were motivated to pursue implant treatment through the NHS to eliminate the impairment in their oral health initiated by tooth loss and its consequences. Removal of the cost barrier and implant provision by specialist clinicians within the NHS seemingly greatly contributed to patients' motivations to seek implant treatment at this secondary care centre.
- Patients generally think of implant supported prosthesis as a superior tooth replacement, considering them a 'cure' for tooth loss and to be resembling natural teeth. Inherent strength, stability and permanency from the material ('*titanium*'); the position ('*rooted within the bone*'); and the uniqueness of the technique ('*recent technology*') all contributed to this view. In addition, younger patients believe in the long-term durability of implant restorations and consider them as a replacement that was appropriate for their ages. As a result, the direct and long-term potential of implant prostheses was often misunderstood, by inadequately recognising the need and resources required for regular professional and home care of the implant restoration to ensure longevity.
- Patients experienced restoration limitations in both the short and the long period of living with implant supported prosthesis, which most of the time led to unfulfillment

of their initial thoughts and anticipations of the prosthesis outcomes. However, the majority of the participants continue to appreciate the time that they experienced enhancement in their quality of life after implant treatment.

Objective 2: explore how information on dental implants is communicated

- Clinical-based sources of patient information on implant treatment were facilitated through clinician's verbal information, pictures and model demonstrations, and generic written leaflets. While patients acknowledged the contribution these made to their understandings, they believed that they are inadequate for addressing important information relating to the longevity, the hygiene requirements and the care needed for long-term favourable outcomes. General sources of information, such as relatives' stories and the internet, contributed to patients' misunderstanding of implant treatment outcomes. Several suggestions were made by patients to upgrade implant information delivery by the involvement of practice nurses, whose interactions can share valuable information, and tailoring written information towards their specific condition.

Objective 3: how patients perceive the referral and the decision-making processes

- With consideration to the fact that this study participants had high initial expectations of the possibility of obtaining implant treatment within the NHS and had initial scarce information on the length of the assessment and decision-making processes. Patients indicated that the overall referral and treatment within secondary dental care is a lengthy process that generally impacted on their life, in particular their education and working time for younger participants.
- Conflicting information was provided to patients about their suitability for dental implant treatment and the concordance of their condition to a clinical guideline. Patients felt restricted in participating during the implant decision-making within secondary dental care and indicated that the ambiguity of applying the selection criteria hindered their ability to identify their eligibility for implant treatment at secondary dental care or highlight their concerns to the clinicians.

Objective 4: explore patients' perceptions of stage II (dental implant surgery, healing stages and transitional implant retained prosthesis)

- Although patients felt that their concerns relating to the implant placement procedures were excessive, their encounters highlighted their struggles to cope during the healing stages. Sedation, informed surgery information and patients' early motivation to implant treatment contributed to patients positive accounts of the implant placement surgery.
- Patients experienced uncertainty with regard to maintaining oral hygiene after surgery and this continued after obtaining fixed transitional implant restoration for partially dentate patients.

Objective 5: understand how patients with different extents of tooth loss experience their implant treatment journey

- Although partially dentate patients perceived their transitional implant restoration as weak and prone to fracture, they felt an improvement in their oral health from the transitional restoration stages and this was further enhanced after the placement of a definitive implant supported prosthesis. They believe their initial expectations were fulfilled in relation to the stability and the appearance of the prosthesis and considered the implant restoration as an integral part of their body. Patients, particularly the dentate, encountered uneasiness in maintaining hygiene of the transitional and definitive prosthesis.
- Experiencing complications after some period of using fixed implant restorations raised patients' awareness of and concerns about maintenance needs and the limitations of implant supported prosthesis; however, this finding is limited by the number of patients (n=2) who were confronted with fixed implant restorations complications.
- Edentulous participants indicated that implant supported overdentures deliver general improvements in their quality of life; however, implant supported overdentures were still considered as a foreign body and inferior to the fixed implant prosthesis. There were some unexpected immediate and late concerns with implant supported overdentures outcomes, as discussed in Section 9.3.
- The unexpected prosthesis' long-term drawbacks and limitations, such as the frequent wear of the prosthesis attachment, led to significant impairment of the prosthesis performance during function. This was not anticipated by patients as they were less knowledgeable about the future care and costs of maintenance of the implant supported prosthesis.

12.2 The clinicians' views

Objective 1: understand what clinicians, who provide implant treatment, think of the patients' experience of implant treatment

- Clinicians were familiar with patients' thoughts and expectations of dental implant treatment and the lengthy time of the treatment pathway. Considering the limitations of their clinical time, and patients' resistance to change their views and concepts, clinicians indicated that they often face challenges in imparting accurate knowledge for patients with high implant expectations.
- In addition, clinicians were unaware of the impact of time needed for referral, assessment and the decision to be made on patients' lives, perceptions of stage II, and uncertainty about the long-term need for implant restoration.
- Clinicians indicated occasional frustrations when faced with patients at late stages with unrealistic anticipations or who lacked accurate information necessary for favourable outcomes of their implant supported prosthesis.
- Clinicians believe some patients' thoughts about their implant supported overdentures related to their desire to improve or eliminate the limitations of removable prosthesis by converting to a fixed restoration retained by implants.

Objective 2: determine how decisions are made in relation to the restricted implant provision in secondary dental care within the NHS

- Clinicians' obligation to negotiate patients' treatment needs and prioritise between patients with similar complications places some restriction on creating a fully shared decision making environment.
- The Royal College of Surgeons clinical guidance, relating to prioritising patients for implant treatment within the NHS, was perceived by clinicians as flexible, allowing them to incorporate their personal judgement of a patient's eligibility and therefore enabling them to justify their final decision on implant provision for patients and also for commissioners.

Objective 3: identify the measures that could realistically be implemented to improve patients' experiences of implant treatment and provide patients with a better understanding of the implant treatment process

- After their insight into patients' suggestions, clinicians have also recommended multiple strategies that, if implemented, may improve the patient's experiences of dental implant treatment. Those strategies focused on improving the clinical sources of patient information in a way that incorporates other appropriately trained clinical support teams and integrates technology. In addition, categorising and timing information depending on a patient's individual needs alongside each stage of treatment can help in making the information memorable. These moves, if implemented, will save clinician's time and possibly help in addressing the gap in patient understanding and preparation for implant treatment. Some of these strategies were also suggested by patients and were accepted by clinicians, such as improvement of patients' support and communication during healing.

12.3 Recommendations

Several suggestions to upgrade current clinical practices and improve patients' experiences have been made throughout this thesis. In addition, multiple gaps in the literature were identified and, if addressed, these can help in modernising patients' care. Recommendations will be made in the following sections for practice and future research.

12.3.1 For clinical practice

- Strategies to improve patients' experiences of implant treatment were suggested based on the current patients' and clinicians' recommendations (these summarised in Chapter 11). These were focused on advancing and empowering patients' communication by enhancing and improving information provision and deliver, for example by the use of patients support groups and using technology such as app technology
- Expanding the roles of dental care professional relating to patients education about implant treatment particularly in relation to the stages of implant treatment, oral and prosthesis hygiene and home care.
- While patients felt their concerns were overestimated in relation to implant surgery, they experienced some unanticipated challenges in relation to the immediate post-surgical symptoms and during healing. Therefore, effort should be focused to

prepare patients for the post-surgical time and improving clinician-patients communication during the healing time

- Clinicians should be more clear and open about the length of the implant procedures, eligibility of patients for implant treatment and the limited implant provision at secondary dental care within the NHS. Clear information should be given to patients upfront and throughout the treatment pathway and this should begin in primary care by the general dental practitioner. This will enable better patients' preparation for the implant treatment pathway in secondary care and eliminate patients' frustrations.
- Faster referral, clinical partnerships and cooperation between general dental practitioners and clinicians at secondary care may improve patient's service and eliminate conflicts of information about implant provision within the NHS. Examples to improve referral pathway were provided in section 7.4.
- While patients strongly believed in the long-term success and permanency of their implant-retained restoration, clinicians should focus on information related to the regular need of implant restoration for home care, professional care and maintenance and explain the restoration long term prosthesis limitation and financial requirements.

12.3.2 For future research

- Future research into tooth loss, implant dentistry and quality of life should take into account younger patients during patient involvement and recruitment.
- Studies into implant treatment should consider involvement of patients after a significant period of using their fixed and removable implant supported restorations and having insight into their oral health related quality of life during and after experiencing the implant supported prosthesis limitations and complications and realising the cost of maintenance.
- More research should be done to investigate how information on the internet may influence patients' understanding and expectation of implant treatment. In addition, research should consider investigating whether improvements in the clinically based sources of implant information and integration of technology and clinical support teams in the process of patient education can fill the gap of current patients' understanding of implant treatment.

- Exploring how implant patients' experiences of implant treatment pathway at private practices might be different.
- Involvement of nurses and hygienist in future research in investigating implant treatment pathway and patients care.

12.3.3 Final summary

This thesis adds to the literature in that it describes patients' experiences of and clinicians' views on the implant treatment pathway. By reporting on these, this thesis and related publications (Appendices 1, 16, and 20) offer the readers, particularly clinicians and researchers, deeper understandings of patients' thoughts and perceptions of the implant treatment process and the implant supported prosthesis. It has highlighted and defined areas where patients may need additional information (such as the long-term potential and care requirements of implant). In addition, it featured several areas of patient uncertainty which are essential to the long-term acceptance of treatment outcomes, such as barriers to patients' engagement in treatment decision-making and hygiene procedures. Moreover, this research offered ways to improve clinical communications based on not only patients' thoughts but on clinicians' views and suggestions as well.

Appendices

Appendix 1. Qualitative synthesis of studies related to patients experience of dental implant

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Review

Patients' experiences of dental implant treatment: A literature review of key qualitative studies

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ABSTRACT

Objectives: To identify and summarise the findings of previous qualitative studies relating to patients' experience of dental implant treatment (DIT) at various stages of their implant treatment, by means of textual narrative synthesis.

Data/sources: Original articles reporting patients' experience with dental implant were included. A two-stage search of the literature, electronic and hand search identified relevant qualitative studies up to July 2014. An extensive electronic search was conducted of databases including PubMed, Embase, Scopus, Web of Knowledge, Cochrane Database and Google Scholar.

Study selection: Included primary studies ($n=10$) used qualitative research methods and qualitative analysis to investigate patients' experiences with dental implants treatment.

Conclusions: While the growing interest in implant treatment for the replacement of missing dentition is evident, it is essential to investigate patients' perceptions of different aspects of implant treatment. This textual narrative synthesis conducted to review qualitative studies which provided insight into patients' experience of two types of implant prostheses namely ISOD (implant-supported overdenture) and FISP (fixed implant supported prostheses). Primary reviewed studies tended to include samples of older patients with more extensive tooth loss, and to focus on experiences prior to and post-treatment rather than on the treatment period itself. Findings across reviewed studies ($n=10$) suggested that patients with FISP thought of implant treatment as a process of 'normalisation'¹ and believed that such implant restorations could be similar to natural teeth, whereas patients with ISOD focused more on the functional and social advantages of their implant treatment.

Clinical significance: The growing interest in qualitative research is evident in several branches of clinical dentistry and dental implantology is not an exception. Qualitative studies concerning the patients account of their experience of dental implants is however limited. The aim of this review is to firstly identify recent work within this field and to subsequently categorise it more consistently by means of textual narrative synthesis, thus highlighting similarities and differences and enabling identification of gaps in research knowledge thereby setting the direction of further research.

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1. Introduction

Dental implants provide predictable treatment outcomes for the replacement of missing teeth that were not previously available,^{2,3} and individuals who require replacement of their dentition, are often enthusiastic about this relatively novel dental technology regardless of the extent of tooth loss.⁴ The successful clinical outcomes of implant treatments have been demonstrated in several quantitative studies.^{2,5,6} In addition, patient-centred outcome studies, especially for edentulous patients, show marked improvement in patients' satisfaction and quality-of-life after treatment with dental implant-supported prostheses.⁷ This evidence consolidates the McGill and York consensus statements relating to overdentures.^{3,8} Notwithstanding these successful outcomes, some patients may still refuse dental implant treatment (DIT) based on concerns about the procedures or expense.⁹ In recent years qualitative studies, exploring different aspects of medicine and dentistry have made positive contributions to the investigation of patient experience of their health care and have identified areas requiring enhancement.¹⁰ Improving patient's experiences of their treatment procedures may in turn, increase patients' satisfaction and motivation towards their care services and health.

This review paper aims to report and summarise the findings of published qualitative studies relating to patients' experience of implant treatment at various stages of their treatment pathway. In particular, we were interested in: (1) patients' experiences of different types of implant prosthesis (implant support over-dentures (ISODs) and fixed implant-supported prostheses (FISP)) and (2) the extent to which the literature addressed the patient's experience at different stages in their treatment journey. In order to organise the findings of the primary papers, the treatment pathway is defined as consisting of three stages: stage I, the pre-implant treatment stage. This includes experiences of tooth loss, and previous restoration (stage Ia), and the decision-making process (stage Ib). Stage II, the implant treatment stage, which starts with implant placement and extends to the placement of the implant supported prostheses and stage III, the post-implant treatment stage, which includes experience of function with the final restoration/s and the maintenance of that restoration.

2. Methods

2.1. Qualitative synthesis

Within dentistry, systematic review and meta-analysis of quantitative research is well established, however, there are comparatively few examples of qualitative research synthesis. This reflects the relative scarcity of qualitative research in dentistry, such that there are few topics where a sufficient body of qualitative research has accumulated to warrant synthesis.

As the amount of qualitative health research has grown, there has been a concomitant desire to bring together findings where several studies have investigated a particular

topic. This has led to the development of various methodological approaches to qualitative research synthesis.^{9,10} In general the process of synthesising primary qualitative research comprises multiple stages of searching, extracting, combining and reporting qualitative data from original research or reports concerning the same topics.^{11,12} In conducting this review textual narrative synthesis was applied.¹³ This method aims to organise studies relating to the same topics into more consistent categories of findings and facilitate recognition of similarities and disparities. Textual narrative synthesis involves identification of sub-groups; production of study commentaries (often using tabulation to facilitate cross-study comparison) and sub-group synthesis.¹³ This approach seemed to best enable us to consider the extent to which experiences were similar and different for those undergoing different forms of dental implant treatment (FISP and ISODs) and the extent to which the existing literature addressed the patient's experience at different stages in their treatment journey.

2.2. Search strategy and qualitative data extraction and synthesis

The aims of this review and inclusion criteria for primary studies were defined and agreed by all authors, in order to focus the search topics and terms. A two-stage search of the literature was carried out to identify relevant qualitative studies up to July 2014 (the search was updated in November 2014). The first stage comprised a search of the electronic databases including PubMed, Embase, Scopus, Web of Knowledge, Cochrane Database and Google Scholar. Search terms included 'dental implant prostheses', 'implant crown', 'qualitative research methods', 'qualitative data analysis' and 'patient-based outcome'. The search was limited to studies involving 'human subjects', 'published up to July 2014', 'dentistry' and 'English language'. The second stage involved a search of citations included within references to identify further relevant studies. Endnote software was used to identify and remove duplicate references from different databases and to manage the review process. Studies were included if they used qualitative research methods, and explicitly considered any aspect of patients' experiences of DIT. Studies which considered the experience of tooth loss but which did not explicitly mention DIT in the aims, sample or methods were excluded.

The authors, who agreed categories for the analysis, read all primary papers. Categories for data extraction included the type of implant restoration, stages of implant treatment and methods of analysis. Authors' themes (coded in primary studies) were identified, extracted and compared across studies. Tabulation was used to compare across studies and categories (Table 1). Lastly, findings within each sub-group were brought together, highlighting commonalities across studies and gaps in the literature.

