Understanding the Lived Experience of Completely Edentulous Patients Treated with Two-Implants Overdenture (IOD):

A Qualitative Phenomenological Exploration

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This thesis is dedicated to:

The memory of my beloved grandmother with admiration and gratitude.

My parents, husband and kids for their love, support and encouragement.

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Abstract

Treatment of complete tooth loss with two-implants overdenture opposed by upper complete denture is considered the minimum standard of care. Until recently, many researchers have shown their interest in the field of implant prosthetic rehabilitation as an alternative option to treat edentulism. They have carried out many quantitative studies to understand how edentulous patients perceive the two-implants prostheses. However, patients' perspectives towards the effectiveness of the two-implants overdentures remains unclear and have not been explored by qualitative methods.

We conducted a scoping review in order to summarize and understand the impact of this prosthetic treatment on completely edentulous patients. The results of the review showed that patients treated with the two-implants overdenture had better satisfaction and quality of life as shown on questionnaires used to evaluate patient satisfaction and quality of life in comparison with conventional complete dentures. However, little was known about the patient's experience with this treatment modality. Therefore, this study's intention was to understand in depth people's lived experiences of being edentulous, what it meant to live with the minimum standard of care, and what were the functional and social implications of living with two-implants overdentures.

Interpretive phenomenology was adopted as the study's methodology. We conducted semi-structured, open-ended, face-to-face interviews with completely edentulous patients treated with two-implants lower overdenture opposed by upper complete denture. The interviews were audio-recorded and transcribed verbatim.

Twelve participants (four women and eight men) were interviewed from a single dental clinic. From the collected narratives, two main findings emerged from the analysis of participants' narratives that are related to being edentulous; 1) long experience of tooth loss, and 2) experience of conventional complete dentures. In addition, five more sub-themes emerged that are related to their experience of the minimum standard of care: 1) replacement of conventional dentures with implant overdentures, 2) experiences of the implant placement procedure, 3) experience of implant overdentures as a life-changing experience, 4) experience of implant overdentures as a struggle and 5) patients' challenges and concerns.

This study comprehensively reviewed the available literature examining the impact of two-implants overdentures on edentulous patients. In addition, it examined how these individuals experience tooth loss, conventional dentures and implants overdenture use over a long period of time. Despite the long experience of tooth loss and conventional denture use, the collected narratives revealed that these experiences ranges from positive life changing experiences to a struggle, both combined with future concerns and challenges. Exploring the lived experiences of the research participants can offer a new way of understanding what being edentulous and treated with two-implants overdenture means. This study findings also offer directions for future research and consideration for current theory.

KEYWORDS:

Edentulism, implants, overdentures, experience, phenomenology

Résumé

Traiter la perte complète des dents avec une prothèse (hybride) inférieure retenue par deux implants et une prothèse complète supérieure est considéré comme des soins prothétiques de base. Jusqu'à récemment, de nombreux chercheurs ont manifesté leur intérêt pour le domaine de la restauration prothétique implantaire comme une alternative au traitement de l'édentation. Ils ont réalisé de nombreuses études quantitatives pour comprendre comment les patients édentés perçoivent les prothèses inférieures supportées par deux implants. Cependant, les perspectives des patients quant à l'efficacité d'une prothèse inférieure sur implants restent floues et n'ont pas été explorées par des méthodes qualitatives.

Nous avons conduit une revue exploratoire de la littérature existante afin de résumer et de comprendre l'impact de ce traitement prothétique sur des patients complètement édentés. Les résultats de cette revue ont montré que les patients traités avec la prothèse inférieure hybride à deux implants avaient une meilleure satisfaction et une meilleure qualité de vie, comme le montrent les questionnaires utilisés pour évaluer la satisfaction des patients et leur qualité de vie comparée au port de prothèses complètes conventionnelles. Cependant, l'expérience personnelle du patient avec cette modalité de traitement était peu révélée. Par conséquent, l'objectif de cette étude était de comprendre en profondeur le vécu des gens édentés, ce que cela signifiait recevoir des soins prothétiques de base et quels impacts avaient les prothèses hybrides retenues par deux implants sur leur mode de vie et leur interaction sociale ?

La phénoménologie interprétative a été adoptée comme méthodologie de l'étude. Nous avons mené des entretiens semi-structurés, ouverts et face-à-face avec des patients complètement édentés porteurs de prothèses hybrides inférieures retenues par deux implants et des dentiers complets supérieurs. Les entretiens ont été enregistrés et transcrits textuellement.

Douze participants (quatre femmes et huit hommes) ont été interrogés dans une seule clinique dentaire. À partir des récits recueillis, deux conclusions principales ont émergé de l'analyse des récits des participants liés à l'édentation : 1) Longue expérience de la perte de dents, et 2) Expérience avec des prothèses complètes conventionnelles. En outre, cinq autres sous-thèmes ont émergé, issues de leur expérience de bénéficiaires de soins prothétiques de base : 1) Remplacement des prothèses conventionnelles par des prothèses hybrides implantaires, 2) Expériences liées à la procédure de pose de l'implant, 3) Expérience marquante (ou bouleversante) liée à l'utilisation des prothèses hybrides implantaires 4) Port de prothèses hybrides implantaires considéré comme une expérience malaisée (ou ardue) 5) Défis et préoccupations des patients.

Cette étude a revu de manière exhaustive la littérature disponible examinant l'impact des prothèses inférieures hybrides retenues par deux implants sur les patients édentés. En outre, elle a examiné comment ces personnes ont vécu leur situation d'édentation totale, l'utilisation des prothèses dentaires conventionnelles et des implants pendant une longue période. Malgré une longue expérience d'édentation totale et le port de prothèses conventionnelles ; les récits recueillis ont révélé que ces expériences, positivement marquantes ou ardues, sont combinées à des préoccupations et des défis futurs. L'exploration des expériences vécues par les participants à la recherche peut offrir une nouvelle façon de comprendre ce que signifie être édenté et traité avec des prothèses hybrides. Les résultats de cette étude offrent également des orientations pour les recherches futures et la prise en compte de la théorie actuelle.

MOTS CLÉS :

Édentation, implants, prothèse hybride, expérience, phénoménologie.

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First and foremost, all praise and thanks to (ALLAH), the lord of the universe, the most beneficent, the most merciful who has blessed me throughout my life. with good health, patience, and ability to pursue and complete this thesis.

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This thesis would not have been possible without the encouragement and wisdom of my supervisor, Dr. Richard Hovey. Thank you, Dr. Hovey. Your support, encouragement, guidance, kindness and insightfulness have been incredible, and much appreciated.

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Special thanks also go to Dr. Nathalie Morin, Dr. Dr. Jeffrey Myers, and Mr. Nicolas Drolet for helping me recruit participants from Faculty of Dentistry, McGill University.

I would like to express my heartfelt appreciation to my friends, Balqees, Mona, Mark and Tulio for their continues support and encouragement. Thanks Balqees, you have been my pillar of strength through all my ups and downs. Above all, I would like to thank my husband, for his great patience, support and love that he has given me at all times, for which my mere expression of thanks does not suffice. I would also like to thank my parents, sisters and brothers and my three beautiful kids for their prayers, love, support and encouragement throughout that kept me going.

Finally, countless thanks to the patients who participated in this study and I am so humbled that they chose to share precious time with me.

List of Abbreviations

CD	Complete Denture
IOD	Implant Overdenture
IODs	Implant Overdentures
IPA	Interpretive Phenomenology Analysis
NR	Not Reported
OHIP	Oral health Impact Profile
OHIP-EDENT	Short Form of OHIP for Edentulous Persons
OHRQoL	Oral Health Related Quality of Life
RCT	Randomized Controlled Trail
QoL	Quality of Life
VAS	Visual Analogue Scale
WHO	World Health Organization

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Preface

This thesis does not contain materials that have been published elsewhere, except where specifically indicated by references. The study findings represent original material and contribute to the advancement of knowledge in the fields of dentistry and oral health. To my knowledge, it is the first time a phenomenological study has been conducted to explore the meaning of being edentulous and treated with the minimum standard of care for patients who are completely edentulous.

This study was designed by myself, and my supervisor, Dr. Richard Hovey. I was responsible for the recruitment of participants, the design of the interview guides and the data collection. The data analysis was conducted by myself with supervision from my supervisor and committee members, Dr. Christophe Bedos and Dr. Paul Allison. The dissertation was written by me with guidance from my supervisor and committee members. All findings in this dissertation was collected from participants recruited from Faculty of Dentistry, McGill University.

The methods used in this study have been approved by the Research Ethics Board of McGill University # A05-B38-17B.

Contribution of Authors

I, Entisar Abdulkader, was the principal investigator for the study presented in this dissertation. I was in charge of all of the work put into this dissertation, including the design of the methods, the recruitment of participants, the collection and analysis of data, the interpretation of findings and the writing of the manuscripts, under the guidance of Dr. Richard Hovey.

In the scoping review manuscript, Martin Morris prepared the Ovid MEDLINE Database search strategy and performed the electronic search. Balqees Almufleh prepared the Embase Classic+Embase Database search strategy, performed the electronic search and helped with data extraction, datat analysis, and manuscript preparation

Dissertation overview

This dissertation represents my doctoral research project and following to recent calls to shift from the long essay version of the PhD dissertation to the manuscript-based format. The results of this study are presented in the form of two manuscripts. The dissertation consists of six chapters: Chapter 1 presents the research introduction and relevant background information. Chapter 2 (Manuscript 1) is a review of the literature, a scoping study that maps the extant literature on the impact of using implants overdentures on treating edentulism. Chapter 3 presents a detailed description of the methodology, the recruitment process, data collection, and analysis.

Chapters 4 and chapter 5 are manuscripts based on the study's results. Chapter 4 (Manuscript 2) focuses on the long-lived experience of complete tooth loss and the use of conventional complete dentures. Chapter 5 (Manuscript 3) is a logical progression of Chapter 4 and examines the experiences with implants overdentures. Chapter 6 presents an overview of the study results described in Chapters 4 and 5, highlights the contribution of this study to current knowledge on the topic, and the limitations of the study. In addition, it presents the main conclusions of the study and identifies future directions. The references of Chapters 1, 2, and 6 are listed in the bibliography and those of Chapters 3, 4, and 5 are provided at the end of each chapter given that these are stand-alone manuscripts.

Over the past three decades, dental implants have been widely accepted as a feasible option for the replacement of missing teeth, particularly with elderly persons. The population of elderly people is rapidly increasing all over the globe (Zarb, 2004), resulting in a subsequent rise of age-related diseases including tooth loss (edentulism). In Canada, the prevalence of tooth loss among the elderly aged 65 and older is as high as 22% (Health Canada, 2010). In addition, Statistics Canada estimates that the aging population will represent up to 23.7% of the country's total population by the year 2036 (Bohnert & Dion, 2015), placing more demand on the need for effective interventions for tooth loss.

Replacement of missing teeth using dental prosthesis is expected to continues to rise, likely due to a growing elderly population (Douglas et al., 2000; Emami et al., 2009). Although complete dentures have been used to treat edentulous patients for long time before other alternative treatment options have emerged, several studies demonstrated that the lower complete conventional denture causes constant discomfort for most edentulous patients. The use of lower conventional dentures causes decreased self-confidence, chewing ability and quality of life (Emami et al., 2009). Thus, tooth loss and denture use can have a significant impact on the affected individual's oral and general health (Gagliardi et al., 2008).

Prosthetic rehabilitation with dental implants helps to restore oral tissue health, oral function, esthetics, and phonetics, thereby improving quality of life (Heydecke et al., 2003). These successful outcomes have been demonstrated across several quantitative studies of dental

implant treatments (Carlsson & Carlsson, 1994; Walton et al., 2002; Heydecke at al., 2003). Additionally, studies using patient-reported outcomes demonstrated significant improvements in patient satisfaction and quality of life after implant-supported prostheses treatment, particularly in completely edentulous patients (Awad et al., 2003; Mack et al., 2005; Emami et al., 2009; Al-Zubeidi et al., 2010).

The McGill and York consensus statements about the use of overdentures further state that patients treated with mandibular implant overdentures have higher general satisfaction than those treated with conventional complete denture wearers. This may suggest that the twoimplants overdentures opposed by upper maxillary conventional denture should be the minimum standard of care for completely edentulous patients (Feine et al., 2002; Thomason et al., 2009). However, there is a limited representation of patients' experiences with implantsupported prosthesis and the impact of this treatment modality on their life, since it is difficult to gain deep insight into patient's perspective from quantitative questionnaires with predetermined options. To better understand patients' perception regarding the effectiveness of this treatment modality, qualitative studies should be considered.

Quality of life is considered one of the most important outcomes of implant prosthetic rehabilitation. In previous studies, patients treated with implants prosthesis experienced improved masticatory function and reported a higher quality of life (Heydecke et al., 2003; Emami et al., 2009; Harris et al., 2013). Recently, researchers introduced qualitative approaches to assess quality of oral health after implant treatment to treat partial edentulism. The results of these studies emphasized the positive influence of implant supported prostheses on quality of oral health, oral function, and social status (Lantto & Wardh, 2012; Grey et al., 2012; Narby et al., 2012). However, these studies did not distinguish between patients treated with different

types of implant prostheses. In addition, they did not consider the potential positive experiences from the long use of conventional dentures for treating complete tooth loss.

Prosthetic implant rehabilitation plays a significant role in enhancement of masticatory function. Lantto & Wardh (2012) suggested that implant supported prosthesis enhanced confidence to function since the patient's teeth were better secured during eating and speaking. In addition, well-secured dentures reduce the incidence of trauma to the underlying oral tissues (Osman et al., 2012). Similarly, Hyland et al. (2006) demonstrated that all participants in the study experienced improved chewing abilities with implant-supported dentures in comparison with conventional dentures. Since then, particitpants in the same study reported to enjoy different types of food of their choice more comfortably while in a social setting. However, the previously mentioned studies did not report the extent of tooth loss, age of their participants when they missed their natural teeth, or history of previous dentures before implant prostheses delivery. Thus, more research is needed to explore the impact of age, extent of tooth loss and previous treatments on patients' perception to prosthetic rehabilitation.

Social enhancement is another essential factor in quality of life. Many edentulous individuals face a major challenge to participate fully in social life if they are without teeth or have poorly fitted conventional dentures. Although the replacement of missing teeth with conventional dentures is considered an optimal solution for edentulous individuals, many patients have not managed to learn how to cope with their dentures.

In recent years, researchers have demonstrated that patients were better able to retrieve confidence back in social life with implant rehabilitation (Grey et al., 2012; Lantto & Wardh, 2012; Hyland et al., 2009). Moreover, they managed to integrate in social events without being anxious of losing dentures or having gaps. However, apart from one study in

Canada, studies conducted in Sweden and the United Kingdom did not consider cultural and social impacts on edentulous patients. Therefore, more studies are needed that focus on the impact of culture differences on how this group of people perceive implants rehabilitations.

Several studies revealed that after prosthetic rehabilitation, patients experienced enhanced normality and have become more motivated about the quality of their oral and general health (Lantto & Wardh, 2012; Grey et al., 2012). Trulsson et. al., (2002) reported that many patients experienced changes in personality from being edentulous, driven by a loss in confidence and self-esteem. However, many patients reported improvements in self-esteem after implant treatment. Conversely, tooth loss and denture wearing were not a substantial matter for some patients in Rousseau et al. (2014) study. These authors argued that this difference might be related to patient perception of tooth loss and duration of denture use (Rousseau et al., 2014)

Although implant prosthetic rehabilitation has many positive enfluences on oral health quality of life, social life, masticatory functions and self-perception, many individuals are still edentulous or struggling with conventional dentures. Ellis et al. (2011) conducted a study across the United Kingdom and Canada to gain a greater in-depth understanding of why elderly patients who are currently dissatisfied with conventional dentures declined implant treatment. Findings from this study revealed that the main concerns were fear from extra pain during implant placement and possible complications after treatment. Other studies revealed common barriers including cost and anxiety about pain and the implants placement procedure (Lantto & Wardh 2012; Narby et al., 2012).