Initial inclusion criteria and categories for analysis were discussed and agreed by all authors. Operationalising and refining these inclusion criteria and categories (i.e. questions regarding whether a particular paper should be included) were initially conducted by discussion between the first (a dentist) and second (a social scientist) authors, and where uncertainty

| Table 1 – A summary of the included qualitative studies concerning patients' experience of implant treatment. | | | | | |
|---|--|--|---|--|---|
| Citation and country | Aims of the study | Participant stage of treatment at study time | Patient criteria | Data generation and analysis methods | Themes identified by authors |
| Trulsson et al. ¹⁵ Sweden | <ul style="list-style-type: none"> • To describe the experience of deteriorating dental status • To analyse what living with FISP means to quality of life • To gain deeper insight of patients' experience of implant treatment | After a period of treatment with fixed denture implant | Patient with deteriorated dentition (edentulous or partially edentulous in one jaw) 8 men/10 women Age from 58 to 66 years from Branemark centre (the clinic patients' list) | Interviews, CCM of GT ¹⁵ | <ul style="list-style-type: none"> • Alteration in self-image • Becoming a deviating person • Becoming uncertain person • Becoming the person, I was once |
| Hyland et al. ¹⁶ United Kingdom (UK) | <ul style="list-style-type: none"> • To understand the effect of edentulousness and prosthetic rehab on issues surrounding eating (social/functional and emotional) • To explore the significance of any limitations upon eating behaviour | Post-implant stage (ISOD) and pre-implant stage (patients with CD) | 33 patients had CD with in last 5 years of the study age 33 patients had received ISOD with in the last 5 years aged between 44 and 82 | Semi-structured interview, thematic content analysis | <ul style="list-style-type: none"> • Experience of edentulousness • The public constrain • The impact of replacement • Conventional dentures on eating • The impact of ISOD on eating |
| Ellis et al. ⁵ UK Newcastle and Montreal Canada | <ul style="list-style-type: none"> • To gain greater in-depth understanding why patients who un-satisfy with their current CD decline implant treatment | Patients' refused to have implant | 30 patients age between 55 and 88 years, 17 women/13 men struggling with CD and seeking to replace them, refused to have ISOD | 5 focus groups. Each participant filled socio-demographic information questionnaire. Thematic analysis methods | <ul style="list-style-type: none"> • Fear of pain and anxiety. • Appropriateness of the implant procedures in elderly |
| Johannsen et al. ²⁰ Sweden | <ul style="list-style-type: none"> • To explore patients expectation on and experience from DIT who had periodontal disease as reason of tooth extraction | Post-implant stage (at least three years of use) | 17 patients, 9 women/8 men, age between 46 and 81 years patients are either fully edentulous or one jaw edentulous, and had at least 3 implants in upper or lower jaw for at least 3–20 years of FISP | Deep interview Thematic analysis | <ul style="list-style-type: none"> • Transition from tooth loss to Amputation to implants prosthesis: negative and positive trajectories |
| Narby et al. ¹⁹ Sweden | <ul style="list-style-type: none"> • To describe the process leading to desire implant treatment | Post-implant stage of patient with FISP | 10 patients, mean age 69 years, 6 women/4 men patient had FISP during the past year | Interviews CCM/GT | <p>Journey from social stigma to exhilaration:</p> <ul style="list-style-type: none"> • Becoming insecure person • Becoming determined person • Becoming the person I once was • Acquiring more realistic perspective |

| Citation and country | Aims of the study | Participant stage of treatment at study time | Patient criteria | Data generation and analysis methods | Themes identified by authors |
|---|--|--|--|--|---|
| Osman et al. ²¹ New Zealand | <ul style="list-style-type: none"> To understand the patient perception concerning a specific type of implant treatment | <p>Post-implant stage</p> <p>It is part of RCT comparing the performance of titanium and zirconia implants to support overdentures</p> | <p>16 patients (3 women, 13 male)</p> <p>age 46–80 years with maxillary and mandibular ISOD</p> | <p>In-depth semi-structured interviews at least after 6 month of implant overdenture. CCM/GT</p> | <ul style="list-style-type: none"> Perception of implant overdenture treatment Positive and negative aspects of treatment Decisive factors in choosing implant therapy Factor influencing the selection of implant material Perception of mid palatal implant |
| Lantto and Wardh ¹ Sweden | <ul style="list-style-type: none"> To explore experience of receiving and living with dental implants for functionally impaired patients | <p>Post-implant stage</p> | <p>17 functionally impaired patients</p> <p>7 men/10 women.</p> <p>Age between 33 and 87 years</p> | <p>Interviews, CCM, GT</p> | <ul style="list-style-type: none"> The implant treatment is a process of normalisation The functionally impaired are also entitled to dental care Edentulousness is a burden for functionally impaired There is interaction between implant treatment and other aspects of life |
| Grey et al. ⁴ UK | <ul style="list-style-type: none"> To explore patients' motivations and expectations for dental implants | <p>7 patients at post-implant staged</p> <p>One patient during implant</p> <p>One patient refused the treatment</p> | <p>9 patients, 3 men/7 women</p> <p>Age between 49 and 69</p> <p>complete missing or partially missing and one patient with single tooth missing</p> | <p>Telephone interview and thematic analysis</p> | <ul style="list-style-type: none"> Normality of appearance, and normality of function |
| Rousseau et al. ¹⁷ UK | <ul style="list-style-type: none"> To understand the experiences of tooth loss and replacement in the context of the arrival of dental implant treatments | <p>19 patients at the treatment or post-treatment stage 16 declined the treatment</p> | <p>39 patients</p> <p>16 men/23 women</p> <p>Age between 23 and 84 years</p> | <p>Semi structured interview, thematic analysis</p> | <ul style="list-style-type: none"> Tooth loss was insignificance for some but disruptive for others Two main form of disruption was identified (1) The meanings of tooth loss and (2) Relationship between the self and the mouth in denture users |
| Exley et al. ¹⁸ UK | <ul style="list-style-type: none"> To examine the influential factor of patients decision to pay for high cost implant treatment | <p>27 patients at decision making of implant treatment, 10 patients paid for DITs, 14 did not pay and 3 were undecided</p> | <p>27 patients</p> <p>Age between 23 and 84 years</p> | <p>Qualitative interviews, CCM and thematic analysis</p> | <ul style="list-style-type: none"> Deciding to pay for private healthcare not simply a matter of price Decision mediating factors; self-value of need for treatment, others recommendations, clinical relationship, impact of treatment price on expenditure of self and others |

^a CCM, constant comparative methods; GT, ground theory; DITs, dental implant treatments.

remained, with all authors. Data extraction was conducted initially by WK and then reviewed by the other authors who highlighted and resolved omissions and inconsistencies. The emerging analysis was led by WK and refined in discussion at analysis meetings with the other authors.

3. Results

Title and abstract screening of 621 papers identified 40 dental articles that considered patients' experiences with dental treatment using qualitative methods. Only ten of these considered patients' experience of DIT.

The papers by Rousseau et al.¹⁶ and Exley et al.¹⁷ relate to the same larger study.²⁴ However as their data relates to different (although overlapping) subsets of participants and concerns different aspects of the patient experience of DIT, they have been treated as separate studies for the purposes of this review. All identified studies were relatively recent ($n = 10$) with the oldest having been carried out in Sweden in 2002.¹⁵ Four of them were carried out in the UK,^{4,16–18} one was carried out between the UK and Canada.⁹ Four were performed in Sweden,^{1,15,19,20} and one in New Zealand.²¹ One-to-one interviews were used for data generation in eight of the studies; a focus group was used in one study⁹ and telephone interviews in another study.⁴ Although methods of data analysis were not always clearly described, thematic analysis appears to have been used in seven of the primary studies. Grounded theory and/or constant comparative methods of grounded theory also informed data analysis.^{1,15,18,19} In addition, a recent qualitative synthesis of patients' experiences of tooth loss and rehabilitation was identified.²² Unlike the current review, the review by Nordenram et al.²² had broader aims and did not include studies reporting only patients' experience of DIT.

3.1. Quality assessment of and methods of data production in the included studies

The criteria developed by Dixon-Woods et al.¹⁴ were used to assess the quality of studies included in this review. Studies with good quality have to meet the following criteria: clarity of the research questions to be addressed; suitability of qualitative methods in relation to the studies' aims and objectives; appropriate sampling technique in regard to the research questions and data generation. Some potential limitations were identified across all studies. Some of the studies' samples were not clearly described in terms of the extent of patients' tooth loss,^{15,17,20} which may be important in terms of patients' experiences. Secondly, methods of ensuring the quality in data generation and analysis (such as looking for deviant cases) were not clearly described. However many of these papers appeared in journals with strict word limits and this may have restricted the extent to which qualitative methods could be described. A summary of details of data generation and methods of qualitative analysis and the themes produced in the reviewed papers is shown in Table 1.

Patients' numbers and stages of treatment are compared in Table 1. In the majority of the original studies, patients

were clearly at stage III and were asked to describe their experiences of DITs 'retrospectively' sometime after the completion of treatment. However, two studies included patients at stages I and II.^{4,18} Very little qualitative data or discussion was found in relation to treatment stage II (i.e. experience of implant surgical placement, healing stage).^{4,21} In the following section, patients' accounts of their implant treatment experiences are grouped according to the relevant stage of treatment. In the text 'italics' are used to show themes which were identified by the authors of the primary studies and they are appropriately cited.

We did not find that our quality criteria distinguished a set of high vs lower quality papers. We did not therefore conduct any sensitivity analysis using quality criteria (i.e. assessing whether findings altered if the synthesis was restricted only to higher quality papers).

3.2. Stage Ia, pre-implant treatment

All of the published primary studies ($n = 10$) included within their samples, patients who had experienced tooth loss and conventional complete dentures (CD) replacement before they sought implant treatment. Some studies additionally included participants with compromised dental conditions (i.e. not completely edentulous) but without clarification of the extent of their tooth loss nor the types of dental restoration they had used prior to implant restorations.^{15,17,20,23} Grey et al.⁴ included patients with various types of implants restorations and extent of tooth loss.

All the papers included a discussion of the burden of tooth loss and the impact on patients' oral health and quality of life. In addition, a recent qualitative systematic review and meta-synthesis consolidated the current knowledge of the impacts of tooth loss and prosthetic replacement on different aspects of patients' life.²² These impacts included lower than satisfactory function; decreased social confidence; and disturbed self-image and self-esteem. Additionally, Rousseau et al.¹⁷ identified that the impacts of tooth loss and replacement varied between study participants and suggesting that this dissimilarity might be related to differences in the 'meaning of tooth loss and denture wearing' between patients.

For many people conventional complete dentures may have a positive effect on quality-of-life including enhancement of function and confidence when compared with having no teeth. Nevertheless, for others, limitations such as denture instability, appearance and socialisation impairment with CD could not be underestimated. This is clearly discussed in the qualitative analysis undertaken by Hyland et al. and Rousseau et al.^{16,17} For example, Hyland et al. highlighted the 'public constraint' caused by CD,¹⁶ which limited patients' social activities, particularly social eating and self-confidence. Patients with a less satisfactory dental prostheses can experience a variety of concerns,^{15,20} including 'alterations in self-image, Becoming a deviating person and Becoming uncertain person'.¹⁵

Despite the involvement of patients who had a removable partial denture (RPD), crowns and fixed bridge (FB) prior to implant prostheses in some studies,^{4,17,24} there was no specific qualitative information and findings about the

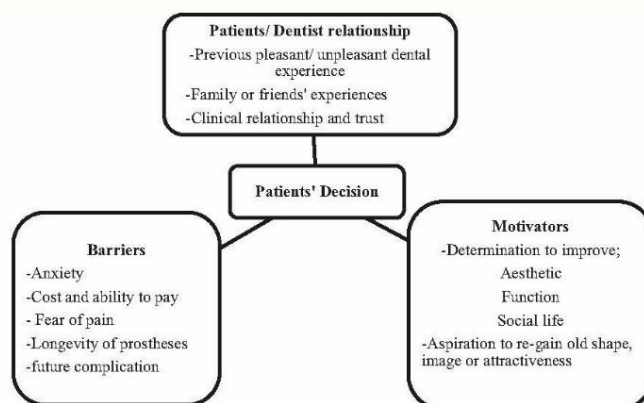


Fig. 1 – Factors influence patients' decision for dental implant treatment from qualitative studies.

experience of those patients' groups with their conventional restorations and how that related to their subsequent DIT. One excluded qualitative study^{25b} has explored patients preferences for the management of the partially dentate condition without aiming to consider patients experiences of dental implants. It was apparent in this study, participants (particularly those in the younger age groups) have high expectations of dental rehabilitation. In addition, partially dentate patients would increasingly prefer preservation of their natural teeth. The study suggests that increased demands for conservative and fixed dentistry, including implant restoration, might be seen in future.²⁵

3.3. Stage Ib, decision making process of dental implant treatment

Deciding whether, or not, to restore a depleted dentition with dental implants is the end-result of the decision-making process between patient and clinician. Across studies, three groups of factors that were central to the decision-making process were identified; barriers; motivating factors and dentist–patient relationships; these are summarised in Fig. 1. Narby et al.¹⁹ identified barriers, which they called, 'gatekeepers' within the decision-making process for implant treatment, these included 'dental anxiety' and the 'cost' of implant treatment. Other barriers identified in the studies were apprehensiveness of pain and the inability to wear dentures after the implant surgery; concerns about the future cost of the maintenance; and future complications of the prostheses; longevity of the treatment and interference with the patients' medical condition.^{1,4,9,15,17,18,21} Findings

^b This study was excluded because it does not meet the inclusion criteria of the current review. There was no primary aim to consider patients' experience of any aspects implants treatment, rather this was only very peripherally mentioned in one of participant's quote.

from two countries suggested there are two main areas of concerns behind patients' refusal to undergo DIT: 'fear of pain and anxiety' and the applicability of treatment in older patients.⁹

Another influential factor in implant decision-making process is dentist–patient relationships. Previous unpleasant dental experiences might negatively impact on the patients' decision in the form of worries related to old complicated procedures, current failed restorations or family and friends' experiences¹⁹ whereas good patient–dentist relationship and trust in the dentist may contribute positively in the decision making process.^{18,19}

Previous quantitative research has investigated whether patients' motivation towards DIT is influenced by age, gender or social status but no clear relationships have been established. In the current qualitative literature, some studies reported that patients' desire to have a dentition as close to natural teeth as possible and searching for 'normality'⁴ or 'normalisation'¹ may act as motivating factors during the decision for implant treatment.^{1,4} The aspiration of retrieving an old identity 'becoming the person I was once',^{15,19} and eliminating the feeling of isolation and 'Social stigma'¹⁹ were other motivating factors for implant restorations.

Narby et al.¹⁹ reported the decision-making process in relation to fixed implant supported prostheses (FISP). Determination to improve the dentition and overcome functional and aesthetic limitations of dentures acted as motivators to undergo treatment with FISP.

3.4. Stage II, experience with implant treatment

Across all papers, very little data related to the experience of implant placement and only three studies recruited patients during their treatment stage.^{4,17,18} The limited information on experiences of this stage mainly concerned pain and distress of the surgical phase and issues around using a denture during the healing period. Findings from one study suggests that

surgical implant placement for some patients can cause more physical trauma than anticipated.²¹

3.5. Stage III, experience with implant restorations

Study findings relating to patients' thoughts and experiences of stage III has been sub-divided according to the type of implant restorations provided. Four studies included patients who were treated with FISP^{1,15,19,20} and three studies reported patients' experiences with ISOD.^{16,17,21} Other studies included patients with a variety of implant restorations^{4,17,18} and there was no clear distinction in the findings.

3.5.1. Patients' experience after the replacement with FISP

Themes across four studies reflected patients' thought of their FISP treatment journey.^{1,15,19,20} Patients described implant treatment as a transition towards their improved dental state and referred to that treatment as a 'positive turning point'.¹⁵ Recognition of the functional enhancement and the improvement of their quality of life after the use of FISP were apparent across studies and coded in one study as *normality of function*.⁴ Recovering personal identity and confidence after implant treatment were also reported and from the patients' perspectives was interpreted as 'becoming the person I was once',^{15,19} and *normality of appearance*.⁴ Patients felt an improvement in their confidence, social life and self-image.

Specific groups of patients with functional limitations described treatment with FISP as 'a process of normalisation'.¹ Improvement of their quality of life after FISP replacement had made them independent in selecting their food. Furthermore, FISP for this particular group could be advantageous to their confidence and socialisation. Some of the participants proposed that having a secure restoration should be a 'right'¹ for them, and that it should be provided at reduced cost when hardship in paying for the treatment may act as barrier. Patients with physical disabilities reported difficulties cleaning their FISP, which might require additional support from the patient's carer.¹ After a period of implant prostheses placements, patients could recognise different DIT outcomes and prostheses deficiencies including speech difficulties at the beginning of FISP use^{19,20}; tongue and cheek biting; increase salivation; change of food taste²⁰ and maintaining the prostheses hygiene.^{19,20}

3.5.2. Patients' experience after the replacement with ISOD

The experience of patients with ISOD was discussed in the literature from two perspectives. The first was the experience of eating and functioning with ISOD and second was the experience of improvement in social life and confidence with ISOD.^{16,21} Studies reported that patients experienced substantial improvements in eating after using ISOD including improvement of food selection and enjoyment of food in social environment.¹⁶ The improvement in ISOD fit and stability during function had two advantages from patients' perspectives. Stable dentures enhanced patients' confidence and clarity of speech and also reduced the frequency of denture induced ulcers.²¹ Patients gave their account of the negative aspects of ISOD such as *difficulty manipulating the overdenture and difficulty in cleaning implants* particularly at the beginning of use.²¹

4. Discussion

There is an increasing use of qualitative methods to investigate patients' experience of health care provision. This reflects the increasing value placed on patients' opinions, alongside clinicians' views and research evidence, in health care decision-making. In the field of implant dentistry, studies using qualitative methods are mostly limited to the last decade. This review considered solely qualitative studies concerning patients' experiences of DIT. Semi-structured, in-depth one to one interviews, were the main methods of choice for collecting data from patients in most of the included studies with only one study using focus group discussions.⁹ As in other areas of healthcare research, thematic analysis and constant comparative methods of grounded theory seem to be the preferred methods of qualitative analysis in the reviewed papers.