It is well demonstrated that implant prosthesis offers functional improvement, social enhancement, normality and enhanced self-esteem, and better quality of life. However, there is no clear understanding from patients perspectives of how completely edentulous patient experience the two implants-supported prostheses as considered the minimum standard of care.

Understanding the lived experience with implant prosthetic treatment from a patient perspective is different and important compared to patient-based outcome measures and it can also offer valuable insight into the impact of this treatment modality on edentulous patients. This will help gain knowledge and enhance understanding of edentulous patients' lived experiences. Additionally, this knowledge may be of value to future patients intending to have implants in determining how to build their decisions and meet their expectations. This data also has the potential to inform clinicians on the most effective treatment options, and inform the development of a coherent and adaptive health system for managing tooth loss and achieving better quality of oral health for edentulous patients.

To conceptualize this, we reviewed the available literature that addresses patient perceptions, concerns and experiences with implant prosthetic rehabilitation, and we conducted a scoping review to summarize the available literature related to this topic.

Chapter Two (Manuscript 1): Impact of Two-Implants Overdenture on Completely Edentulous Patients; A scoping Review

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2.1. Abstract

Objective: To conduct a scoping review addressing the impact of using two-implant supported overdentures on completely edentulous patients for treating edentulism.

Background: Replacement of missing teeth through the provision of dental implants has undoubtedly become a valuable alternative option for treating edentulous patients, yet little is known about the impact of the two-implant overdentures on edentulous patients' reported outcomes.

Materials and Methods: The major databases (MEDLINE (OVID), EMBASE (Ovid), and Cochrane Central Register of Controlled Trials and The Cochrane Systematic Reviews Database) were searched extensively for relevant qualitative and quantitative studies, followed by manual search of the reference lists on included publications. Two researchers independently read all the included studies and relevant papers titles and abstracts from three databases. Arksey and O'Malley's scoping review framework has guided this review. Descriptive and narrative thematic analysis of the included studies was classified, analyzed and then summarized.

Results: The review retrieved 52 publications that met the inclusion criteria, focusing on the impact of using implants on completely edentulous patients' satisfaction and quality of life. The

majority of publications were carried out in Europe and North America, and the most common study design was quantitative. Studies evaluated patients' satisfaction and quality of life equally by employing structured questionnaires. However, edentulous patients in the included studies showed higher satisfaction with their implant overdenture and improved quality of life in comparison with the conventional dentures.

Conclusion: Complete tooth loss and treatment of edentulism remain a major area of concern in dentistry worldwide. The key findings of this review showed that patients treated with the two-implants overdenture had better satisfaction and quality of life as shown on questionnaires used to evaluate patient satisfaction and quality of life in compare with convetional complete dentures. However, there is a lack of patients' perspectives towards this treatment modality. More qualitative research is needed for exploring how completely edentulous patient's experience implant treatment. The result of this review has utility for dental practitioners, researchers, and other stakeholders working to improve the patient' satisfaction and quality of life.

Key words: Edentulism, Two-implants overdentures, Patient satisfaction, Quality of life.

2.2. Introduction

Complete tooth loss has a debilitating influence on oral health functions (Zarb et al., 2004). Following the International Classification of Impairments, Disabilities and Handicaps Classification, the World Health Organization (WHO) has categorised edentulous patients as impaired individuals (WHO, 1980). Despite the valuable improvement in oral health care measures, the prevalence of edentulism increases with age and it is considered more common in people who are 65 years or above (Steele, 2009). In Canada, due to increased life expectancy, the number and proportion of seniors increased to reach 16.9 % in 2016 (Canada Statistics, 2016). According to the Quebec Institute of Statistics (2019), it is expected that by 2031, people aged 65 or over will make up more than 25% of the population in Quebec, continuing to grow to reach 28% in 2066. The main causes of tooth loss are; trauma, dental decay and periodontal disease, which most probably leads to an early extraction of permanent teeth. The complete tooth loss has negative social and psychological affects on the patients' quality of life. Thus, there is a demand for treating edentulism for many decades all around the world (MacEntee et al., 1998; Emami et al., 2009).

Replacement of missing teeth with conventional complete dentures has been considered the main choice of treatment for edentate patients for many years (Douglas et al., 2000; Carlsson, 2006; Emami et al., 2009). However, there is a strong evidence of limitations and problems associated with using this conventional method of treatment. Hence, this treatment modality causes constant residual ridge resorption which directly affects denture stability and retention, and compromises patients' comfort and adaptability with conventional complete dentures (Atwood, 1971). On the other hand, treatment of edentulism by using the provision of dental implants has undoubtedly become a valuable alternative option for treating edentulous patients. There is substantial evidence in the literature showing the increased success rate of implant-supported overdentures to restore oral function in edentulous patients, enhancing prosthetic retention and stability and therefore, improving patient satisfaction and oral health-related quality of life (Geertman, 1996; Thomason et al., 2009; Emami et al., 2010).

The McGill (Feine et al., 2002) and York consensus statements (Thomason et al., 2009) have suggested that the mandibular two-implants overdenture opposed by maxillary conventional denture, should be the optimal treatment choice of completely edentulous patients. This treatment modality has shown to significantly improve function, patients' satisfaction and quality of life (Awad et al., 2003; Emami et al., 2011; Alfadda et al., 2014; Awad et al., 2014).

Several systematic reviews had been conducted to compare patient's perception about conventional dentures and implant overdentures, and their results consolidated what has been suggested by the consensuses (Emami et al., 2009; Kodama et al., 2016; Kutkut et al., 2018). However; we were unable to find any review articles that synthesized the literature on the impact of the two-implant overdentures on edentulous patients' reported outcomes. A synthesis of the extant literature is of importance to a variety of stakeholders: 1) edentulous patients who might consider dental implants as a treatment; 2) researchers can address identified gaps; and 3) dental health care providers.

For this reason, we conducted this scoping review to evaluate the impact of the minimum standard on patient satisfaction and oral health related quality of life.

2.3. Purpose:

This scoping review intends to report and map the findings of published qualitative and quantitative studies relating to the impact of using two-implants overdenture for treating complete edentulism. In particular, our objectives were as follows:

- (i) to summarize the available research and identify gaps;
- (ii) to summarize the impact of treatment on patient's satisfaction; and
- (iii) to summarize the impact of treatment on quality of life.

2.4. Materials and Methods

A scoping review was deemed appropriate for this study given the heterogeneous nature of the literature. This study progressed iteratively with guidance from the methodological framework proposed by Arksey and O'Malley (2005), which comprises five stages; identifying research questions, identifying relevant studies, study selection, charting the data, and collating, summarizing and reporting the results.

Research Question

This review was guided by the research question: "What do we know about the perceived impact of lower two-implants overdenture opposed by upper complete denture for treating edentulism?"

The intention of this question was to highlight the impact of this treatment modality on patient satisfaction and oral and general health quality of life.

Identifying Relevant Studies

In collaboration with an academic medical librarian (Martin Morris, MM), a search strategy was conducted by (Entisar Abdulkader, EA & Balqees Almufleh, BA) encompassing three key concepts: edentulism (population), two-implants overdenture (intervention), patients' satisfaction and quality of life (outcome). These three key concepts were combined with "AND" to find all relevant research encompassing them together. For each key concept, relevant controlled vocabularies (i.e. MeSH terms, subject headings, index terms) and keywords (i.e. synonyms, related terms, and/or spelling variations) were identified and were combined with "OR" to ensure relevant studies were identified.