The majority of participants in included studies were interviewed after completion of their DIT. This may have reduced the possibility of obtaining in-depth information about patients' experiences earlier in the treatment pathway (i.e. before and during implants placement). In addition, their experiences of the completed dental implant restoration may have altered how they perceived earlier treatment stages. Although some studies explored patients' experiences of implant decision making, this was usually discussed retrospectively from the perspective of completed implant treatment. In addition, patients' experiences of implant treatment (stage II) were insufficiently considered in the reviewed papers, including experiences of clinical investigation and surgical placement; bone graft procedures; failure of implants osseointegration and the experience of temporary implant prostheses. The limited information available about surgical implant placement²² suggests that it can be a difficult period for some patients and warrants further qualitative investigation.

After provision and use of both FISP and ISOD prostheses, patients were able to discuss the benefits and drawbacks of their restorations.^{20,21} Recognition of the functional improvement, aesthetic enhancement and social advantages of the implant-supported prostheses were generally reported across studies. For patients with FISP, implant treatment was seen as 'a process of normalisation'¹ and fixed restorations as similar to natural dentition in function and appearance. On the other hand, patients with ISOD believed that implant-supported prostheses would overcome functional, aesthetic and social requirements but they were not described as resembling the natural dentition. This may be appearing primarily because of the requirement to remove the denture frequently. Patients with fixed implant-supported prostheses were concerned about maintaining hygiene of their FISP. This was especially the case among individuals who were functionally impaired.¹ Cleaning the prostheses and around implants fixtures were also an issue amongst some participants with ISOD, who also complained about difficulty in unseating their ISOD.²¹ Further, patients' information on how to maintain their implants restoration hygiene may be expedient.

Patients' expectations of restorative dental treatment are growing.^{4,25} To accommodate these expectations, decision-making in relation to implant treatment should be more collaborative between patients and their restorative clinicians.

Accurate information and discussion on what implants can offer and on their drawbacks should be provided before treatment commences in order for patients to have realistic expectations.¹⁹

Although included papers provided considerable insight into the experiences of patients undergoing DIT for extensive tooth loss, there was relatively little information about the experience of patients with single implant crowns. Linked to this (as extensive tooth loss is more common in older age groups) there was relatively little information about the experiences and expectations of younger patients groups. In terms of future research, there is a need to explore the factors that influence patients' expectations of the DIT at stage I and how these can subsequently impact on satisfaction with the final prostheses; patients' experiences of implant placement at stage II (surgical and healing stage) and patients' experiences of implants' prostheses maintenance requirements and implant failure. These areas were identified as having been sparsely covered in the current qualitative literature of patients' experience of dental implant.

5. Conclusion

This textual narrative synthesis of qualitative studies provided insight into current patients' perceptions of different aspects of implant treatment and highlighted directions for further investigation and reports.

In general, there were two main factors motivating patients to elect for implant replacement, to improve confidence and existing functional problems with other types of conventional restoration. The included qualitative studies provided insight into patients' experiences of two types of implant prostheses namely ISOD and FISP. Findings across reviewed papers ($n = 10$) suggested that while patients experienced functional and social improvements after both types of restoration, they additionally saw treatment with FISP as a process of 'normalisation'⁴ and believed that such implant restorations could be similar to natural teeth. Across studies, less consideration was given to young patients; patients with single and limited tooth loss; and to patients' expectations of DITs and the significance of this for treatment decision making and future satisfaction. Future work might focus on investigating patients' experiences and understanding of DITs at stages I and II, and on how this influences patients' expectation of, and satisfaction with, the implant restoration.

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Appendix 2. RCS clinical guideline and local guideline

[Guidelines for Selecting Appropriate Patients to Receive Treatment with Dental Implants: Priorities for the NHS](#)

https://www.rcseng.ac.uk/fds/publications-clinical-guidelines/clinical_guidelines/documents/guidelines-for-selecting-appropriate-patients-to-receive-treatment-with-dental-implants-priorities-for-the-nhs

- Local hospital guideline

http://www.newcastle-hospitals.org.uk/services/dental_services_restorative-dentistry_nhs-funded-implants.aspx

NHS funded Implants

Criteria for NHS funded implant treatment at Newcastle Dental Hospital

The Dental Hospital is only able to provide a limited volume of dental implant treatment. In many circumstances alternative treatment options must have been tried prior to referral for assessment.

Guidelines for selecting appropriate patients to receive treatment with dental implants: priorities for the NHS (Royal College of Surgeons of England 2012) lists the following categories as potentially warranting intervention with implants. Note that these are not listed in order of priority. The latter guidelines will be used to help decide which patients can be offered implants.

- Patients with developmental conditions resulting in deformed and/or missing teeth
- Patients who have lost teeth due to trauma
- Patients who have undergone ablative surgery for head and neck cancer
- Patients with extra-oral defects
- Patients who are edentulous in one or both jaws
- Patients with severe denture intolerance
- Patients with aggressive periodontitis
- Patients requiring implant-borne orthodontic anchorage

Matching these categories does **not** guarantee that implants can be offered at Newcastle Dental Hospital.

We would normally expect that dentate patients to be caries free, have no active periodontal disease and be able to demonstrate a good standard of oral hygiene.

The Dental Hospital is **not** normally able to offer treatment for the following:

- Completion of implant treatment commenced elsewhere
- Making good prosthodontic problems in relation to implant treatment carried out elsewhere
- Maintenance of implants and implant restorations provided elsewhere

Following completion of implant based treatment it is our usual practice to discharge patients from the Dental Hospital.

PhD Research proposal

Qualitative Study Of Patient and clinician Experience Of Dental Implant Treatment pathway

Wafa .A. Kashbour
11/15/2014

All proposal changes are underlined and in **Bold**



List of change to this proposal

- 1- Title modification (title page and page 3)
- 2- Addition of study B (pages 3,6-7)

Background and introduction

Despite the improvements in oral health provision and progress in preventive and restorative dentistry (Müller and Schimmel, 2010), tooth loss and its physiological and psychological consequences are still a burden for patients and dentists (Craddock, 2009).

Replacement of the missing dentition can be performed with the use of fixed or removable prostheses. These restorations can be supported with natural teeth, dental implants or a combination of both. Restoration of the dentition with dental implants has become increasingly widely used since the success of osseointegration was demonstrated by Branemark and colleagues in the 1980s (Adell *et al.*, 1981; Branemark, 1983). It is well documented from a dental research evidence base, that dental implant treatment provides a successful option to restore the partially dentate or edentate patients (Eriksson *et al.*, 1990; Jemt *et al.*, 1990). Implant restoration has the advantages of preservation of natural teeth where these remain, and alveolar bone in the absence of natural teeth, and provision of support and stability for removable prostheses (Ashok, 2005).

For single tooth implant restorations, the success rate can be as high as 98.5% (Palmer *et al.*, 2008). For restoring edentulous jaws, implant success rate can be 95% in the anterior mandible and 85 to 90% in the anterior maxilla (Peter, 2000). As a result of this high success rate and greater awareness of implant as alternatives to conventional rehabilitation, patients are increasingly becoming motivated and more oriented toward dental implants (Rustemeyer and Bremerich, 2007).

The success rate of implant treatment may be influenced by a significant number of factors. These factors can be divided into three categories. Firstly, patient factors, which include general health; smoking; occlusion; bone quality; patient expectations and ability to maintain their oral health. Secondly, implant factors which could include the location of implants in the mouth and the type of the implant, and thirdly, clinician factors including their training and skills (Peter, 2000; Hannaban and Eleazer, 2008).

From a patient perspective, there is significant evidence that patient satisfaction with implant supported complete overdentures is greater when compared to conventional denture (Thomason *et al.*, 2007). In contrast, there is a lack of evidence relating to patient satisfaction in implant treatment of partially dentate states (Thomason *et al.*, 2007). This may in part be due to the wide diversity of extent and pattern of tooth loss in the partially dentate which would complicate study design and interpretation of outcomes.

NHS implant provision is limited to a number of clinical situations which are largely governed by clinical guidelines, examples of which include those published by the Royal College of Surgeons (Alani, 2012). Limited availability within the NHS and the high costs associated with provision under private contract, plus protracted referral pathways and treatment progression may constitute a real barrier to provision of this type of treatment.

Research proposal (version 3) 05th January /2015

Whilst the evidence base for success of Osseo integration and patient satisfaction at the end point of restoration provision is rich (Feine *et al.*, 2002; Feine *et al.*, 2003), there is little research which considers the patients perspective as they journey through a treatment pathway (Johannsen *et al.*, 2012). Greater understanding of this process would be invaluable for informing clinicians about how the various stages of referral, assessment, planning, and provision affect patients, and indeed whether this is the same regardless of the extent of tooth loss. Providing an effective communication between health providers and patients is essential to ensure that patients expectations and anxieties are managed appropriately and treatment outcomes are this more likely to achieve those expectations. (Gustafsson *et al.*, 2010).

In order to explore in depth the thoughts, feelings and the experience of patients throughout their treatment journey we are directed towards employing qualitative research. Previous examples of how this approach can ultimately improve the standards of care and thus improve satisfaction and meet expectation are seen in orthopaedic surgery (Jacobson *et al.*, 2008; Gustafsson *et al.*, 2010).

The aim of the study is to explore the thoughts and feelings of edentulous and partially dentate dental patients as they progress through initial referral assessment, planning, placement and restoration of dental implants and to consider how the patients experience may differ depends upon the extent of their tooth loss.

Plan of the research

Qualitative Study of Patient and clinician Experience of Dental Implant Treatment pathway

- **Location of the research**

The research will be carried out at the Newcastle University, School of Dental Science, and Newcastle Dental Hospital.

Patients' study (Study A) (is approved by London- Stanmore Research Ethics Committee / (13/10/0765))

- **AIMS**
 - To understand how the implant journey is similar and different for partially dentate and edentulous patient.
 - To explore patient thoughts, feelings and expectations of implant treatment at the outset of their implant 'journey'.
 - To understand how patients 'value' their implant treatment at different clinical stages.
- **Research questions study A**
 - 1- How patients' with different extent of tooth loss experiences their implant treatment and implant restoration

Clinician study (study B)

- **AIMS**
 - To understand what clinicians, who provide implant treatment, think of the patients experience with implant treatment (from study A)
 - To identify ways in which clinicians can provide patients with better understanding of implant treatment
- **Research questions study B**
 - 1- What do clinicians, who provide implant treatment, think of patients of account of their experiences of dental implant treatment.
 - 2- what are the criteria that influence a clinicians decision to provide implant restorations in secondary dental care
 - 3- what measures could realistically be implemented to improve patients experience with implant treatment

Literature review

A literature review will be conducted to identify relevant research in three areas:

- Quantitative research relating to outcomes from dental implant treatment
- Qualitative research relating to outcomes from dental implant treatment
- Wider literature on patient experiences of illness and health care help seeking

Research proposal (version 3) 05th January /2015

- **Search strategy**

The first literature review will be undertaken using the data bases PubMed; Medline; Ovid; Web of knowledge and Scopus. The search terms; tooth loss; consequences; patient psychological wellbeing, implant treatment of complete edentulous; implant treatment of the partially dentate, patient satisfaction, implant treatment outcome will be used.

A second literature review will be undertaken to explore the types of research methodology and their appropriateness to address the current research questions. The terms that will be used in the search are qualitative research method; quantitative research method; interviews approach; implant surgery; patient outcome measures.

The literature review will consider the grey literature including e-thesis from the British library. Moreover, reference lists of papers will be screened for relevant studies to this project.

Methodology study A; patients study

(is approved by London- Stanmore Research Ethics Committee/ (13/LO/0765)

- **Research design groups of patients and the sample**

The study will employ qualitative research methods. Semi-structured interviews will be used to collect data, however if after conducting the literature review a more appropriate method is identified this would be considered. Two groups of patients will be included; partially dentate and edentate patients. Patients will be recruited from within a secondary care environment, thus there will be no financial consideration from the patient perspective as the treatment through NHS will be without charge for the patient.

Although the aim is to follow patient through the implant journey, numbers of patients and time available mean that it will not be possible to follow two cohorts of patients from referral through to treatment completion. Where possible, patients will be followed throughout their pathway, but the study will also collect data from samples of patients at different stages of their treatment which are listed below. An advantage of this approach is the flexibility to purposively recruit additional patients in response to the developing analysis. On-going thematic analysis and an iterative development of the content of the semi structured interview and indeed the timing of interviews will be applied.

- **Time points**

Several time points have been identified at which patients might be recruited.

- Before treatment commence, for instance at the first appointment following referral, at assessment for implant provision and immediately before surgical implant placement.
- During the treatment period for example, after surgery, before or after healing period, before restorative stages or during restorative period of treatment
- After the end of their treatment. This could be immediately, after weeks, months, or years.

- **Sample and research setting, inclusion and exclusion criteria**

Patient, who will participate in the research, should have the following criteria;

- 18 years old or above
- Male & female
- Edentulous or partially dentate.
- NHS patient.
- They may or may not have previous complete or partial prosthesis.
- Able to give informed consent.

Patient will be excluded if;

- Patient unable to engage in a spoken interview.
- Patient unable to give informed consent.

- **Interview**

Semi-structured interview; the initial topic guide will be developed, informed by the literature review and following informal discussion with current patients of Dr Ellis and also after discussion

Research proposal (version 3) 05th January /2015

with implant providers at the Dental Hospital/School. Data collection and analysis will be iterative process and hence question format may develop following thematic analysis of initial interviews.

- **Recruitment and data collection procedures**

Patient will be identified from implant database of Newcastle Dental Hospital or from the prosthodontics referral clinics. The consultant responsible for the care of the patient will initially seek consent from the patient to be contacted by the researcher (PhD Student) by telephone. Subjects will then be provided with full information relating to the study and their consent to participation sought. Approximately 10 patients will be recruited for interview at each stage (before, during and after treatment) but if saturation of theme occurs earlier this number might be reduced.

Semi-structured interviews will all be undertaken by the researcher, with all interviews being audio –recorded and transcribed. Qualitative analysis will follow accepted procedures for rigorous analysis including coding, constant comparison, memoring (Glaser and Strauss, 1966) and deviant case analysis (Seale, 1999). The data analysis will be facilitated with the use of N VIVO a “specialised computer assisted qualitative data analysis software”(Pope *et al.*, 2000). The advantages of using computerised assisted software are they allow for multimedia files storage, simplify build up theoretical links, improve rigour and analysis, help in data retrieval after coding (Pope *et al.*, 2000).

Anticipated ethical issues

Seeking ethical approval is in progress. It is anticipated that potential ethical concerns will include the need to reassure patients that their decision to participate or otherwise will not influence their clinical care. A further consideration is the possibility of Dr Ellis (PhD supervisor) having access to transcripts of her current patients. This can be avoided by ensuring removal of all identifiable patient and clinician details.

Methodology Study B: clinicians interviews

Focused interviews will be used to explore what clinicians think of the findings from study A. The use of focused qualitative interview will ensure discussion of topics related to the aims of the study. This involves commenting and reflecting on different aspects of patients thoughts and feelings of implant treatment. The interviews will explore positive and negative aspects of patient’s treatment pathways and will discuss how patient’s journey may be improved.

Only one interview will be carried out with every clinician. We anticipated that 5 to 10 interviews may be needed to be carried out until data saturation will occur. Interviews will all be undertaken by the researcher (chief-investigator), with all interviews being audio –recorded and transcribed.

Ethical issues and Confidentiality of clinician details in study B

Clinicians will be interviewed after they give their informed consents for the interviews. The interviews will only be accessed by chief investigator and the principal investigator who will ensure removal of Identifiable Clinicians’ details immediately after interviews. This will be achieved by the use of acronym and assigning random numbers for each interview as the following:

Research proposal (version 3) 05th January /2015

I would use the acronym (Imp Clin) as short of (implant clinician) and this will be proceeded by random number, begins at 18 and continue until the end of the potential numbers of the interviews.