This scoping review was conducted on pertinent works published between the late 1977 and July 2019 with an update of the searches performed in September 2019. The search strategy was formulated for MEDLINE (OVID), then was adapted on other databases: EMBASE (Ovid), and Cochrane Central Register of Controlled Trials and The Cochrane Systematic Reviews Database (See table 3 for a full search strategy adapted in the Medline Ovid database). The search was limited to studies published after 1977, as this year when the first dental implant was placed in humans by Brånemark group (Brånemark et al., 1977).

To best answer the research question, observational, randomized trials and qualitative studies were included, some study designs such as case reports and case series, editorials, and reviews were excluded. However, only articles published in English were included due to the linguistic competencies of both researchers (EA & BA).

In order to ensure all relevant articles were identified, citation tracking of key articles was employed in Medline and PubMed. In addition to the electronic search, a complemented hand search of the reference lists of the relevant systematic reviews and included studies were searched to ensure our results were maximal.

Study Screening and Selection

Based on the scoping review research question, we developed our review inclusion and exclusion criteria as follow:

Inclusion criteria:

1. Study participants who are adults and completely edentulous.

2. Study participants are wearing upper conventional complete denture and lower twoimplants overdenture.

3. Qualitative studies.

4. Quantitative studies that studied the patients reported outcomes (Patient satisfaction and oral health related quality of life)

5. Studies written in English language.

Exclusion criteria:

1. Participants who are not completely edentulous.

2. Not wearing upper complete denture and lower two-implants overdenture or not reported in the study the extension of tooth loss/ type of prosthesis.

3. Studies explored the other types of conventional two-implants overdenture.

4. Studies that explored only clinical outcomes.

5. Case reports, case series, and reviews.

6. Studies not written in English language.

The articles that have been retrieved by electronic search were exported to EndNote X8.0.2, a citation management software. Then the two researchers (EA & BA) independently screened all titles and abstracts of each citation applying the eligibility criteria outlined above and identified the eligible articles for full text screening. Then, the full text of eligible articles was screened following the eligibility criteria and disagreement between reviewers was achieved through discussion and resolved by consensus.

Charting the Data

In this step we extracted and charted the relevant fragments of information from the included research articles under review. The data extraction form recorded the following information for each included article: first author; year of publication; geographical location of study; study design; number of participants; follow up period; outcomes measured; data collection tools, and results.

Collating, Summarizing, and Reporting the Results

The data synthesis method was comprised of three steps: (i) tables were developed comprising information charted from each article; (ii) two reviewers read the extracted information and performed a quantitative descriptive analysis; (iii) textual narrative was pooled, summarized and reported on study characteristics, context, and findings.

2.5. Results

Search results

Electronic and hand searches yielded a total of 7351 articles. After removal of duplicates, 2468 articles remained to be screened by title and abstract. After applying the eligibility criteria, 2279 records were excluded leaving 171 records to undergo further full-text review. Of these, 120 records were excluded due to ineligible population, clinical studies, and lack of outcomes of interest, etc. The remaining 52 articles met the inclusion criteria and were included in the synthesis (Figure 1), using the Preferred Reported Items in Systematic Reviews and Meta-analysis flowchart (Moher 2009).

Characteristics of included studies

Of the 52 studies assessed, 50 (96%) were quantitative (Table 1), two (4%) were qualitative (Table 2), the detailed characteristics of each study are shown in Table 1 & Table 2. The majority of the quantitative studies were randomised controlled trials, which most frequently used patient-based questionnaires for outcomes. Studies were evenly distributed based on the year of publication, without studies published prior to 1995 (Figure 2). The majority of studies were carried out in industrialized countries, including 16 studies from Canada, eight from the Netherlands, six from Turkey, four from the UK and Brazil, two from the United States, Malaysia, Switzerland, and one study from Denmark, Italy, Portugal, New Zealand, Hong Kong and China, which two of them were International studies as shown in (Figure.3).

The sample sizes in the included studies ranged from n=12 to n=255 participants who have been completely edentulous for at least six months, however; the length of edentulism was not specified in some studies. The follow-up periods ranged between two months (Awad et al., 2000; Awad et al., 20003; Heydecke et al., 2005; Jabbour et al., 2012) to up to ten years (Meijer et al., 2003; Raghoebar et al., 2003; Naert et al., 2004; Cune et al., 2010).

The two included qualitative studies were relatively recent (Hyland et al., 2009; Pisani et al., 2017). In the two studies, one-to-one interviews were used for data generation and a thematic content analysis guided the data analysis.

Findings from Quantitative Studies

In all of the studies, implants' patients group received two implants from various implant systems which were placed in the inter-foraminal region of the mandible and conventional maxillary dentures. The two-implants overdentures were retained either by clip attachments to a bar or two ball attachments and some of them were attached with locator attachments.

Of the 50 quantitative studies in this area, 38 studies report patient satisfaction with implants overdentures (IODs) and 26 report the Oral Health related Quality of life with twoimplants overdentures. Questionnaires with Visual Analogue Scale (VAS) were the used instruments to assess patient satisfaction in the included studies. The Oral Health Impact Profile and its different versions (OHIP- EDNT, OHIP-14, OHIP-20 and OHIP-49) were used to assess the Oral Health Related Quality of Life (OHRQoL).

Studies Comparing the Two-Implant Overdenture with Conventional Dentures

It has been reported that higher ratings/scores in patient satisfaction questionnaires in implant overdenture group when compared with conventional complete denture group in 17 studies (Boerrigter et al., 1995; Kapur et al., 1999; Akoglu et al., 2001; Awad et al., 2000, Awad et al., 2003a; Raghoebar et al., 2003; Awad et al., 2003b; Meijer et al., 2003; Thomason et al., 2003; Allen et al., 2006; Hobkirk et al., 2009; Ferias et al., 2012; Geckili et al., 2012; Muller et al., 2013; Harris et al., 2013; Rashid et al., 2014 & Zhang et al., 2019). These studies which compared the two-implants overdentures with conventional dentures showed that the latter yielded to a higher general satisfaction score which was related to the improvements in comfort, chewing ability and stability or retention. For items such as speech, esthetics and cleaning ability, the two-implants overdenture and conventional complete denture were comparable.

The results of the 14 studies assessed OHRQoL reported a substantial improvement in the OHIP and OHRQoL for two-implants overdenture patients when compared to conventional complete dentures (Boerrigter et al., 1995; Kapur et al., 1999; Awad et al., 2000; Awad et al., 2003a; Awad et al., 2003b; Meijer et al., 2003; Thomason et al., 2003; Allen et al., 2006; Hobkirk et al., 2009; Ferias et al., 2012; Geckili et al., 2012; Harris et al., 2013; Muller et al., 2013 & Rashid et al., 2014).

Studies Comparing the Two-Implant Overdenture with Different Attachment Systems

Ten studies compared participants' rating of general satisfaction with overdentures connected to two non-connected implants using either ball or magnets abutments or two connected implants with a bar retained (Bakke et al., 2002; Walton et al., 2002; Naert et al., 2004; Timmerman et al., 2004; MacEntee et al., 2005; Ellis et al., 2009; Mericske-Stern et al., 2009; Cune et al., 2010; Al-Zubidi et al., 2012; Mumcu et al., 2012). It was concluded that the type of attachment did not seem to have an impact on general satisfaction. (Ellis et al., 2009 & Mericske-Stern et al., 2009) trials showed a consistently positive patient satisfaction with denture stability and comfort with chewing. Other studies mentioned that there were some cost

and technical-related issues among attachment systems, however; these issues did not have an effect on the patient' satisfaction (Walton et al., 2002; Naert et al., 2004).

The results of the three studies evaluating the impact of different attachment systems of overdentures on oral health related quality of life (Bilhan et al., 2011; Mumcu et al., 2012; Matthys et al., 2019) showed significant post treatment improvement compared to pre treatments on the OHIP scores.

Studies Comparing the Two-Implant Overdenture with Different Loading Protocols

Four studies reported patient 'satisfaction with the two-implants overdentures loaded by different protocols; immediate, early and late. All studies showed a significant improvement in patients' satisfaction compared to pre treatment general satisfaction' scores (Alfadda et al., 2009; Menassa et al., 2016; Zygogiannis et al., 2018 & Reis et al., 2019) and quality of life (Alfadda et al., 2009; Menassa et al., 2016 & Zygogiannis et al., 2018) regardless of whether an immediate, early or a delayed protocol was adapted to retain the two-implants overdentures.

Studies Comparing the Two-Implant Overdenture with Different Size/Number of Implants

Two studies evaluated patient 'satisfaction with mandibular overdenture retained either by one or two implants (Walton et al., 2009; Bryant et al., 2015). They reported that there were no significant differences after one year (Walton et al., 2009) and five years (Bryant et al., 2015) in satisfaction with mandibular overdentures retained by one implant or two implants. While De Souza et al. (2015) study showed that overdentures retained by four or two mini implants can achieve patient satisfaction and oral health related quality of life comparable with the two
standard implants. However, the survival rate of mini implants overdentures is not as high as the standard two-implants overdentures

Finding from Qualitative Studies

Two qualitative studies met the inclusion criteria of this scoping review and explored patients' experience with implant overdentures. The first study reported the patient perspectives of how implant overdentures affect eating (Hyland et al., 2009), and the second study explored the patients' perception of two types of attachments for implant overdentures (Pisani et al., 2017).

Hyland et al. (2009) reported that participants experienced substantial improvements in eating after using the two-implants overdentures in comparison to conventional dentures. Four major themes originated from the first study, "*the experience of edentulousness, the public constraint, the impact of replacement conventional dentures on issues surrounding eating* and *the impact of IODs on issues surrounding eating*" (Hyland et al., 2009). The 33 participants in this study reported enhanced enjoyment of food during social interactions and improvement in their food choices.

Pisani et al. (2017) conducted the second qualitative study on 22 patients (11 males,11 female) to gain a deeper understanding of patients 'perceptions of ball and locator attachments systems used to retain and support mandibular implant overdentures. This study identified that, apart from the attachment systems used to retain overdentures, retention is the most important aspect which affects denture stability and function. Thus, regular follow-up visits for attachment adjustment should be considered to improve retention. The major themes emerged from this exploration were; *the importance of retention and stability, the importance of improving oral*

function, presence of pain, hygiene, previous experience with attachments, confidence in the dentist's work and esthetic (Pisani et al., 2017).

2.6. Discussion

To our knowledge, this is the first scoping review intended to identify the published literature on the impact of two-implants overdentures on patient 'satisfaction and oral health-related quality of life. Although quantitative studies dominate the available literature, recently there is more focus on patient-reported outcomes in health care provision. A total of 52 studies as shown the table one below were identified, demonstrating the importance of this topic and possibly reflects an increasing awareness of patients 'opinion for improving oral health and scientific evidence. However, there are only two qualitative studies in this field of implant dentistry (Hyland et al., 2009; Pisani et al., 2017).

As expected, the majority of the included studies were carried out in developed countries due to an increase in their aging populations. However, the prevalence of edentulism is also considred high in the developing countries (Khazaei et al., 2012; Nagaraj et al., 2014). Additionally, there was a wide range variation in age and length of edentulism among study participants.

Previous systematic reviews have identified the mandibular two-implants overdentures offers higher patient satisfaction and improved quality of life for edentate patients than conventional complete dentures (Emami et al., 2009; Kodama et al., 2016; Kutkut et al., 2018). However, those review studies included only clinical studies that compared the two-implants overdentures with conventional complete dentures which might have restricted their results. In this review we investigated the impact of this treatment modality with a broad research question to include all types of studies that looked at the two-implants in comparison with conventional dentures, different attachments, loading and number and size of implants to include all types of study design.

The results of this scoping review demonstrate that mandibular implant overdentures are more effective treatment for edentulous individuals than conventional dentures, based on patient ratings of satisfaction or oral health related quality of life. Patients received the twoimplants overdentures reported a positive impact related to eating, smiling, speaking, social contact. However, some studies reported that patients who received a conventional complete denture were also fully or moderately satisfied with their removable prosthesis. Participants completed a survey to evaluate their satisfaction levels and quality of life with their prostheses. On the other hand, Assunção et al (2007) showed that there was no significant difference between two-implant overdentures and conventional complete dentures in relation to aesthetics, chewing ability, comfort, phonetic, social, psychological limitations and overall satisfaction.

Despite the type of attachment used to retain the overdenture, the loading protocol followed and the size of implants, this review showed that the two-implants overdenture enhanced ratings on questionnaires used to evaluate patient satisfaction and quality of life.

The outcome instruments were varied among the included literature, and several quantitative instruments have been used to measure patient satisfaction and oral health-related quality of life. Likert or Visual Analogue Scale (VAS) was the most used questionnaire to evaluate patient satisfaction while other validated questionnaires used in some studies. Different versions of the Oral Health Impact Profile (OHIP) questionnaire, for example, is commonly used to measure individuals' perception of their oral health status. The majority of clinical trials used the OHIP-49. The others used the OHIP-EDENT, OHIP-20 and OHIP 14 to assess oral health related quality of life (OHRQoL). However; some studies were carried out in Turkey and

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they used the OHRQoL-UK questionnaire which was based on the UK population's perception of how oral health affects life quality (Cakir et al., 2014; Geckili et al., 2011).

This review found only two studies concerning patients' experiences with overdentures. The main method of data collection in the included studies were semi-structured, in-depth oneto-one interviews, and for data analysis was the thematic analysis (Hyland et al., 2009; Pisani et al., 2017). Despite the increased use of the qualitative methods in health care research, studies using these methods are still limited in implant dentistry.

While the first study explored the patient opinions of how implant overdentures could affect eating (Hyland et al., 2009), the second study compared the patients 'perception of two types of the attachments for implant overdentures (Pisani et al., 2017). However, both studies were part of ongoing clinical trials and have not focused on patient's perception to the minimum standard of care. In addition, patients in these studies had to fill out questionnaires which might had influenced the collected qualitative data and the participants experience

The major themes originated from the first study, *the experience of edentulousness, the public constraint, the impact of replacement conventional dentures on issues surrounding eating* and *the impact of IODs on issues surrounding eating.* The participants reported enjoyment of food in their social life and improvement in their food choices. However; there are no clear details when these participants were interviewed which might reduce the possibility of obtaining in-depth information about their experience. In addition, their experience with conventional complete dentures might change their experience with the implant's overdentures.

Denture retention and stability are considered the most important aspect to improve function with different attachment systems for implant overdenture. Cleaning the attachment was a major problem among some participants treated with different attachment systems of implants overdentures as patients experienced difficulty cleaning the attachments in the Pisani 2016 study. In addition, interviewing participants was done after a short period of time which might conceal the patient's experience with the overdentures retained by different attachment systems.

Although the included quantitative and qualitative studies provided considerable insight into the impact of using two-implants overdenture on improved patient satisfaction and quality of life, there was relatively little information about the lived experience of complete tooth loss and having the two-implants overdentures as a minimum standard of care from patient perspective. The adoption of a qualitative methodology to understand the patient's prespective is crucial in dental practice. As it stems strength from generating data rooted in the reality of participants, and from the inductive nature which create data with depth and complexity that could have been challenging to obtain through structured questionnaires.

The scoping review methodology allows the analysis of a broad range of publications, however; it does not necessitate the quality assessment of publications and grading of evidence. This scoping review reveals some strengths and limitations when compared with previous systematic reviews. Thus, this scoping reviews provide an avenue for future research and have clinical and public health impact. Limitations within this review include; First: the review was restricted to articles written in English only, and thus more likely missed published work in some other areas of the world in other languages. Second: the included studies were not assessed for scientific quality; thus, the results of this review should be cautiously interpreted.