Example

| Interview | Anonymise name of clinician |
|-------------------------|-----------------------------|
| Interview1 Clinician x | Imp Clin18 |
| Interview 2 clinician y | Imp Clin 19 |

Qualitative analysis will follow accepted procedures for rigorous analysis including coding, constant comparison, memoring (Glaser and Strauss, 1966). The data analysis will be facilitated with the use of N VIVO a “specialised computer assisted qualitative data analysis software”(Pope et al., 2000). The advantages of using computerised assisted software are they allow for multimedia files storage, simplify build up theoretical links, improve rigour and analysis, help in data retrieval after coding (Pope et al., 2000).

Clinician inclusion criteria

Clinician should have experience of the provision of implant treatment in a secondary care hospital.

Ethical consideration of study B

- Clinician time

Training needs and skill development

- Understanding qualitative research.
- Interview skills and communication with patients.
- Carrying robust search strategy.
- Data handling, storage and the use of N VIVO software.
- Academic writing and thesis structuring.

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Health Research Authority

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05 August 2013

Dr Wafa Ahmed Abubkar Kashbour
PhD student with in the School of Dental Sciences,
Newcastle University (School of Dental Sciences)
School of Dental Sciences,
Framlington Place
Newcastle upon Tyne
NE2 4BW

Dear Dr Kashbour

Study title: The implant journey; Is it the same for the partially dentate and edentate patients?
REC reference: 13/LO/0765
IRAS project ID: 118858

Thank you for your email of 30th July 2013. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 09 May 2013

Documents received

The documents received were as follows:

| Document | Version | Date |
|-------------------------------|---------|--------------|
| Participant Information Sheet | 2 | 30 July 2013 |

Approved documents

The final list of approved documentation for the study is therefore as follows:

| Document | Version | Date |
|-----------------|---|-------------|
| Covering Letter | IRAS/REC Application form for proportionate | 07 May 2013 |



07 January 2015

Dr Wafa Ahmed Abubkar Kashbour
Newcastle University (School of Dental Sciences)
School of Dental Sciences,
Framlington Place
Newcastle upon Tyne
NE2 4BW

Dear Dr Kashbour

Study title: The implant journey; Is it the same for the partially dentate and edentate patients?
REC reference: 13/LO/0765
Amendment number: Am02: Updated documents
Amendment date: 06 January 2015
IRAS project ID: 118858

Thank you for your letter of 06 January 2015, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

| Document | Version | Date |
|--|---------|-----------------|
| Notice of Minor Amendment [Email from Wafa Kashbour] | | 06 January 2015 |
| Other [Consent to contact] | 2 | 05 January 2015 |
| Other [Interview guide for implant clinicians] | 2 | 05 January 2015 |
| Participant consent form | 2 | 05 January 2015 |
| Participant information sheet (PIS) [Clinicians information sheet] | 2 | 05 January 2015 |

Appendix 6. Stages of the research conduct

| | | |
|--|---|--|
| Research designing | Stage 1 | Review of the Literature, identifying literature gap and Establishing the research aims, objectives and questions |
| | | Establishing research proposal |
| | | Submission of ethical approval in (NRES) parallel to Stages of development and training |
| | Stage 2 | Generation of primary topic guide for in-depth semi-structured qualitative interviews to fulfil the main research questions |
| carrying out clinician group discussion & Pilot interviewing with patients, to feed and develop patients' interview topic guide | | |
| Research in action | Stage 3 | Commencement of study A 'the patients' study N=34 patients, 38 accompanied by demographical data collection and followed by Transcription and inductive iterative thematic analysis |
| | | Development of study A thematic framework (inductive approach) |
| | Stage 4 | Modifying the initial research proposal, addition of study B Development of study B interview topic guide based on thematic framework of study A Submission of ethical amendments |
| | | Commencement of study B, the clinicians' study , semi-structured interviews n=8 |
| | | Inductive, iterative thematic analysis of study B transcripts and Development of thematic framework |
| Stage 5 | Last round of patients interviews, study A | |
| conclusion | Stage 6 | the final thematic framework development |
| | | Discussing the overall finding and reporting |
| | Stage 7 | Answering the research questions |

interview topic guide for patients and interviewer

This topic guide includes general topics of the interviews. Specific questions in every thought/point of the guide will be explored according to the patient stage of treatment.

1. Can you start by giving me a bit of background about yourself
 - Personal information
 - Education/work activities and occupation
 - Marital status,
 - Medical health)
2. The interview will be generally will explore the topics below. However, the depth of the question will be influenced by the stage of the treatment.
 - Reasons of teeth loss
 - Reasons of teeth replacement
 - Example (physical symptoms, psychological, family)
 - Previous prostheses experience
 - Complaints from previous prostheses/ experience of dental treatment/ limitation of prostheses
 - Hope and expectation from seeking new treatment type, or prostheses i.e. (expectations and requirements in new prostheses)
 - Level of knowledge about implant treatment
 - Example, What do you know about dental implant?
 - What is the Source of implant treatment information? (From friends, media, and internet)
 - If implant chosen to be an option in the treatment, would u participate?
 - What solutions for your complaints can implant fulfill as you think
 - Worries or concerns regarding implant treatment and treatment out comes
 - The Progress in the implant treatment if the patient already participated.
 - How do the patient value the treatment so far
 - Concerns and worries regarding the implant treatment so far

The implant journey / interview question guide (2013/2014 version-1)

- Hope and expectation for the future
- Implant Surgery experience (complication , as expected , better or worse)
- Surprised or unexpected surgical procedures
- Thinking about appointment interval
- Exploring past experience expectation and satisfaction
- Improvement after treatment finish
- Limitation of the procedures overall
- Comparison between previous replacement and the implant option
- How patient value the treatment compared to previous attempt
- Complication and follow-up procedures
- Limitation of current prosthesis if its implant supported
- Level of satisfaction
- Finally, would you please fill in the questionnaire which will be provided by the interviewer?

Appendix 8. Patient's introductory letter



Introductory letter to the patient

Date

Dear [Insert Name of Patient]

I am looking for your help with a project I am doing at Newcastle University.

I would like to talk to some of the patients who have been referred to have implant treatment; or who are undertaking dental implant treatment or have had implant treatment. I would like to hear about the experiences.

There is no treatment involved. I simply want to hear your thoughts about dentures, if you wear them and implants and how the experience has been for you so far. I would like to be able to telephone you to explain what would be involved and invite you to take part in the study, but I cannot do this without your consent.

Enclosed with this letter you will find an information sheet. Please take your time to read this carefully and if you are happy to be contacted please complete the enclosed 'consent to contact' form. This should then be returned in the stamped addressed envelope included for your convenience or hand it back to the clinician you are seeing today.

I would really appreciate your help as it may help dentists to provide better services for people like you in the future.

I sincerely hope that you will be able to help with this study.

Yours sincerely,
Dr. Wafa A Kashbour DDS, MSc (Dent Sci)
PhD student at Newcastle school of dental science



The implant journey; is it the same for partially dentate and edentulous patients?

Patient Information Sheet

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.

Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to participate.

What is the purpose of the study?

The study examines what patients think about dental implant. Also the study aims to explore patients feeling and experience of dental implant at various stages of their treatment.

Why have I been chosen?

You have been identified by your clinician as someone who has either one of the following;

- Recently referred to have dental implant.
- Accepted to start the treatment.
- In the process of implant placement.
- Has had dental implant.

It does not matter whether you have actually had the implants or you are considering the treatment options. We are interested in hearing a range of experiences, thoughts and feeling from people who have exposed to this treatment option. We want to interview you because your experiences are important for planning future care.

Do I have to take part in the interview?

No. It's up to you to decide whether or not to take part. If you decide to take part now you can change your mind at any time, even after the interview has started. We will not tell your dentist if you choose to take part or not, and your treatment from your dentist will not be affected in any way.

What will happen if I take part?

A research interviewer from the university will ask you questions about your general dental health and specific questions about how implants were discussed with you, and how you came to the decision about whether to have them or not. If you don't want to answer a question you don't have to, and you can end the interview at any point. Your interview will last about 45minutes and will be tape recorded and transcribed verbatim.

Why do you record interviews?

We record the interviews because it is hard to take notes of what people say, listen carefully and think all at the same time! After the interview the recording will be listened to carefully and every word that both you and the interviewer say will be typed down. We use this written record, to help us remember what people said. The recording will be kept until the end of the study, and then destroyed.

What do I have to do?

If you are interested in taking part, please send back the enclosed consent to contact form, making sure you fill in your telephone number.

A researcher will get in touch with you to answer any further questions you may have. After that, if you would like to take part, they will find out what times suit you best to be interviewed. Patient will have the choice where to be interviewed. We might interview people in their own homes, but if you prefer to be interviewed at the university or the dental school we can easily arrange that. **We can provide travelling expenses of up to £20.**

When the interviewer arrives to interview you, they will ask you to fill in informed consent form. This is to show that you understand what the study is about, that you are happy to be interviewed and that you are happy for us to record the interview.

Are there any benefits to helping with the interview?

Although there are no direct benefits to you personally, we hope that you find being interviewed an interesting experience. Your involvement will give us a better understanding of patient's experience as they journey through the treatment. We believe this will contribute to improve future patient care provision.

Are there any disadvantages to helping with the interview?

The main disadvantage is the time it will take; an interview usually lasts 45 minutes.

Will my taking part in the study be kept confidential?

Yes. Everything you tell us during the interview is completely confidential. We won't tell your dentist or anyone else anything. All personal information – your name, names of family or friends or your dentist - or anything else which might identify you will be removed so that no-one can identify you personally.

All recordings and written records are treated as confidential material. The written records are stored securely within the University under the supervision of the researcher and her academic supervisors and in compliance with the Data Protection Act.

Who is organising and funding the research?

The research is being organised and funded by the University of Newcastle upon Tyne (the School of Dental Sciences).

Who has reviewed the study?

Local ethical committee reviewed the research proposal.

How can I get more information about the study?

If you want to know about what the interview will involve or about the study in general please get in touch with us. Our telephone number is: 0191 222 6378, please ask for Dr Wafa Kashbour.

Our address is: School of Dental Sciences
Newcastle University
Framlington Place
Newcastle upon Tyne, NE2 4BW, UK

Appendix 10. Clinicians interview topic guide

Qualitative Study of Patient's Experience of Dental Implant Treatment pathway Study B interviews guide;

Note: This study uses focused qualitative interviews. Focused qualitative interviews are a particularly useful tool to employ in an area where relatively little is known about an area. They are flexible enough to allow interviewer and interviewee to explore issues which are pertinent to the individual person which had not been anticipated in advance, thus enabling a fuller understanding of the processes at work to emerge.

1. What do you think about the following patients' perceptions that emerged from study A;
 - Implants may not need future maintenance
 - Implants will act as natural teeth
 - Implants will last at least 20 years
 - Implants are the best available treatment option

2. In your experience, What sources of information do you think your patients use more?
Note; do not give the list unless to clarify or use as prompts;
 - Internet
 - Dentist discussion
 - Media
 - Family and friends

3. Why do you think some patients thought of implants as natural teeth?

4. Could you just briefly describe your own experience of offering implants as a treatment option? What are the difficulties you may face in providing patients with information about implants?

5. Why do you offer implants as a treatment option to your patients?
Note: to elicit information about Evidence Based Practice
 - Own views on benefits and costs/cons?
 - Own experience of providing implants
 - Practical considerations – how do you make referral decisions?

Qualitative Study of Patient's Experience of Dental Implant Treatment pathway (version (2). 05 January 2015)

6. Can you describe how you might determine whether a patient's condition is suitable for implants?

Prompts:

- Physical signs/symptoms,
- Problems with existing treatment options.
- Patient's expressed preferences?
- Are certain 'types' of patients more suitable than others?

7. What other considerations do you take into account, beyond clinical need, when offering implants to your patients?

Prompts:

- Social
- Psychological
- Age
- Financial factors

8. If you consider a patient to be suitable for implants, how might you go about offering? Can you describe the process you go through when offering patients implants?

Prompts:

- Customised or standardised approach
- If this varies explore the different ways used
- If this means referring the patient explore how this is presented to the patient.
- Are there any situations when despite feeling there is a clinical need for a treatment that you don't offer implants as a treatment option to patients?
- Information you would provide?
- Questions you normally get asked?
- The actual referral – to whom, etc?

9. Why do you think patients choose (or refuse) to have implants?



Principal investigator Professor Janice Ellis
Chief investigator Wafa Kashbour

Information sheet; study B

Qualitative Study of Patient and clinician Experience of Dental Implant Treatment pathway

Thank you for taking the time to consider being involved in this research project. We have provided some information as a background to help you understand how you can help. Please take time to read the following information carefully.

Ask us about anything that is not clear or if you would like more information you can discuss this with our researcher. Take time to decide whether or not you wish to take part.

This study consists of study A and study B. study A involved patients who were at any stage of their implant treatment. We explored patient thought and experience of dental implant treatment by mean of qualitative interviews. Study A was given ethical approval by London-Stanmore Research Ethics Committee (13/LO/0765)

What is the purpose of the study B?

The study explores how clinicians, who are involved in secondary care dental implant clinic; think about patients implant treatment pathway. Also what are the criteria they consider in deciding to provide implant treatment? In addition to that to reflect and comment on different aspects of the findings from study A. Study A investigated what patients think of implant treatment including the referral procedure; information and knowledge; expectation and decision making for implant treatment.

Why have I been chosen?

If you offer implant treatment for edentulous or partially dentate patients, we would like you to take a part in this research to understand different aspect of patients' journey of implant treatment

What do I have to do?

If you decide to take part we will then arrange an appointment for you to be interviewed at a time that is convenient to you. Usually interviews will be done at your office, but if you prefer to be interviewed at another meeting room we can easily arrange that.

When the interviewer arrives to interview you, they will ask you to fill in a consent form which will confirm that you understand what your involvement in the study entails, that you are happy to have your interview recorded.

What will happen during the interview?

The interview will consist of questions about the way you decide which patients should be offered implants and how you may make this offer to patients, and also to reflect on finding of previous patient study (study A). If you don't want to answer a question you don't have to, and you can end the interview at any point. Your interview will last about 30 minutes and will be tape recorded.

Why do you record interviews?

We record the interviews because it is hard to take notes of what people say, listen carefully and think all at the same time! After the interview the recording will be listened to carefully and every word that both you and the interviewer say will be typed down. We use this written record, to help us remember what people said. The recording will be kept until the end of the study then destroyed.

Are there any benefits to helping with the interview?

Although there are no direct benefits to you personally, we hope that you find being interviewed an interesting experience. Your involvement will give us a better of understanding of different aspects of patients thought and also to have you suggestions of finding ways to improve patients care.

Are there any disadvantages to helping with the interview?

The main disadvantage is the time it will take; an interview usually lasts about 30 minutes. The intention would be to timetable these interviews to coincide with staffs 'lunchtime' and therefore not affect Trust 'output'.

Will my taking part in the study be kept confidential?

Yes. Everything you tell us during the interview is completely confidential. All personal information – your name, names of colleagues or patients - or anything else which might identify you will be removed so that no-one can identify you personally. You will not be able to be linked to any of your patients that we may subsequently interview and vice versa.

All recordings and written records are treated as confidential material. They are stored securely within the University under the supervision of professor Janice Ellis, and in compliance with the Data Protection Act will be retained for 5 years before being destroyed. They will not be played or shown to anyone outside the research team.

Who is organising and funding the research?

The research is being organised by Newcastle University (Institute of Health & Society and the School of Dental Sciences)

Who has reviewed the study?

This study was reviewed by the Medical Research Council and given a favourable ethical opinion for conduct in the NHS by NRES Committee London – Stanmore Skip ton House Ground Floor. NRES/HRA80 London Road London SE1 6LH

How can I get more information about the study?

If you want to know about what the interview will involve or about the study in general please get in touch with us. Please ask Professor Janice Ellis or Wafa Kashbour (PhD student) at Newcastle dental hospital in person or email them at Janice.ellis@ncl.ac.uk and w.a.a.kashbour@ncl.ac.uk.