2.7. Conclusion

The review in this area has shown a wide range of findings that have utility for dental practitioners, researchers, and other stakeholders working to improve the patient' satisfaction and quality of life. Although the included studies showed that treatment of edentulous patients with two-impalnts overdenture enhanced patient satisfaction and quality of live, this literature lacks the inclusion of the patient's lived experience of living with complete tooth loss and two-implants overdentures. Thus, we need to understand these experiences in order to optimally find the most successful treatment option for treating completely edentulous individuals. More qualitative research is needed for exploring how completely edentulous patient's experience edentulism and implant treatment modalities.

2.8. Financial Support and Conflict of Interest

This research received no specific grant from any funding agency, commercial or notfor-profit sectors. The authors declare that they have no conflict of interest.

Table 1: Included Quantitative Studies

First Author, Year/ Country	Study Design	Aim	NO of Patients Age/Year(s) of Edentulism	Follow Up	Outcome(s)/ Instrument(s)	Findings
Akoglu, 2011 Turkey	Clinical Follow- up	To evaluate the patient 'satisfaction with IODs in severely resorbed mandible.	36 patients Age 45-63 years Minimum of 1 year	5 Years	Patients Satisfaction NR	All patients were satisfied with the esthetic and functional outcomes of their prosthetic treatments
Al-Zubeidi, 2012 New Zealand	Randomized Clinical trial	To evaluate patient satisfaction before and after 5 years of wearing mandibular two-implant overdentures using different attachment systems.	106 patients Mean age 65.3 NR	5 Years	Patient Satisfaction VAS	Mandibular two-implant overdentures, in the majority of patients, significantly enhanced levels of patient satisfaction for 5 years.
Alfadda, 2009 Canada	Longitudinal study	To present patient-based outcomes of an immediate- and conventional loading protocol of with mandibular overdentures in edentulous patients 5 years following initial placement	57 patients NR Edentulous for a mean of 17.75 ± 17.37 years	5 Years	Patient Satisfaction & OHRQoL VAS OHIP 20	The long-term clinical and patient- mediated outcomes of immediately loaded dental implants with a bar- retained mandibular

Allen, 2006 UK	Randomized Clinical trial	Assessment of implant- retained overdentures (2 implants) versus conventional complete dentures reporting clinical and OHRQoL outcomes	118 patients/ IOD: 62 patients Mean age, 64.5 [SD 8.8] yrs. More than five years	3 Months	Patient Satisfaction & OHRQoL VAS OHIP 49	Significant improvement in OHRQoL and denture satisfaction was reported by both groups. There were no significant post-treatment differences between the groups, but a treatment effect may be masked by the application of "intention to treat" analysis. The pre-/post-treatment OHIP change scores were significantly greater for those receiving implants than for those who refused them.
Awad, 2000 Canada	Randomized Clinical trial	To compare OHRQoL patients with IOD and patients with CD conventional prostheses	102 Patients Age 35-65 Years A minimum of 10 years	2 Months	Patient Satisfaction& OHRQoL VAS OHIP 49	Patients who received implant overdentures experienced more improvement in their perceived oral health than do patients who received conventional treatment.
Awad, 2003 ^a Canada	Randomized Clinical trial	To compare the relative efficacy of mandibular overdentures retained by only two implants and a bar attachment with conventional dentures.	102 Patients Age 35-65 Years A minimum of 10 years	2 Months	Patients Satisfaction VAS	Patients who wore mandibular overdentures supported by two implants with a bar attachment experienced significantly greater general satisfaction, ease of chewing, stability, and comfort with their prostheses than patients with conventional dentures. In addition, implant therapy provided significantly more improvement in ease of chewing foods with different textures.
Awad, 2003 ^b Canada	Randomized Clinical trial	To compare elderly patients' satisfaction and oral health–related quality of life with mandibular two-implant	N= 60 patients /30 patients IOD Mean age 69.3 years	2 Months	Patient Satisfaction& OHRQoL VAS	Elderly patients who received a mandibular- overdenture retained by ball attachments on two implants opposed by a maxillary conventional denture had significantly better oral

		overdentures and conventional dentures	A minimum of 5 years		OHIP- 49 OHIP EDENT	function than those who were given mandibular and maxillary conventional dentures. In addition, the implant group re- ported significantly better OHRQL
Awad, 2014 International	Non- Randomized Clinical trial	To compare OHRQoL in subjects receiving 2- implant supported mandibular overdentures and conventional dentures	203 patients/ 102 IOD Mean age:68.8 years NR	6 Months	OHRQoL OHIP 20	The proportion of patients who showed improved OHIP-20 scores at 6 months was higher in the groups receiving implants in comparison with those receiving conventional dentures.
Bakka, 2002 Denmark	Prospective Study	To assess patient' satisfaction with implant- supported mandibular overdentures	12 Patients mean age was 63 years (51 to 70 years) At least 5 year	5 years	Patients Satisfaction Questionnaire	All patients reported marked functional improvement after implant supported overdentures treatment. No difference between groups with respect to attachment system.
Bilhan, 2011 Turkey	Crossover RCT	To evaluate edentulous patient' OHRQoL treated with IOD with different attachments	25 patients Mean age 57.3 years NR	3 Months	OHRQoL OHIP 14	Self-aligning attachments for mandibular overdentures retained by 2 attachments are comparable to ball attachments in OHRQL and may be superior in cases of reduced space for attachment placement.
Boerrigter, 1995 The Netherland	Randomized Clinical trial	To compare denture satisfaction of edentulous patients treated with implant- overdentures and full dentures	157 patients/ IOD 86 patients Mean age 56 +/- 9, range 35-84 years At least 1 year	12 Months	Patients Satisfaction Validated Questionnaire	For patients with a severely resorbed mandible, overdentures retained by dental implants appear to provide a more satisfactory solution to their denture-related problems

Bryant, 2015 Canada	Randomized Clinical trial	To assess the satisfaction of edentulous participants with removable complete overdentures attached to 1 or 2 mandibular implants.	86 Patients/ 33 patients IOD mean age, 67 y at least 6 months	5 Years	Patients Satisfaction VAS	There were no significant differences after 5 y in satisfaction or survival of implants with mandibular overdentures retained by 1 implant or 2 implants
Cakir, 2014 Turkey	Prospective Study	To compare patient satisfaction and QoL in in subjects receiving mandibular complete dentures and IOD	116 patients/ IOD:29 Patients Aged 36 to 81 A minimum of 5 years	12 Months	OHRQoL OHIP 14 OHRQoL-UK	The implant- supported FPD group, Group 2 (5.14 \pm 2.08). The OHIP-14 ratings showed a similar trend with improvements across all domains except social disability in the implant- retained over- denture group. All four groups experienced significant improvement of OHIP-14 and OHQoL-UK scores. The OHIP-14 questionnaire revealed the most significant difference in the implant- retained overdenture group, Group 1
Cardoso, 2016 Brazil	Non- Randomized Clinical trial	To assess the (OHRQoL) of patients rehabilitated with dentures & IOD	50 patients/ IOD: 25 patients Age 44-75 Years 22.7 years for IOD group	3 Months	OHRQoL OHIP-EDENT	The results of this study suggest that treatment with immediately loaded 2- implant mandibular overdenture associated with maxillary conventional denture provides better masticatory efficiency and oral health–related quality of life than upper and lower conventional dentures.
Cune, 2010 The Netherlands	Crossover RCT	To evaluate patient satisfaction with two- implant mandibular overdenture treatment with different attachment	14 Patients Age 33-56 Years NR	10 Years	Patients Satisfaction VAS	There was no marked difference in patient satisfaction between subjects with ball-socket– and bar retained two- implant mandibular overdentures at initial evaluation and after 10 years of function. Furthermore, patients'

		types after 10 years of function				appreciation for their two implant– retained mandibular overdenture was and remained high at initial observation and after a decade.
De Kok, 2011 USA	Randomized Clinical trial	To assess patient satisfaction and OHRQoL (pre and post) 2 implants OD	20 patients/ IOD: 10 patients Age: NR At least 3 months	12 Months	Patient Satisfaction& OHRQoL VAS OHIP 49	The two-implants overdenture had significant and positive effects on patient satisfaction and quality of life with relatively rare prosthetic complications.
De Souza, 2015 Brazil	Randomized Clinical trial	Comparison of mandibular overdentures retained by 2 or 4 mini- implants with standard implants	120 patients/ 40 patients IOD Age 59.1 yrs. NR	12 Months	Patient Satisfaction& OHRQoL VAS OHIP EDENT	OHRQoL and satisfaction improved in all groups post- treatment, with most favorable results in patients with mini- implant-retained mandibular overdentures. However, the provision of mini implants was associated with considerably higher implant failure rate than observed for standard implants
Ellis, 2009 UK	Crossover RCT	To compare ball and magnet attachments within implant-supported mandibular overdentures (ISMOD) using patient centred outcome measures	18 Patients Mean age 64.31+/- 7.93 At least 5 years	6 Months	Patients Satisfaction VAS	IODs retained by ball attachments achieve greater satisfaction scores than those retained by magnets. However, both retainer designs provided patients with a significant increase in satisfaction from baseline. While the majority of patients expressed a preference for the ball attachment as a result of improved stability, one- third of patients preferred the magnetic retainers highlighting comfort as the most significant attribute of the retainer design influencing this decision.

Emami, 2011 Canada	Randomized Clinical trial	To compare the effects of IODs and conventional dentures on (OHRQoL) and perceived general health at a one-year follow-up.	255 Patients/ 2IOD:127 Patients Mean age 70.0 ± 4.8 NR	12 Months	OHRQoL OHIP 20	Mandibular two-implant retained overdentures provide significant long- term improvement in oral health related quality of life. Oral health related quality of life is a significant predictor of perceived physical health.
Farias, 2012 Brazil	Randomized Clinical trial	To evaluate patient satisfaction with conventional dentures (CDs) or implant- retained mandibular overdentures	29 Patients; IOD patients 14 Mean age 67 years NR	3 Months	Patients Satisfaction Validated Questionnaire	Mandibular IOD treatment group showed significantly higher patient overall satisfaction than CD group. The method used to quantify patient satisfaction concerned 12 factors that covered the three major purposes of complete denture treatment: recovery of chewing, speech and aesthetics.
Geckili, 2011 Turkey	Crossover RCT	To assess the impact of two-implant retained overdentures on OHRQoL	78 Patients Age 65–82 At least 1 year	6 Months	OHRQoL OHIP 14 & OHRQoL-UK	Patients who received two-implant retained overdentures that replaced conventional complete dentures reported significant improvement after treatment in terms of life quality.
Geckili, 2012 Turkey	Randomized Clinical trial	To compare patient satisfaction, quality of life, and bite force with respect to implant support for complete dentures	100 patients; IOD: 50 patients Mean age 67.86 Years NR	4 Years	Patient Satisfaction& OHRQoL VAS OHIP 14	after 4 years of function, subjects wearing mandibular overdentures supported by two implants had higher values for bite force and patient satisfaction scores, but similar QOL scores when compared to conventional complete denture-wearers.

Harris, 2013 Ireland	Randomized Clinical trial	To determine the difference in patient satisfaction and OHRQoL in patients treated with CDs & IODs	112 Patients/ 60Patients IODMean age 64yearsAt least 2 years	3 Months	Patient Satisfaction & OHRQoL Denture questionnaire OHIP 14	Significant improvement on the functional limitation, physical pain, psychological discomfort, physical disability, social disability, psychological disability, and handicap scales of the OHIP for IOD group. Significant improvement on most scales of the Denture Satisfaction Ouestionnaire for IOD groups.
Heydecke, 2003 Canada	Randomized Clinical trial	To compare the oral health-related and general quality of life of seniors, who received either mandibular implant overdentures or conventional dentures	60 Patients /30 patients IOD Age 65–75 years 5 years of edentulism	6 Months	OHRQoL OHIP 20	Patients who received mandibular implant overdentures 6 months before had significantly better oral health status than patients given conventional removable dentures. Within the implant group, there was also an improvement in certain aspects of general health, particularly vitality, role emotional and social function.
Heydecke, 2005 Canada	Randomized Clinical trial	To assess the impact of implants on social and sexual activities in subjects with new mandibular conventional complete dentures or 2- IOD	102 patients/ IOD: 54pateints Mean age: 51.2 yrs. At least 10 year	2 Months	OHRQoL OHIP 49	Improvements in OHRQoL were reported for each group, but improvement was significantly better for subjects receiving implants versus those receiving conventional dentures
Hobkirk, 2009 UK	Case Control	To compare patient' satisfaction and OHRQoL in IOD & CD patients	60 patients /30 patients IOD Age: NM more than 25 years	7 Years	Patients Satisfaction Denture satisfaction Questionnaire & OHIP 14	Patients with IOD continued to be more satisfied with their overdenture and their diet than those using CD

Jabbour, 2012 Canada	Randomized Clinical trial- Follow-up	To determine the stability and magnitude of the effect of IODs on OHRQoL	172 Patients Mean age 71 (SD4.5) NR	2 Years	OHRQoL OHIP 20	Participants wearing IODs reported better OHIP scores than those wearing CDs.
Kapur, 1999 USA	Randomized Clinical trial	To compare the benefits perceived by patients who received a new maxillary denture and a (CD) and (IOD).	89 patients; IOD 52 patients 48-75 Years NR	Before/After Treatment	Patients Satisfaction Validated Questionnaire	No significant difference between groups post-treatment in regard to patient satisfaction, but it is higher in the implant overdenture group
MacEntee, 2005 Canada	Randomized Clinical trial	To evaluate patients' satisfaction of IOD with different attachments.	68 patients; 2IOD: Mean age 62 Years at least 1 year	3 Years	Patients Satisfaction VAS	There was low satisfaction generally at baseline with the previous dentures, but the new implant- retained dentures in both attachment groups improved the participants' overall satisfaction significantly (P,.05) and dramatically.
Matthys, 2019 The Netherlands	Comparative Cohort	To compare the differences between ball and locator 2IOD with respect (OHRQoL)	90 Patients mean age 658 years NR	5 Years	OHRQoL OHIP 14	Balls and locators yield stable 5-years implant outcome and improved Oral Health Related Quality of Life (OHRQoL)
Meijer, 2003 The Netherlands	Randomized Clinical trial	To evaluate patient' satisfaction with CD & 2IOD after 10 years	121 Patients; 2IOD: 61 patients 65.9-+ 11.6 years At least 1 year	10 Years	Patients Satisfaction Denture satisfaction Questionnaire	There was a significant difference between complete denture and IOD and the mean scores were higher in the implant group.

Mendes, 2016 Brazil	Randomized Clinical trial	To evaluate the effects of replacing poorly fitting dentures on patient's masticatory function, satisfaction and oral health related quality of life.	16 Patients Mean age 59.2 years NR	6 Months	Patient Satisfaction& OHRQoL VAS OHIP-EDENT	It had been concluded that patient satisfaction and aspects of quality of life improved immediately after denture replacement
Menassa, 2016 Canada	Randomized Clinical trial- Pilot	To evaluate patient satisfaction, and OHRQoL with regard to the implants' immediate loading protocol in edentate individuals.	18 Patients Age 62.4+_7.7 Years More than 1 year.	4 Months	Patient Satisfaction& OHRQoL VAS OHIP 20	The ILP of two un-splinted implants with a mandibular overdenture significantly improved satisfaction and short-term OHRQoL, and appears to meet expectations in edentate patients
Merickke-Stern, 2009 Switzerland	Crossover RCT	To compare two designs of a rigid bar connecting two mandibular implants.	20 Patients Age 52-74 years At least 3 years	12 Months	Patients Satisfaction VAS	Patient satisfaction with implant overdentures in the mandible is high. Patient's demands for proper function seem to be fulfilled. The comparison between both bar types revealed that service provided because of screw loosening was higher with the attachment bar than with the simple rigid bar. However, patients seem to perceive better retention and stability if attachments are soldered to the rigid bar.
Muller, 2013 Switzerland	Randomized Clinical trial	To investigate denture satisfaction following the conversion of complete dentures to implant overdentures (IOD) in very old edentulous patients	45 patients/ 2IOD 16 patients Age 85_+6.19 years 11.1 ± 8.36 years of edentulism	12 Months	Patient Satisfaction& OHRQoL VAS OHIP-EDENT	Stabilizing existing lower dentures by means of 2 short regular-diameter intermorainal implants in very old edentulous patients who are dependent for the activities of daily living provides significantly higher denture satisfaction than that of a conventional reline. Therefore, the hypothesis has to be rejected. High survival and success

rates confirm the feasibility of the IOD treatment concept.