Appendix 12. Study A participants characteristics

(Missing teeth in partially dentate is determined by the use of World Dental Federation FDI dental chart).

| Names | Sex | Age | OHIP-49. ADD | Stage of implant treatment/ time of prosthesis use | Extent of tooth loss (missing teeth) | Type of previous prostheses |
|---------------------------------|-----|-----|--------------|--|---------------------------------------|-----------------------------|
| Participants at stage I | | | | | | |
| Mary | F | 72 | 88 | Stage I | E | CD |
| Martha | F | 27 | 158 | Stage I | E | CD |
| Sandra | F | 55 | 131 | Stage I | E | CD |
| Gary | M | 24 | 142 | Stage I | Pd (11,12,13) | Acrylic denture |
| Elizabeth | F | 72 | 88 | Stage I | E | CD |
| Diana | F | 33 | 139 | Stage I | Pd (12) | Acrylic denture |
| Mary2 | F | 72 | 80 | Stage I | E | CD |
| Maya | F | 21 | 120 | Stage I | Pd | Acrylic denture |
| Mark | M | 68 | 110 | Stage I | Pd | Acrylic denture |
| Christine | F | 23 | 145 | Stage I | Pd | RPD |
| Alexander | M | 25 | 120 | Stage I | Pd (12,22,23) | Acrylic denture |
| Participants at stage II | | | | | | |
| James | M | 23 | 86 | Stage II/ Restorative | Pd (11,21) | tISFP |
| Georgia | F | 20 | 88 | Stage II/Restorative | Pd (14, 12, 22) | ICs |
| Lawrence | M | 19 | 82 | Stage II/Post-surgery | Pd (11.21. 22) | tISFP |
| Lora | F | 65 | 98 | Stage II/Restorative | E | CD |
| lawrence2 | M | 19 | 44 | Stage II/Immediate after Restorative | Pd (11.21. 22) | tISFP |
| George | M | 28 | 77 | Stage II/Post-surgical | Pd | ICs |
| Nichol | F | 74 | 76 | Stage II/Post-surgical | E | OD |
| Smith | M | 70 | 110 | Stage II/Restorative | E | OD |
| Helen | F | 48 | 88 | Stage II/Restorative | E | OD |

| | | | | | | |
|----------------------------------|---|----|-----|------------------------|---------------|-------|
| joy | F | 45 | 96 | Stage II/Post-surgical | Pd(12,11,21) | tISFP |
| Liam | M | 32 | 88 | Restorative | Pd (11,12) | tISFP |
| Participants at stage III | | | | | | |
| Amanda | F | 76 | 120 | 4 years | E | ISOD |
| David | M | 22 | 30 | 2 years | Pd (21) | ICs |
| Linda | F | 74 | 97 | 5 years | E | ISOD |
| William | M | 20 | 30 | 3 months | Pd (11,21,22) | ISFP |
| John | M | 53 | 20 | 6 months | E | ISOD |
| Dennis | M | 20 | 36 | 9 months | P | ISFP |
| Deborah | F | 72 | 70 | 3 years | E | ISOD |
| Angela | F | 76 | 150 | 7 years | E | ISOD |
| Rose | F | 62 | 70 | 7 years | Pd | ISFP |
| Linda2 | F | 74 | 35 | 6 years | E | ISOD |
| Catherine | F | 76 | 120 | 7 years | E | ISOD |
| Alice | F | 70 | 80 | 2 years | E | ISOD |
| Amelie | F | 71 | 120 | 6 years | E | ISOD |
| Andreal | F | 75 | 120 | 5 years | E | ISOD |
| Andrea2 | F | 75 | 30 | 7 weeks | E | ISFP |
| Holly | F | 35 | 25 | 6 months | Pd | IC |

The Newcastle upon Tyne Hospitals 
NHS Foundation Trust

Dental Implants

Dental Services
a guide for patients

This booklet provides information about dental implants and implant treatment at Newcastle Dental Hospital.

What is a dental implant?

A dental implant is a screw, usually made of metal called titanium, fitted into a socket in your jawbone. The bone becomes firmly attached to the implant in a process known as osseointegration.

The implant provides the foundation for a crown, bridge or denture.

Implants can help to replace missing teeth as:

- single tooth – also known as a crown (Fig 1)
- group of teeth – also known as a bridge (Fig 2)

Or when most or all teeth are missing as:

- removable dentures: clipped onto studs (Fig 3) or secured onto a bar (Fig 4)
- a 'fixed on' denture (Fig 5)



Figure 1: Single tooth/crown



Figure 2: Group of teeth/bridge



Figure 3: Stud 'clip-on' denture



Figure 4: Bar 'clip-on' denture



Figure 5:
'Fixed on' denture

Are implants always the best option?

There are a number of ways to replace missing teeth, and the advantages and disadvantages of each technique need to be thoroughly discussed with you before starting any treatment.

We are only able to offer implants to a limited number of people at Newcastle Dental Hospital. If you are being seen under the NHS, Newcastle Dental Hospital uses nationally published criteria to help make the decision about whether implants can be offered in your case.

If implant treatment has been agreed, what are the stages of treatment?

Following your assessment, a treatment plan will be discussed. The stages of treatment will include some or all of the following. Each item is explained in more detail in the following sections:

1. Any un-savable teeth will need to be removed.
2. Missing teeth may need to be replaced with a removable denture or artificial teeth. These temporary replacements may be required for the duration of the implant treatment until your final restorations have been provided.
3. If there is insufficient bone to insert implants then additional bone will need to be provided to the area.
4. Implants fitted into the jawbone.
5. Implants may need to be uncovered later by an additional procedure.
6. Implants restored with fixed teeth or attachments for a clip-on denture.
7. Lifelong maintenance will be needed.

1. Extraction of teeth

If you have a broken tooth or falling teeth or roots that need to be removed, then this needs to be carried out either at the time of implant insertion or several weeks beforehand, depending on your case.

Extractions may be carried out at Newcastle Dental Hospital or with your regular dentist. On most occasions extractions are carried out using local anaesthetic with an injection in the gum.

2. Temporary replacement of missing teeth

Artificial replacements can usually be provided at the time of tooth extraction. These replacements could be in the form of a removable denture or a temporary bridge attached to adjacent teeth. Dentures are often chosen, as minor adjustments can be made very easily. Several adjustments may be needed until the implants are finally ready to be restored to carry teeth.

3. Will I need a bone graft?

Some people do not have enough bone in which to fit implants and so they need a bone graft to build up the area before implants can be fitted. The bone may be taken from various places, typically other areas of your mouth, or occasionally from your hip.

When large amounts of bone are required, grafts are usually carried out under a general anaesthetic. The grafts are left for three to six months to 'knit' together before the implants are fitted.

Even when there is enough bone to hold the implants, it is often necessary to build up the bone around the implants at the same time as they are fitted. A bone substitute and membrane can be a good way of doing this. The implant team will advise whether a bone graft is necessary once you have been fully assessed.

Increasing bone with bone substitutes (Bio-Oss and Bio-Gide)

Bio-Oss is a bone substitute or bone replacement material. It is bovine (cow) bone which has undergone special purification and sterilization procedures and has a structure very similar to human bone. It comes as small granules and is packed into the area lacking bone to be used as a scaffold to allow new bone to grow.

Bio-Gide is a membrane made of highly purified natural collagen, originally obtained from pigs. The Bio-Gide membrane is placed over the Bio-Oss bone substitute granules to help protect them and to allow the underlying bone to heal undisturbed.

What happens to the Bio-Oss and Bio-Gide?

Your own bone slowly grows into the Bio-Oss material. The Bio-Gide membrane is completely broken down by the body.

4. Fitting implants into the jaw bone

How many implants might I need?

Every case is different. The number of implants depends on a full assessment of your situation and a discussion about the treatment options. You will need to have moulds made and may require a special kind of scan (a Cone Beam CT Scan) to help show whether implants are possible and how many you might need.

If you are missing just one tooth then usually just one implant is needed. Larger spaces created by two, three or more missing teeth do not necessarily need one implant per missing tooth. Other factors are also important like the amount and quality of your jawbone in the areas where the implants are needed.

Is it uncomfortable?

Implants are usually put in place using local anaesthetic injections.

If the treatment is more complex, or if you are particularly anxious about having the implant surgery, the use of sedation may be suggested. You would be given a sedative through a vein in your arm or hand and would be monitored during the treatment. You would remain awake but would remember very little about the treatment. You would be given further detailed instructions if you have sedation.

General anaesthetic is only required for a small number of cases, for example when large numbers of implants are needed.

Depending on your case, the operation might take anything from 30 minutes for a single implant, to several hours for complicated or multiple implants.

Post-operative care

The surgery often involves exposing the bone in the area where the implant is to be fitted, so you can expect some swelling, bruising, and some discomfort. For most patients, the simple painkillers taken for a headache will be all that is needed for a few days.

Any stitches are usually removed a week later.

After the first few days you should report any unexpected levels of pain or swelling. If in doubt, always ask for advice.

You may be asked to take a course of antibiotics and to follow some simple procedures such as rinsing with an antiseptic mouth rinse. It is important that you carry out these instructions.

Please be aware that if you wear a denture to replace the missing teeth, you may be asked not to wear it for a week following the surgery. This will avoid pressing on the wound.

Even if the procedure is carried out using local anaesthetic, it is advisable to arrange for someone to take you home by car. If you have treatment using sedation, arranging someone to accompany you home is essential. Special instructions relating to sedation will be provided.

You may require up to a week off work or studies. Specific advice will be provided.

5. Do I need further surgical procedures?

Implants are often fitted underneath the gum and allowed to heal for a period of months. This allows the implant to 'knit' to the bone so it is very secure.

If implants are fitted underneath the gum, then a procedure will be required to uncover the implants and to attach temporary teeth or small metal pegs

to the implants that will emerge through the gum to allow for the gum to heal around the implants.

Occasionally gum grafts are also needed to add extra gum around the implants. This will make the gum thicker and stronger and easier to clean.

Any additional surgical procedures following implant fitting into the jaw bone are usually done using local anaesthetic injections.

6. Restoration of the implants

Once the implants are ready to carry teeth, you will have a number of appointments for the dentistry to build on the implants. This stage of treatment can take a few months (2-10 appointments).

It is important that you are able to complete this treatment without the need for intravenous sedation as you need to be fully alert to make important decisions about colour matching etc.

At this stage you may be referred to another dentist within Newcastle Dental Hospital for the restoration to be completed.

7. Lifelong maintenance

What can I do to help?

It is important to be in good general health when undergoing treatment with dental implants. Heavy drinking or smoking can increase the likelihood of problems during the initial healing, and in the long term can adversely affect the health of gum and bone surrounding each implant. It is very important to get rid of any decay or gum disease around natural teeth before starting treatment with implants.

During the implant treatment it is essential to maintain a good standard of oral hygiene and continue with your regular dental checks.

It is very important that you appreciate the commitment required for treatment with dental implants.

You must be available to attend Newcastle Dental Hospital for appointments during the planning and treatment stages. If you anticipate any difficulties with appointments, you should discuss these with the implant staff as soon as possible.

Once treatment is completed, we normally aim to discharge you from Newcastle Dental Hospital back to your regular dentist with advice about maintenance care. You will be expected to look after the implants just as if they were your own natural teeth. This means you will need regular dental check ups to monitor the health of your implants and mouth.

Newcastle Dental Hospital is a teaching hospital, so your treatment may be carried out by a trainee dentist or dental student under the supervision of a senior member of staff.

How do I look after the implants?

Implants need to be kept clean in the same way that you would look after your natural teeth. In some areas dental floss, mini-brushes and other cleaning aids will be needed to maintain good oral hygiene.

It is reasonable to expect some of the daily hygiene procedures to be a little more difficult than around your original teeth so expect to spend more time on them to maintain the implant.

How long will the implants last?

Although it is unusual, failure of implants can occur either early on during treatment or later when the implants have been in use for some time.

Once the implants and surrounding soft tissues are seen to be healthy and the new teeth comfortable and correctly adjusted, it is how you look after them and have checks that will influence how long they will last.

If poorly cared for, implants will develop a covering of deposits (calculus and plaque) which are very similar to that found on neglected natural teeth. These deposits can lead to gum infection, bleeding, soreness, general discomfort, and occasionally loss of implants.

Well looked after implants placed into adequate bone can be expected to last for many years. However, just as you would expect conventional crowns, bridges and fillings to need occasional repairs or replacements during their lifetime, your implant-supported teeth are likely to have similar requirements. In general, dentures that use implants to help them stay in place require more maintenance than fixed implant teeth.

If you are provided with a protective gum shield at the end of treatment it is very important that you continue to use it as instructed.

Will I have to pay for maintenance treatment?

It is important to understand that once you have been discharged from Newcastle Dental Hospital you are likely to need to pay for maintenance and repair work that is required because implant dentistry is not usually available under the NHS from regular dentists.

**If you have further questions or concerns, please contact:
Senior Implant Nurse 0191 282 5131 (Monday – Friday 9.00am - 1.00pm
or 2.00pm - 5.00pm)**

Further information

The Patient Advice and Liaison Service (PALS) can offer on-the-spot advice and information about the NHS. You can contact them on freephone 0800 032 02 02 or email northoftynepals@nhct.nhs.uk

Useful websites

If you would like further information about health conditions and treatment options, you may wish to have a look at the NHS Choices website at www.nhs.uk. On this website there is an information prescription generator www.nhs.uk/ips which brings together a wealth of approved patient information from the NHS and charity partners which you may find helpful

Information Produced by The Newcastle Dental Hospital dental
implant team January 2014
Review January 2017

Potts Print (UK)

NFH/3063

Introduction

The internet is now increasingly becoming a well-known readily accessible source of health information especially in developed countries. Given the speed with which the volume of information on the Internet, and access to it, have grown, people have become accustomed to looking on the internet for health related information for several reasons. Some of those are: to improve their knowledge on symptoms or diseases they are concerned about; to find out about a type of treatment; and also to search for health advice.

Since the beginning of last decade researchers in some medical disciplines have conducted exploratory and deep investigations into the impact of the Internet on patients' knowledge and experiences of disease and treatment. Examples have been published in Sweden and Canada (Josefsson and Hanseth, 2000; Chen and Siu, 2001) and recently in the USA a report was published on the growing role of social networking in communicating health information to patients (Aitken *et al.*, 2014). In the UK, the National Health Service NHS has long since developed several patient information websites and electronically accessible leaflets, which aim to present accurate health information on medicine and dentistry, about disease and management, in a way that the public can understand. For example, one of those is 'NHS Choices' in England and another is 'NHS Inform' in Scotland. However there is a lack of information about the use of those resources and their influence on patients.

In addition, it is easy to lose sight of the more trusted websites, like those provided by the NHS or other formal health commissioners, due to the notable current exponential growth in the use of the internet, social media, and smartphones apps by patients. For instance, in the USA, a high percentage of online health seekers (77%) begin their search for information through well-known search engines like Google, Bing or Yahoo (Aitken *et al.*, 2014) with the use of lay terms that could result in a wide range of webpages. It could be proposed that the same attitude exists in the UK.

The availability of information on particular treatment might be even wider when it involves expensive cosmetic or rehabilitation types of medical treatment, specifically dental care. For example, dental implant dentistry involves aesthetical and functional measures. Additionally several industries are competing in the implant dentistry market. Nevertheless, no published work has clarified how information on dental implant treatment is displayed on the Internet and furthermore there is a lack of research on the

impact of using sources on the Internet in general with regard to patients' experiences of dental implant treatment.

Aims

This preliminary report is intended to look specifically at how the search engine *Google* displays pages related to dental implant treatment and explore how information on dental implants is presented on the first webpages based on their providers.

Methods

A quick search on the search engine 'google.co.uk' was conducted on 1st October 2015, and updated on March 2016. This was done using the lay terms *dental implant* and *implant restoration*. The search result considered the first five webpages in a raw display from the first *click* using the two phrases separately.

This was followed by categorising those webpages from their web addresses into commercial (profitable) and public funded (non-profitable) webpages. A preliminary comparison of how information on dental implants was displayed on two of those webpages (i.e. one profitable and another non-profitable) from first sight was conducted qualitatively.

Findings

The first five webpages displayed after the first search using the term '*dental implant*' were investigated. The first three were profitable webpages followed by –Implants - British Dental Health Foundation (non-profitable). The fifth was a combination of dental providers' practice websites.

The second search with the term '*dental restoration*' derived four top profitable webpages with the fifth exclusively displayed as a video from YouTube.

I will now move on to a brief analysis of how the information was displayed on the websites based on their type. The first commercial website was chosen from the first search presented in Google as [Dental Implants - 0% APR - evodental.com](#) (Wpage1). The first non-profitable (the fourth in the list of the first click search) was presented as [Implants - British Dental Health Foundation](#) (Wpage 2). A brief comparison of the first sight information is provided in Table 1.

| | | |
|--|--------|--------|
| | Wpage1 | Wpage2 |
|--|--------|--------|

| | | |
|------------------------|--|--|
| Illustration | <ul style="list-style-type: none"> • labelled as <i>'Multiple & Full Jaw Dental Implants'</i> • Video only, at the top and readily available • Displayed into first sight • It is content has invitation to make appointment | <ul style="list-style-type: none"> • Labelled as <i>'Cosmetic Dentistry > Implants'</i> • Pictures however video available on link. • The video illustrate the placement procedures with no verbal signposting |
| Display of Information | <ul style="list-style-type: none"> • As text of information • based mainly on advantages • advantages are highlighted in bold <p>Misleading information in term of</p> <ul style="list-style-type: none"> • duration of treatment for example • one day single visit • last a lifetime • improvement in patients' overall health • One day can change your life! • No information of disadvantages, contraindications, limitations, or cleaning and management requirements • advertisement for free consultation at the top of the page | <ul style="list-style-type: none"> • As questions and answers • Covers most of the treatment journey (before, during and after) • Information based on both advantages and limitation • For example regarding longevity it is written as <i>'much like natural teeth, will last for as long as you care for them.'</i> • No advertisement on providers or practices • Referring patients to their dentists for more personal information |
| Conclusion | It could be argued that information are Imprecise and inaccurately advertised | Information was mainly displayed with caution languages and precise |

Conclusion

This brief report has only touched upon the possible questions of what sort of webpages and information are easily available to patients on the Internet. Given the fact that people use Google as their primary search engine and they may look at the first click first search, it can be summarised that commercial and profitable webpages are prioritised in the display of the webpages. Furthermore, information on those websites might be based on the concept of selling products and advertisements rather than educating patients or improving their understanding.

The impact of the Internet on healthcare and particularly dentistry is yet to be fully understood. The Internet allows people to research symptoms, medications, practices and possible treatments for their illness and this usually involves commercial and profitable providers' webpages. So it could be argued that patients' knowledge might be biased. In addition, with the recent increase in social networking and sharing information about healthcare and treatment, this could be increased.

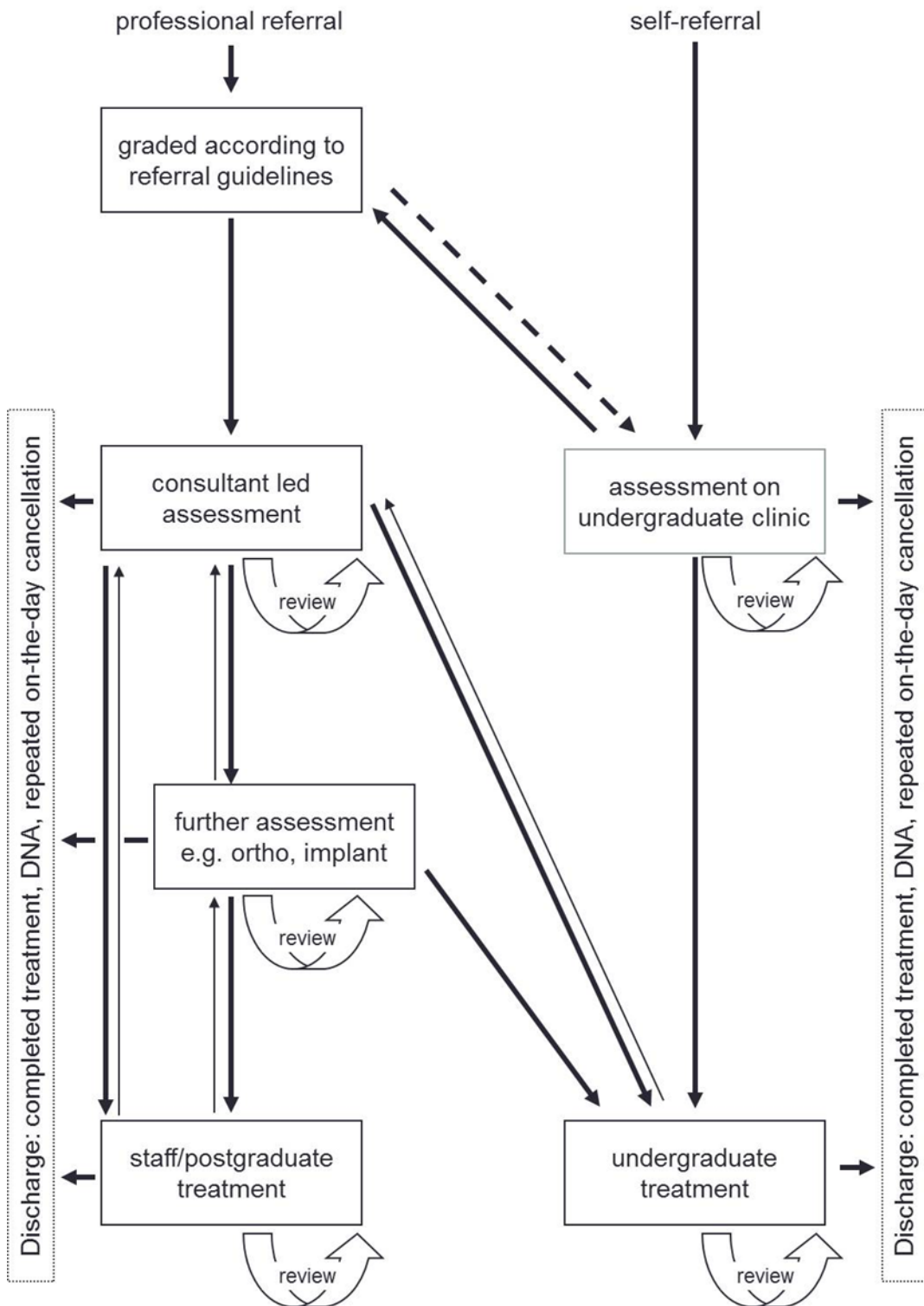
Therefore, a further investigation needs to be conducted to assess the real impact of the readily available information on the Internet, not only with regard to how patients may think but also with regard to what they expect from healthcare in medicine and dentistry. Until this can be done patients might be advised to access specific websites that are trusted by clinicians and have no profitable background.

Links of search

https://www.google.co.uk/?gfe_rd=cr&ei=QUMNVrnVFqTj8wexmpuIDw&gws_rd=ssl#q=dental+implant+

https://www.google.co.uk/?gfe_rd=cr&ei=hUMNVt6GC3H8geC74yoDQ&gws_rd=ssl#q=implant+restoration

Patient pathways- Newcastle Dental Hospital and School



CLINICAL ORAL IMPLANTS RESEARCH

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Patients' perceptions of implant placement surgery, the post-surgical healing and the transitional implant prostheses: a qualitative study

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Key words: conscious sedation, fixed transitional prosthesis, implant healing, implant surgery, overdenture, transitional implant-supported/retained prosthesis

Abstract

Objectives: This study aimed to explore patients' thoughts, feelings about, and experiences of, implant placement surgery (IPS), the post-surgical healing stage and the immediate post-surgical transitional implant prosthesis (TIP) (fixed and removable).

Methods: A qualitative study design was chosen and 38 semi-structured telephone and face-to-face interviews were conducted with 34 patients at different stages of implant treatment. The interviews were transcribed verbatim; the data collection and coding process followed the principles of thematic analysis, which was facilitated through the use of NVivo10.

Results: Patients anticipated that surgery would be painful and unpleasant but were prepared to accept this temporary discomfort for the expected benefits of implant treatment. However, a key finding was that patients felt they had overestimated the trauma of surgery but underestimated the discomfort and difficulties of the healing phase. A number of difficulties were also identified with the TIP phase following implant surgery.

Conclusion: Existing research has tended to focus on the longer term benefits of dental implant treatment. This qualitative study has investigated in-depth patients' perceptions of dental implant surgery, including their experiences related to sedation, and of transitional implant restoration. While patients felt their concerns were overestimated in relation to the implant surgery, they experienced greater morbidity than they expected in the healing phase. Recommendations are made for relatively small changes in care provision which might improve the overall patient experience. Partial dentate patients treated with a fixed transitional prosthesis experienced advantages more quickly than patients with an overdenture.

Replacement of teeth by means of dental implant has a strong evidence base with survival rates of 94.6% over a two decade follow-up period (Moraschini et al. 2015). As a result, this type of restoration continues to develop popularity amongst patients (Wang et al. 2015) and clinicians (Vasak et al. 2007). Outcomes from dental implant treatment in research settings have been good; nevertheless, the widespread take-up of dental implant treatments has been accompanied by an increasing number of complaints, mainly relating to dissatisfaction with treatment outcomes (RCS 2014). Therefore, whilst predictability of outcome is important, patient's experiences of the process are also important, to identify the aspects of care that are problematic and could be improved. A recent review demonstrated that previous qualitative

research of patient "implant experience" is based mainly on retrospective accounts of participants either at the end of their implant treatment or after a period of using implant-retained restoration with the main focus being the implant restoration outcomes (Kashbour et al. 2015). There has been little focus on patients' thoughts about, and experiences of, the surgical aspects of the implant placement stage (Kashbour et al. 2015). In contrast, previous quantitative research, which reports patient-based outcomes in relation to implant placement surgery (IPS), has investigated several aspects of surgical discomfort, pain and anxiety related to the procedures and their consequences, with some conflicting results (Eli et al. 2003; Hashem et al. 2006; González-Lemonnier et al. 2010; Fardal & McCulloch 2011; Hof et al. 2012; Weisensee et al. 2012;

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Bryce et al. 2014; Gómez-de Diego et al. 2014; Seferli et al. 2014). Several studies have recognised the need to explore patients' experiences of implant surgery (Grey et al. 2013; Seferli et al. 2014; Kashbour et al. 2015), as it is argued that the necessity of surgery for implant placement may influence patient decision to proceed with dental implant treatment (DIT) and the subsequent outcomes (González-Lemonnier et al. 2010). This study aimed to explore patients' thoughts, feelings about, and experiences of, surgical implant placement, the post-surgical healing stage and the immediate post-surgical transitional implant prosthesis (TIP; fixed and removable).

Qualitative research was chosen to conduct this study to enable patients to raise aspects of their experience that may not have been apparent to the researchers and with the aim of understanding the meaning patients attribute to their experiences of treatment. Patients' perspectives may influence treatment effectiveness, patients' ability to cope with difficulties and value outcomes. Therefore, findings from this study can serve as data that would help clinicians to identify the obstacles and, in turn, find resolutions to issues related to patients care and management (Green & Thorogood 2009).

Methods

The study employed qualitative methods to obtain an in-depth understanding of patients' perceptions particularly with regard to the implant placement surgery phase of DIT.

The study received a favourable ethical opinion from the UK Health and Research Authority, NRES Committee London, Stanmore Ethics Committee (13/LO/0765). Written informed consent was obtained from all participants.

In the UK, DIT is provided free of charge in NHS secondary dental care for a limited number of patients with particular dental conditions as described by clinical guidelines (Alani et al. 2012). In such cases, treatment would be undertaken by consultants with involvement of clinical trainees and students in some stages of the treatment. Potential participants for this study were recruited from a pool of patients treated at Newcastle Dental Hospital. The participants were recruited according to the following criteria; 18 years of age or above, either gender, partially dentate or edentulous, at any stage in the implant treatment pathway and able to speak the English language. Sampling was purposive, aiming not to represent the

general population, but to select participants who had experienced the situation under investigation and could provide insight into the research questions. For this study, we intended to include participants of different ages and gender, at different stages of implant treatment and with different degrees of tooth loss. Patients' characteristics were monitored throughout recruitment according to these criteria and the point of data saturation. For example, towards the end of data collection, we actively sought out additional patients who had experienced less favourable outcomes. Patients were interviewed during one of three phases of implant provision: phase I being the pre-surgical phase, phase II being the period starting from IPS and ending after the placement of the immediate implant restoration and phase III being identified as starting with the placement of the final implant-retained restoration.

In-depth semi-structured interviews were conducted face-to-face or by telephone. The interviews were conducted between October 2013 and September 2015 and were all undertaken by the same researcher (WAK). A topic guide was used, which was modified iteratively throughout the study and after every interview, in accordance with the emergent themes.

Particular attention was taken to ensure a positive interaction during telephone interviews (Block & Erskine 2012; Irvine et al. 2013). Steps taken included initial face-to-face contact with the potential interviewees prior to recruitment, facilitating the most suitable time for the participants, and following an active listening technique and communication with the patient during the interview through the use of "receipt token" (Irvine et al. 2013) to indicate to the patients that what they were saying was understood and clear.

A thematic analysis approach, as described by several authors in the literature, was adopted in this research (Braun & Clarke 2006; Pope et al. 2007; Nicholls 2009; Rapley 2011). Briefly, thematic analysis is a method of identifying and reporting trends (themes) within qualitative data. A theme (a code) is a text, or chunk from the data itself, which captures an important meaning or pattern in relation to the research questions. A theme consists of several subthemes (subcodes) that are related to the main topic of that theme. Themes are used to facilitate the reporting of the findings and for interpreting various aspects of the research questions (Braun & Clarke 2006). As interviews and inductive thematic analysis progressed, a coding frame was developed, adjusted and explored with patients in subsequent interviews. This

continued until data saturation was achieved.

The data were approached through the traditional means of reading, hand highlighting and extracting codes by the first author (WAK), and this was then followed by the use of qualitative analysis software (NVivo 10). The wider research team included a social scientist (NR) in addition to two further clinical researchers (JMT; JSE); all were involved throughout the analysis process, including reading of transcripts, development of coding frame and identification of key categories in the analysis.

Unlike quantitative research where sensitivity, reliability, bias and validity can be measured and controlled, the quality of qualitative research depends mostly on transparency of the research conduct and reports. Several tools and criteria have been developed to help in optimising, criticising and improving the quality of qualitative research (Pope et al. 2000; Dixon-Woods et al. 2004; Kuper et al. 2008; Green & Thorogood 2009). Due to their simplicity and clarity, the criteria developed by Dixon-Woods et al. (2004) were continuously used to monitor the quality of this study.

Data and results

Seventy-five ($n = 75$) patients were invited to take part in the study of which 34 consented to participate (45%). Thirty-eight interviews were conducted with those 34 patients as four patients were interviewed twice at different treatment stages. Approximately half of the patients were edentulous; 19 were women and 15 were men. The age range was 19–76 years with half of the sample being under the age of 40. The study participants are compared with all approached participants in Table 1. The duration of face-to-face and telephone interviews was similar; overall, they varied from 20 min to 42 min. In the data presented, we have selected a pseudonym for each participant. Quotes are also annotated with the participant's age, their

Table 1. The study participants compared with all approached participants

| Variable | Approached | Study participants |
|----------------------|------------|--------------------|
| Gender | | |
| Female (F) | 40 | 21 |
| Male (M) | 35 | 13 |
| Age | | |
| < 40 | 45 | 16 |
| > 40 | 30 | 18 |
| Extent of tooth loss | | |
| Partial dentate | 40 | 13 |
| Edentulous | 35 | 21 |

current phase of treatment at the time of the interview (I, II and III) and planned type of implant-retained restoration (overdenture (OD), fixed bridge (FB) or crown (Cr)). The initial overarching emergent themes of the study are given in Table 2.

Patients' anticipations of implant placement surgery: anxiety and thoughts of pain

Patient had implants placed under local anaesthesia and more than two-thirds of this study's participants chose to be sedated during the implant surgery. The implants were placed using a two stage and delayed implant loading technique (Misch 2007). In relation to patients' experiences of IPS, patients identified that they had overestimated the amount of pain they would experience during surgery which in turn resulted in them being anxious about the IPS. Nonetheless, they reported having not been very interested in obtaining in-depth information about the surgery until the point where a decision had been made to proceed with implant provision. This avoidance of obtaining information about the surgery was seemingly an attempt to avoid further anxiety and fear of surgery. Patients also sometimes related this to the trust they had in their clinicians.

I was scared at the beginning, I really was not interested in knowing more about the surgery beforehand.

Liam, 32, II, Cr

I didn't want to know about surgery, what happened and how the implants came about to eventually go into your mouth, may be because I trusted in them 100%. I could put my complete trust in them [clinicians].

Andrea I, 75, III, OD

The majority of the patients anticipated that whilst there would be pain associated with the surgery that this could be tolerated

in order to achieve the goal of the treatment and thus put an end to their oral & dental challenges. These patients mainly focused on the pain and discomfort during the surgical procedures, as being short term in nature.

If I have to go through some pain, I'll go through any pain whatsoever, right, to have, to be normal again, it doesn't frighten me the pain and surgery, and that, it's a means to an end.

Sandra, 55, I, OD

I just think to myself, "This is something you have to go through". I know it's painful but, it'll be worth it.

Martha, 27, I, OD

Obviously it's a little bit of pain and a little bit of suffering for a great operation and the chance of having permanent teeth.

George, 28, II, FB

It has been reported in the literature that the acceptance of pain and the consequences of implant surgery can be associated with patients who reported less satisfaction with conventional dentures and who show high motivation regarding the provision of dental implants (Hof et al. 2012). This is echoed in the views of study participants.

I haven't thought about the surgery, to be honest. It's just one of those, I've always thought I don't want a denture because it is, it's spoiling the roof of my mouth and I'll do anything to get rid of it, even going through pain, at this age I realise I'd rather have a healthy mouth.

Diana, 33, I, FB

I'm not really concerned about the pain or the difficulty in terms of actually getting these implants in there. I would just like them in there. Well no, the surgery and the pain weren't my concerns. My

concerns are that they won't do it. "If there is a risk..." and I'm quite happy to accept that there is a risk.

Mark, 68, I, FB

Concerns relating to the post-surgical consequences and the healing stage were disclosed on several occasions. Some of these related to anxiety about the success of the surgery.

I'm not really like bothered about the surgery and stuff, if I could get implants but I think it would be like the afterwards, of healing, and thinking, "Is it ok- has it gone okay?" What's the next step Staying without denture, you might so is, is this a big thing that you need to think about.

Christine, 23, I, FB

The possibility of acquiring infection after the surgery was considered as one of the ultimate risks that might necessitate management; however, whilst patients recognised that infection was a possible consequence of surgery, they anticipated being able to overcome this. Patients indicated that their knowledge of the possible surgical implications would not deter them from accepting implant therapy if offered.

Infections are my main concern, which is a major risk with any type of surgery or anything like that, which I'm well aware of. I'd hate it if I did get an infection but I mean if I got one, we just deal with it. Whatever problem arises, you just deal with that problem and move on to the next.

Sandra, 55, I, OD

The surgery doesn't frighten me. I'm not saying I won't be nervous, but I do accept it is something I need to deal with. So for example it is possible to end up with infection afterward but everything could be managed isn't it?

Meya, 21, I, Cr

Once, a decision to provide implants had been reached patients felt more interested in obtaining more information about the IPS.

But after they had made the decision and then decided to go ahead, yes I wanted to know more about it [the surgery].

Dennis, 20, III, FB

When I got referred to the implant clinic, I was interested to have more idea about the whole thing I mean the surgery.

James, 23, II, FB

Patients believed that they had reliable and adequate knowledge regarding the technical

Table 2. Themes related to patients experiences of stage II implant treatment IPS (implant placement surgery)

| Aspect of treatment | Themes |
|-------------------------------------|---|
| Surgical implant placement | <ul style="list-style-type: none"> Overestimating the difficulties and the trauma of the surgery Being sedated |
| The healing | <ul style="list-style-type: none"> Underestimating the morbidity of the healing stage Impact of IPS on patients' daily activities Support after IPS Being without teeth Oral hygiene |
| The transitional implant prostheses | <ul style="list-style-type: none"> The fixed restoration Overdenture |

aspects and the stages of the implant placement procedure. After discussion with the clinician and receiving detailed information related to the IPS, patients felt that they were sufficiently prepared for stage II of DIT.

I feel I got all the information, they were like, "This is what's going to happen, this is what's going to happen next, it may take couple of hour, you may feel some pressure and so on

Georgia, 20, II, FB

I definitely got the right information. They were telling me exactly what I'm going to go through during the surgery, how's it going to be, I feel so I was ready for it

Helen, 48, II, OD

The real surgical experiences: "Overestimating the implant placement surgery unpleasantness"

After implant surgery, patients felt that although they had been well informed and were well prepared for the pain, their anticipation of the difficulties of the surgery and the severity of the pain during the implant surgical procedures were excessive. Patients ascribed their positive experience of the IPS to the skill of the clinicians and the effect of the anaesthesia and sedation.

Oh, I think I overestimated the surgery. Definitely a lot easier than what you would think it was, plus, I mean, I was knocked out. The sedation, yes, and it was really good.

James, 23, II, FB

The surgery was fine I was a complete wimp, I'm not brave at all. So it went very well no pain at all, during the surgery they were very kind, and supportive everything went well I was surprised actually. But I could hear them doing things and I could not believe when they finished. I thought it is more painful than extraction for example but it wasn't.

Helen, 48, II, OD

For some participants who had two IPSs, they identified that the positive experiences of the first implant surgery helped them to be less anxious and well prepared in the second surgery.

Really good, I thought it would have been a lot worse, the first time, I didn't know what to expect. The second time, I had a bit more idea, a better idea, and I wasn't frightened. The first time I was obviously

a bit anxious and worried and frightened, but then everything went smoothly.

Georgia, 20, II, FB

Both surgeries went very well, I was feeling better at the second one, the people that are doing it for you are very helpful, understanding, and they're doing their best. "So I'm grateful.

Andrea, 75, III, OD

Being sedated

Patients, who chose to be sedated ($n = 26$) considered this beneficial and recognised advantages. They felt sedation helped them to overcome their anxiety and fear of surgical difficulties and also to manage the duration that the surgery lasted.

It was fun I was just asleep, just, it was great because first time I've had that. I think sedation is necessary for many people, unless if it's bad for some, I know there are sort of health risks

Lawrence, 19, II, Cr

I had sedation, just in the back of the hand; it wasn't like a [general] anaesthetic. I'm not sure what it was, what they use, but it was great; I loved it. It was a good time, I can't really remember the surgery itself, which is great, no pain, no trouble. But I was very relaxed it went actually very quickly.

Dennis, 20, III, FB

Despite the requirement for an additional injection in the hand and being conscious and aware of some of the procedures, the majority of the patients highlighted that they would recommend sedation for others if they were asked.

I would recommend it, I would say there's multiple injections, for sedation, it's kind of, you've got to compromise kind of thing, because the injections, they're really painful but it sort of only lasts really five-seconds.

William, 20, III, FB

Well I had, it wasn't total anaesthesia, but there was some medication given in my hand it was a bit painful but I was conscious throughout the procedure, not feeling anything, it was great, but you can still hear I wasn't really asleep, you can hear them,

Lawrence, 19, II, Cr

One negative experience related to sedation was repeatedly highlighted by the patients.

This was regarding the protective surgical "drape" placed over their faces to maintain optimal infection control during surgery. This caused distress for some patients.¹

I was sedated. I didn't like the fact that they tried to completely wrap you up so that your face is covered. I didn't like that at all, but the doctor was nice, understanding, and he basically just allowed me to have my head wrapped up, but my eyes were uncovered; I just had the glasses on. Then I was absolutely fine, I was perfectly alright with that.

Joy, 45, II, FB

First they tried to cover my face I did not like it. I, personally, have "claustrophobia" and in fact I do have it quite badly. I just didn't like the feeling of feeling like I was trapped; I think that was probably my feeling at that time.

Lora, 65, II, OD

A number of patients chose to avoid sedation. They preferred to be fully conscious, experience the procedure and be aware of the details of the surgery.

I didn't get sedation so – because I did not want to sleep so I kind of hear everything that was happening, the experience was good, cause it kind of gave me awareness of what it was going on, I had no pain in that sense it was quite my choice to be awake.

David, 22, III, Cr

Only one patient indicated that they had experienced discomfort during the surgery, which was related to trainees' students learning about implant surgical placement.

I didn't get sedation so – I wanted to know what was going on, and it was okay the surgery was okay. It was not painful as I thought, but it was sometime uncomfortable not because of the pain I was a little bit aware of the fact that there is students there and then you could hear things, feel things like, not going quite, quite right, and I think there was a few times when [clinical supervisor] had to take over,

James, 23, II, FB

The healing stages: underestimating the morbidity of IPS

After surgery, many patients realised that they had underestimated the morbidity of

¹Patient's face might be partially covered with sterile sheets while sedated and during the procedures as part of patients protection and infection control

post-surgical healing period in several ways, the severity of the pain after the surgery, the discomfort related to the wound (i.e. bleeding and sutures) and the change in their face shape because of bruising and/or swelling. For all of the participants who experienced the surgery, the post-surgical symptoms or difficulties lasted between a few days and two weeks. None of the patients involved in the current study sample reported post-operative symptoms that lasted for more than two weeks.

I expected it to be painful having it done, but as it turned out it was a lot more painful afterwards.

Nichol, 64, II, OD

I really quite underestimated the surgery. I didn't know what to expect straight after the surgery. When the injections, were wearing off I could feel quite a lot of pain on my face and on the jawbone, it was too bad, and quite painful. My face came up quite a lot with bruising. I had a big black eye for three or four days I did suffer I didn't get told and. I didn't expect my face to come up so much,

George, 28, II, FB

I didn't feel anything during the procedures, but I was very panicked, three, four days after, when I was still waking up with blood on my pillow and whatnot. I didn't know if that was normal or if it wasn't which made things more difficult.

James, 23, II, FB

I couldn't believe the pain about an hour later. I, it was very, very extreme in the jaw bone, you know. I called into [pharmacist] for some painkillers and they didn't work anyway. But eventually it, it settled down and, and my implants have been very successful.

Deborah, 72, III, OD

Two main factors appeared to account for patients' underestimation of the healing stages. Firstly, patients felt that their own interest before the surgery had focused on the surgery itself and they had disregarded the details of the healing period. Secondly, patients claimed that the clinical information had mainly focused on the surgical procedures and there was less detailed information given regarding the severity of symptoms during the healing period. They perceived that they were well prepared for the surgical procedures in terms of the information and

knowledge provided; however, this was less so for the post-surgical time.

I would have said that I was fairly well prepared for it [the surgery], really. But what it was really a shock is the swelling and the pain afterward really I was suffering. they said you may feel pain after and sorts of um explained but I felt that was not given in detail.

Joy, 45, II, FB

I wanted to make sure it was going to be worthwhile [the surgery], so that's why I checked it all out with them. But I was sorts of focusing on the surgery itself.

George, 28, II, FB

Support after surgery

Patients thought that their experiences during the healing stage could have been improved by obtaining a better understanding related to the immediate post-surgical time. They also suggested that access to assistance and advice after IPS, particularly in the first few days, would help in resolving some of their apprehensions, particularly when medication failed to work properly. Patients identified different ways in which support could be provided. There was a strong suggestion that communication with clinical personnel, for example the clinic's nurse, would be the best way of providing reassurance. Evidence from previous research (Exley et al. 2009) suggests that such interaction is common in UK private dental implant care but is currently not routine in NHS dental implant care.

Support should be given after the surgery, for example by a nurse call or any one should call the patient - just to make sure everything is fine? Just to make sure there are no abnormalities, because I wouldn't ring up to say, "I've got a black eye after the surgery, is that fairly normal?" Maybe just a quick phone call to see the effects it's had on the patient and just a nice little step just to make sure they're okay and they're coping with it.

Georgia, 20, II, FB

It's not easy to get back in contact with people when they've done something in this hospital they are so busy. So if they provided a phone number to call for example if patient had doubts or anything or a phone call from a nurse or the department or the same clinic so I guess that might be very helpful.

Nichol, 64, II, OD

Being without teeth during the healing time

Patients indicated that they were fully aware that they may need to be without restoration for a period of time. They accurately perceived the purpose of avoiding restoration during the healing period (complete or partial denture wearers). Knowing this in advance helped them to make their personal arrangements in relation to jobs and studying during the healing time. However, being without restorations had several impacts on the patients' social wellbeing, as well as their ability to eat and socialise.

The days after surgery I didn't have the denture while I was healing, but after that I got better at it. It was not easy. They told me, beforehand I sort of knew, so I was prepared. I don't think left the room for about four days. I was without teeth & I was in quite a bit of pain.

James, 23, II, FB

I think for one week I could not wear my dentures after the surgery and I told my friends and family don't come to see me I could not face people without my teeth may be that my just pride, also I can't eat I was eating only soft and soup

Linda, 74, III, OD

After the healing some patients realised that even when they were able to wear their dentures, the fit of the previous denture was impaired because of the surgery. This unexpectedly prolonged the time that they had to be without teeth and additionally compromised some aspects of their lives.

I didn't have anything in for at least two weeks after the surgery. Then after the surgery because it didn't fit properly, when I went back for my check-up, a clinician altered the plate so that it was suitable for me to wear it.

Joy, 45, II, FB

For people who might have to be out and about or still go to work after couple of weeks or so, just to know that you can't wear your denture straight after treatment for duration of time because they won't fit until they adjust it.

Helen, 48, OD

Oral hygiene during healing week

In spite of the high awareness of the importance of oral hygiene amongst the partially dentate participants during the healing stage, patients were confused about how that could be best undertaken, particularly during the days immediately after the

surgery. This was because of 1) the presence of the stitches, 2) the fear of pain and bleeding and 3) the fear of compromising the healing of the wound.

I was worried about the stitches, it may fail. Couple of days later, it was, hard to brush, my teeth.

George, 28, II, FB

I thought "Is it better to brush" or I mean just "rinse" I have to keep it clean I remember he said that but I was not too sure How? Because it was painful, look "all this area was painful" [patient pointed at his front teeth].

Liam, 32, Cr

For edentulous patients, maintenance of oral health was of less concern. Most of them stated that they avoided wearing dentures and they used water or mouthwash to rinse their mouths. After they started to wearing their dentures, they identified that they continued using their normal daily routine of cleaning the dentures.

I just used water, wash and rinse my mouth, with, there was some bleeding but only couple of days, When I started wearing them I had to take them out and wash them basically

Helen, 48, II, OD

TIP² is often implant-supported and implant-retained restoration that can be used to restore dentition during the healing phase of DIT. This phase might vary in length from four months to more than a year if bone grafts are performed followed by implant placement (Misch 2007). The complete and partially dentate participants had different accounts of their TIP in accordance to the type of the restoration, fixed or removable (i.e. overdenture).

The fixed transitional implant prosthesis "appearance and strength"

After receiving implant supported fixed prosthesis, patients began experiencing the implant treatment outcomes they had anticipated and observed some advantages of the transitional restoration. Following a short period of use, patients felt the fixed implant restoration delivered a normal appearance. However, they still perceived them as unnatural in texture. Occasionally, they recognised

²The transitional, provisional, interim, immediate or temporary implants crowns, prosthesis, overdenture or restoration are all synonymous of fixed and removable Transitional Implant Prosthesis Misch (2007) Contemporary implant dentistry: Elsevier Health Sciences.

that they needed a period of time to adapt to the new restoration.

At first, when I do it with my tongue, the back of it, it felt a bit different, bumpy but I suppose it just took a bit of time getting used to it. Now after some days, when I look, it just looks normal, really. It's okay with the appearance, what they've done is really good.

Lawrence, 19, II, Cr

Obviously, it wasn't like the final material; There was quite a large lump at the back, where it was attached to the metal the implant it was, the colour they tried to match the colour. But it was quite white. It looked normal though

Dennis, 20, III, FB

Some patients, who proceeded to advanced stages of implant final restoration, identified that they favoured the appearance of the TIP, which was constructed as individual crowns and this provided a natural look rather than the connected crowns the final restoration.

I don't really know the full purpose of the temporary crowns, but they look good, they look better than these ones [patient has final restoration as x-unit bridge]. I think I'm not really sure what was that for, because I had, I had gap teeth in the past because when I got the temporaries everyone was like, "Wow, those, those look good, are those your final teeth?" I thought they were my final teeth, but they're not the temporaries sort of fit really nicely, they were separate.

William, 20, III, FB

In terms of function, patients were hesitant to eat normally with the fixed TIP. They perceived them as fragile after experiencing some of the limitations of the temporary material such as fractures and cracking. Patients indicated that they had restricted their food selection and they mainly chose soft food.

One of the crowns came off, about two minutes later [after the appointment]. So I then got that fixed again by one of the clinicians, and then that afternoon it fractured, so then I Superglued it and I just kept on going with the Superglue for, like, four weeks. That was the worst part.

James, 23, II, FB

I've cracked one of my crowns. The temporary when I was eating so I felt they were a bit weak.

Georgia, 20, II, FB

The overdentures "they are still moving about"

After experiencing the overdenture (which is supported by two implants), unlike patients with a fixed implant restoration, complete denture wearers had no particular comments relating to the appearance, as they pointed out that they continued using the same dentures made before the IPS. However, their initial main experiences were related to the stability of the denture and the ability to function with them. Patients continued having difficulties with denture stability and retention while eating and speaking despite anticipating that these would be eliminated after having the final overdentures

I'm still wearing my old dentures. After a week, a week and a half but I just I'm not comfortable with them at all, still getting food underneath and could not eat

Smith, 70, II, OD

I don't know if the implant has done anything honestly, it's just my gums, I think they've shrunk a little bit more. The plate seems a little bit bigger now, it's the bottom one. If I stick it [patient is using denture fixatives] in it's a bit more comfortable,

Helen, 48, II, OD

In addition, those patients felt that there was no immediate improvement in the denture stability after the involvement of the implant [by the use of short term denture soft lining material].

I can't really say until I get my new dentures, but this is not helping me I'm not able to eat now things that I could never chew certain foods,

Lora, 65, II, OD

It hurts my gums, because the denture I've got keeps moving about, you know? So it is slack, because my gum has shrunk, when I try to eat it keeps moving about.

Nichol, 64, II, OD

An implant doesn't improve anything. Well I thought, after implant "Oh, well I'll be able to eat, and chew on a bit of steak or something", but I can't do that. So let's wait for the next one.

Smith, 70, II, OD

Given the fact that those patients had high expectations of the dental implant restoration, some of the edentulous patients at this stage considered that having only two implants might not be sufficient to deliver denture stability.

I mean, now, the plates, they still move about, where if you've got six teeth, [implants] to hold them in this shouldn't happen but they are only two you know. So I'll find out eventually won't I, when I get sorted out

Helen, 48, II, OD

Discussion

Existing studies concerning patients' experiences of implant surgery focus mainly on the relationship between patients' anxiety and the perception of pain during or following the IPS and/or patients' satisfaction with the treatment outcomes (Hashem et al. 2006; Eli et al. 2007; González-Lemonnier et al. 2010; Fardal & McCulloch 2011; Weisensee et al. 2012; Gómez-de Diego et al. 2014; Seferli et al. 2014).

The current study aimed to explore further patients' experiences of IPS. The results showed that the majority of the patients felt that they had overestimated the unpleasantness of IPS. Patients perceived that they were well informed about the procedures and with their commitment to implants, trust in the implant clinicians and the positive sedation experiences, their encounters of the surgery were favourable compared to their earlier expectations. These findings contrast with the findings of earlier study, which found that patients described experiences of discomfort during surgery when it was conducted by students (Seferli et al. 2014).

By contrast, despite being informed about the consequences of the IPS, patients underestimated the morbidity of the healing stage (e.g. the severity of the pain and/or the extension of the swelling). This finding is consistent with the earlier research, in which the majority of the patients described the early post-implant surgery time as "painful" and that was associated with other healing symptoms, such as fever, swelling and bruising (Seferli et al. 2014). In addition, there was some uncertainty about how to maintain oral hygiene during the healing phase, with concerns that oral hygiene practices may be painful, cause bleeding and/or interfere with healing process.

Our research provides several possible explanations for the patients' favourable experiences during the implant surgery. Firstly, patients appeared strongly motivated with regard to DIT and therefore accept the relationship between the surgery and pain as

a necessary step towards a valued outcome, when patients hold high expectations of DIT may often more readily accept the "morbid-ity" of the procedures (Hof et al. 2012).

Secondly, participants were satisfied about their understanding of the surgical procedures and felt that they were well informed by their clinicians. Linked with the literature, it is argued that the provision of well-informed pre-surgical information can minimise anxiety-related pain during the implant procedures and unlike patients with a low anxiety level, patients with a high level of anxiety may report more discomfort during surgical procedures (Fardal & McCulloch 2011). Anxiety and anticipation of pain may be also associated with patients' refusal of DIT (Ellis et al. 2011). Lastly, the positive patients experiences of sedation improved patients perception of the surgery by lessening their anxiety and minimising their perception of the surgery duration, which, when elongated, may adversely impact on patients' experiences (Seferli et al. 2014). Nevertheless, the need to cover patient face with surgical drapes was perceived as disconcerting. From a clinician's point of view in relation to sedation and implant surgery, it is argued that patient sedation can contribute positively to the ability of the implant clinician to perform the surgery efficiently (González-Lemonnier et al. 2010).

Moving on to the healing stage, it is generally accepted that the majority of patients will experience pain and feel mild-to-moderate post-operative symptoms that interfere, to some extent, with their daily activities following implant placement surgery (Hashem et al. 2006; Bryce et al. 2014). The severity of post-surgical pain is, however, subjective. It can be related to other factors such as the complexity of the surgical procedure, for example when it involves a bone grafting technique (Hof et al. 2012), and also patient demographic characteristics such as age, sex and socioeconomic status.

In addition, from the current data, it could be proposed that the reason for the patients' less favourable experience of the post-surgical healing phase was that patients were distracted by thoughts of the surgery at the time of the information provision. Previous research suggests that patients may fail to recall information given during consent procedures, suggesting that they may not be wholly receptive to all information prior to surgery (Eli et al. 2007). To overcome this issue, it is suggested that good and targeted information should be delivered early on during the treatment planning and repeated at

different occasions (Pommer et al. 2011; Narby et al. 2012) and delivering efficient information by introducing a checklist of advice based on patients' need for information (Seferli et al. 2014).

Surgery morbidity and the inability to wear provisional restoration result in some limitations to daily activities (Bryce et al. 2014) even though this study patient considered that this was necessary for implant surgery. Still, the unexpected impaired fit of the usual restoration after the healing meant that the time that the patients had to spend without teeth continued for longer than they expected. Patients may need to be particularly cautioned about this matter as previously claimed that the need to be without dentures throughout healing stage can sometimes deter patients from DIT (Ellis et al. 2011).

As the surgery was conducted in two stages and employed delayed implant loading for all participants, patients with partial tooth loss perceived the transition from acrylic removable dentures (which were mainly spoon dentures) to transitional fixed implant restoration positively. There was an improvement in appearance outcome that was comparable to their expectation despite feeling abnormal texture. However, after experiencing some failures, most of the participants considered fixed TIP as weak and therefore felt restricted in their dietary intake. In contrast, the complete edentulous wearers perceived the outcomes of the implant supported temporary dentures less favourably. This group of patients were mainly concerned with the stability of the overdentures, and this had led to continual restriction of some of their daily activities.

In general, although patients perceived the IPS positively, they experienced some unanticipated challenges particularly in relation to the immediate post-surgical symptoms. This was accompanied with uncertainty about maintaining oral hygiene, which continued after obtaining TIP for partially dentate patients. However, fewer difficulties were experienced by edentulous patients in maintaining their oral and dentures hygiene during healing and after wearing the temporary overdentures. These challenges could be overcome by improvement of pre-surgical advices about cleaning and facilitating communication with healthcare personal from the clinical team during the immediate post-surgical time to assist in resolving patients' uncertainties as suggested by patients. The recent introduction of mobile apps for

monitoring the quality of post-surgical patients' recovery at home has proved successful in other disciplines and may be one route to providing additional support (Semple et al. 2015). In addition, the use of Internet-based information and/or social media has been suggested as a tool of communication with patients, although this might not be suitable for all patients (Hawn 2009). Further studies could explore the contribution of post-surgical communication with patients on patients overall DIT experiences.

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Appendix 17. Stage I themes and subthemes framework (Pre- implant stage)

| Themes at stage I | Subthemes |
|--|--|
| Motivation to seek implant treatment | <p>The hope of eliminate the impacts of tooth loss and unsatisfactory restoration on quality of life</p> <p>The possibility of gaining costless implant treatment at NHS</p> <p>The trustworthy NHS dental care</p> <p>Hope of implant perfection</p> |
| Patients' expectations of dental implant | <p>Patients understanding and knowledge of dental implant</p> <p>Anticipation of outcomes</p> <p>Normality <i>'I will have my permanent teeth back'</i></p> <p>Security during function <i>'Implant will secure this in place, this(denture) should not move when I eat'</i></p> <p>Longevity / durability <i>'It will last for the rest of my life I think, I don't think it will need maintenance'</i></p> <p>Modern and advance <i>'implant is the recent cure of losing teeth'</i></p> |
| Patients' referral for NHS dental implant treatment | <p>Types of implant referral from primary dental care to NHS</p> <p>RCP⁹ clinical guideline</p> <p>Trigger of implant referral</p> |
| Implant decision making process at NHS and patients clinicians' interactions | <p>The ambiguity of implant decision criteria and patients' risk consideration <i>'I want to know who is entitle and who is not and why I am not'</i></p> <p>barrier</p> <p>motivation to offer implant</p> <p>patients dentist relationship</p> <p>the impact of the decision on patients <i>'Cancer, more struggle, loss my job, change my job, devastation'</i></p> |

⁹ RCP Royal College of Physicians and Surgeons

Appendix 18. Themes and subthemes of stage II (The implant placement)

| Themes at stage II | Subthemes |
|-------------------------------|---|
| Implant surgical placement | Underestimation of the surgery The length of healing stage Sedation and instruction Patients' perspectives' on complication of the surgery including in ability to ear restoration |
| Immediate implant restoration | Immediate improvement of fit The first experience of implant |

Appendix 19. Themes and subthemes of stage III (post-implant stage)

| Themes at stage III | Subthemes |
|--|--|
| The experience of implant outcomes ' <i>It has been a good experience. Not a nice experience</i> ' | The overall experience |
| Implant hygiene | Uncertainty of cleaning information <i>brush them every day, it's just, it's like normal teeth, basically</i> |
| The overdenture experience | Function with implant restoration <i>'I can't fault it; it's made a difference to my life my denture feel better now it is more secure, not stable though'</i> Food underneath denture |
| The fixed implant restoration | <i>It was like getting my own teeth back again'</i> <i>'they don't feel like anything, you don't realise you've got them in. they are rooted inside my jaw like teeth'</i> |
| The implant maintenance | The un-anticipated need <i>'I'll be back to square one. They're starting to jump around now'</i> |
| The hidden concern of the implant journey | Decision criteria The risk of failure The future cost |

Appendix 20. Presentation

This thesis based on research which has been presented at academic conferences.

Oral presentation;

Triggers for patients' referral for NHS dental implant treatment and the subsequent decision making process; Patients' encounters and Clinicians' views.

Kashbour, W. A., Ellis, J., Rousseau, N., Thomason, M. Newcastle University. Oral presentation at British Society of Oral and Dental Research September (BSODR) 2015. Abstract number 98.

<http://www.bsodr.org.uk/meetings/cardiff-2015/BSODR-2015-Final-programme.pdf>

Poster presentation;

Patients' perceptions of implant placement surgery, the post-surgical healing and the immediate fixed and removable implant retained restoration; a qualitative study.

W.A. Kashbour; N.S. Rousseau; J. M. Thomason; J.S. Ellis. Poster presentation at British Society of Prosthodontics (BSSPD) and Institute of Health and Society postgraduate student conference

<http://www.bsspd.org/Conferences/Annual+conference+2016/Programme.aspx>

Appendix 21. Implant Clinic Patient Satisfaction Audit 2015

| | |
|---------------------|---|
| Audit Title: | Implant Clinic Patient Satisfaction Audit 2015 |
| Authors: | Abisola C Asuni (Supervisor: Mr. Francis Nohl) |
| Date: | 29/04/2016 |
| Project No.: | 6889 |

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1. Executive Summary

The executive summary should include a summarised version of the background and rationale to the project, the main aims and objectives, key findings and recommendations.

(This should be written after the report has been completed)

2. Background

NHS striving to increase patient satisfaction in all departments
Identify ways of improving practice/service which translates into better care and happier patients.
Success rates for implant systems over 95% successful.
Initial audit 2005, 2009 and 2012/13 re- audited.

3. Aims and Objectives

Aim

To quantify patient satisfaction with the whole implant service
To assess if improvements have been made as a result of the 2009 and 2013 audit

Objectives

Maintain high standards and reputation
Identify any areas of service that still require improvement

4. Standards

Aim for 95% of patients to be satisfied with the service provided by the implant team

Specifically:

- Environment
- Reception staff
- Clinical staff
- Communication
- Treatment success

5. Methodology

Questionnaire given to patients at the end of an appointment and asked to complete anonymously in the waiting room

1-5 sliding scale:
Strongly agree (1) - Strongly disagree (5)

Patients attend for either consultation/review or treatment, therefore separate section for treatment on the questionnaire.

Opportunity for any comments from patients at the end of the questionnaire.

Questions asked:

1. I was seen within 15 minutes of appointment
2. Staff in reception treated me with dignity and respect
3. Clinical staff in the implant clinic treated me with dignity and respect
4. The waiting area was clean and tidy
5. The clinical areas were clean and tidy
6. Staff introduced themselves properly
7. I had adequate opportunity to ask questions or raise concerns
8. I was given enough privacy when discussing my condition or treatment
9. I was given a good explanation of what the treatment or treatment options would involve
10. I was involved in decisions about my care or treatment
11. Pain during my treatment was adequately controlled
12. I like to have music playing while being treated
13. I found the written post-operative instructions helpful
14. I felt I had enough time to recover before I was discharged
15. Overall I am happy with my treatment on the implant clinic

6. Results



Questions that did not meet standard:

1. Seen within 15 minutes of appointment

Yes -16/18 (89%)

No -02/18 (11%)

11. Pain during my treatment was adequately controlled

Score 1- 08/12 (67%) (Strongly agreed/agreed- 83%)

Score 2- 2/12 (16%)

Score 3- 1/12 (8%)

No response- 01/12 (8%)

12. I like to have music playing while being treated

Score 1- 3/12 (25%)(Strongly agreed/agreed- 50%)

Score 2- 3/12 (25%)

Score 3- 5/12 (25%)

No response- 1/12 (8%)

13. I found the written post-operative instructions helpful

Score 1- 6/12 (50%)(Strongly agreed/agreed- 75%)

Score 2- 3/12 (25%)

No response- 3/12 (25%)

14. I felt I had enough time to recover before I was discharged

Score 1- 8/12 (67%)(Strongly agreed/agreed- 83%)

Score 2- 02/12 (16%)

No Response- 2/12 (16%)

Discussion:

Similar questions not meeting standard at 95% in previous audits
Question 11- Pain during my treatment was adequately controlled
Question 12- I like to have music playing while being treated

We improved in scores related to team staff introducing themselves (91% > 95%)

Pain control during treatment dropped, (83% < 100%) but no negative responders (others neither agree/disagree and non-responders)

Music playing while being treated slightly dropped but consistently a mixed bag (50% < 58%)- again, no negative responses (neither agree or disagree 25%, no response- 8%)- maintain practice to ask patients if they would like music playing in the background rather than automatically play music.

Patients found the usefulness of written post-operative instructions dropped (75% < 96% and 25% non-responders) but again, no negative results. ? Likely did not read leaflet or could not remember if they had

Recovery time before discharge dropped (83% < 96%), high number of non-responders (16%) again no negative responses

Despite five questions not meeting standards, 1, 11, 14 >80% on reflection, should have aimed for more responders- ? Effect on results?

Conclusions:

Generally excellent results and positive comments from patients.

Areas for improvement:

- Improving communication on what to expect regarding pain/pain control (e.g. post-operative management or suture removal), adequate analgesia
- Maintain practice to ask patients if they would like music playing in the background rather than automatically play music.
- Review post-operative instructions (immediate/delayed)
- Ensure patients ready to leave clinic before discharge

10. References

KEY (Change status)

Project Number: 6889

- 1 Recommendation agreed but not yet actioned
- 2 Action in progress
- 3 Recommendation fully implemented
- 4 Recommendation never actioned (please state reasons)
- 5 Other (please provide supporting information)

Action Plan

| | |
|----------------------|--|
| Project title | Implant Clinic Patient Satisfaction Audit 2015 |
|----------------------|--|

| | | | |
|-------------------------|--------------------|-----------|-----------------------------------|
| Action plan lead | Name: Francis Nohl | Title: Mr | Contact: francis.nohl@nuth.nhs.uk |
|-------------------------|--------------------|-----------|-----------------------------------|

Ensure that the recommendations detailed in the action plan mirror those recorded in the "Recommendations" section of the report. The "Actions required" should specifically state what needs to be done to achieve the recommendation. All updates to the action plan should be included in the "Comments" section.

| Recommendation | Actions required (specify "None", if none required) | Action by date | Person responsible (Name and grade) | Comments/action status (Provide examples of action in progress, changes in practices, problems encountered in facilitating change, reasons why recommendation has not been actioned etc) | Change stage (see Key) |
|--|---|----------------|-------------------------------------|--|------------------------|
| 1. Disseminate results to implant team and members involved with clinical governance | Email team- Disseminate results to implant team and members involved with clinical governance | 29/04/2016 | Miss Abisola Asuni LAT SIR Rest | 29/04/2016 – Miss A Asuni emailed implant team and registered audit with Clinical Audit Department as evidence that the action has been completed. | 3 |
| 2. Present results at next consultant clinical governance meeting | Present at next meeting | ? | Miss Abisola Asuni LAT SIR Rest | | 2 |
| | | | | | |

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