Mumcu, 2012 Turkey	Clinical trial	To compare the quality of life and patient satisfaction outcomes of two attachment systems in mandibular overdentures	62 patients Age range: 52–90 years 183.10 ± 128.62 months	NR	Patient Satisfaction & OHRQoL VAS OHIP 14	ISMOD supported with four implants and bar attachments shows the highest quality of life score, whereas patient satisfaction is not influenced by the number of implants or attachment type.
Naert, 2004 The Netherlands	Randomized Clinical trial	To compare the patient satisfaction with prosthetic care in two- implant-retained mandibular overdentures, whether implants were splinted with a bar or left with magnets or ball attachments	36 patients 63.7 Years At least 1 year.	10 Years	Patients Satisfaction VAS	Patient satisfaction with the mandibular overdenture was rated similar for splinted and un-splinted groups, but the magnet group scored lower for chewing comfort and stability compared to the ball group. The bar group scored lower for comfort and stability of the maxillary denture.
Pera, 1998 Italy	Clinical trial	To determine the patient's satisfaction of edentulous subjects rehabilitated with complete removable denture, before and after anchorage to implants	12 Patients Age 53-78 years NR	12 Months	Patients Satisfaction VAS	The objective results of this study confirm the general satisfaction expressed subjectively by patients rehabilitated with an overdenture on implants. The degree of satisfaction with the rehabilitation was significantly higher in the post-implant than in the pre- implant situation.
Raghoebar, 2003 The Netherlands	Randomized Clinical trial	To assess the satisfaction of the patients treated with 2IOD and other modalities	75 patients/ 2IOD 32 patients Age 58.2 _+ 12.6 years	10 Years	Patients Satisfaction Validated Questionnaire	The success use of implants has reduced the need for conventional pre- prosthetic surgery as a sole means to improve denture retention and stability, but in some cases, a

			19.9 ± 11.5 years of edentulism			combination of pre-prosthetic surgery and implants is necessary to create a stable and reliable basis for implants.
Rashid, 2011 International	Observational Study	To determine patient satisfaction with either conventional dentures or mandibular 2-implant overdentures in a 'real world' setting	102 patients/2IOD: 49 patients Mean age 68.8-+ 10.4 years NR	6 Months	Patients Satisfaction VAS	The results observed here, combined with findings from other studies, suggest that mandibular 2-implant over- dentures are a more satisfactory therapy than conventional dentures for edentulous individuals.
Reis, 2019 Portugal	Randomized Clinical trial	To compare immediate and early loading protocols for mandibular overdentures with two- splinted narrow- diameter implants	24 patients Age 67-+ 9 years At least 6 months	12 Months	Patients Satisfaction VAS	There was a slight in- crease (or maintenance) of the mean patient satisfaction at the 6-month evaluation, with no statistically significant differences be- tween the two periods
Sun, 2014 China	Randomized Clinical trial	To evaluate OHRQoL in patients with implant- retained mandibular overdentures	50 patients mean age 62 years At least 5 years	6 Months	OHRQoL OHIP 49	Implant-retained mandibular overdentures can significantly improve patients OHRQoL. The improvement in OHRQoL is mainly because of the improved functional performance. An improved chewing experience and pain relief also plays a role in the improvement of OHRQoL.
Thomason, 2003 Canada	Randomized Clinical trial	To examine patient satisfaction with CD and mandibular implant overdentures	60 patients /30 patients IOD Age 65-75 years More than 5 years	6 Months	Patients Satisfaction VAS	Edentulous seniors who received two- implant mandibular overdentures opposing a conventional maxillary complete denture rated general satisfaction, comfort, stability, and ability to chew significantly higher than did a comparable group provided with new conventional mandibular and maxillary dentures.

Timmerman, 2004 The Netherlands	Randomized Clinical trial	To evaluate participants' satisfaction 8 years following delivery of the prostheses.	103 Patients/ 2IOD 73 patients Age 39 and 87 yrs. At least of 10 years	8 Years	Patients Satisfaction NR	Patients with 2 implants and ball attachments were found to be less satisfied with the retention and stability of the mandibular overdenture than were those with the splinted implants.
Walton, 2002 Canada	Randomized Clinical trial	To evaluate patient 'satisfaction with 2IOD with different attachments	64 Patients Age 41.4 to 88.9 years At least 1 year	12 Months	Patients Satisfaction VAS	There were no significant differences between mandibular IODs retained by different attachments. However, the dentures retained by ball attachments required more repaired than other dentures.
Walton, 2009 Canada	Randomized Clinical trial	To assess patient' satisfaction with implant- supported mandibular overdentures	86 Patients/ 44 patients 2IOD Mean age 66 years At least 6 months	12 Months	Patients Satisfaction VAS	No difference between groups treated with one or two implants in the patient' satisfaction with the study over 1 year
Yunus, 2014 Malaysia	Prospective Study	To compare OHRQoL and Patient satisfaction of edentulous patients treated with IOD and CD	17 patients Mean age 61.2 years At least 6 months	12 Months	Patient Satisfaction& OHRQoL Validated questionnaire OHIP 14	Edentulous patients who self-selected and were provided with mandibular telescopic crown at attachment- retained implant overdentures showed significant improvement in oral health- related quality of life, mandibular overdenture satisfaction, and masticatory performance compared to

						mandibular conventional complete dentures
Yunus, 2016 Malaysia	Prospective Study	To assess the (OHRQoL) of patients treated with mandibular implant- supported overdenture and complete dentures.	48 patients/ 28 Patients 2IOD Mean age 61.5; SD 9.1 years At least 6 months	12 Months	OHRQoL OHIP 14	Improvement in OHRQoL occurred following both mandibular implant- supported overdentures.
Zhang, 2019 Hong Kong	Prospective Cohort	To evaluate patient- reported outcome measures and treatment outcomes of mandibular two-implant retained overdentures (IOD)	103 patients/ 80 patients 2IOD Mean age 71.3 years At least 3 years	5 Years	Patients Satisfaction Validated questionnaire	Overall patient satisfaction scores showed significant reduction after phase I and further decreased significantly after phase II. Therefore, patients were more satisfied after optimal CD treatments and reached the highest satisfaction level after IOD delivery
Zygogiannis, 2018 The Netherlands	Randomized Clinical trial	To assess patient satisfaction and OHRQoL of patient treated with 2 IOD with immediate loading protocol	50 patients/ 2IOD:25 Patients 2IOD Aged 47-83 Years At least 6 months	12 Months	Patient Satisfaction & OHRQoL VAS OHIP 20	A significant improvement in patients' satisfaction and QoL after using implants to stabilize dentures regardless of the type of loading protocol.

Table 2: Included Qualitative Studies

First Author, Years / Country	Aim	Number of Participa nts	Age range (Ys)	Method of Data Generation	Method of Data Analysis.	Themes Identified
Hyland 2009 UK	To obtain qualitative data from patients on the impact of edentulousness and common prosthetic rehabilitation techniques on issues surrounding eating (emotional, social and functional)	33 Patients	44–82 years	Semi- structured interviews	Thematic content analysis By using NVivo	The experience of edentulousness The public constraint The impact of replacement conventional dentures on issues surrounding eating The impact of IODs on issues surrounding eating
Pisani 2017 Canada	To gain a deeper understanding of patient perceptions of wearing implant-retained overdentures with ball-shaped or cylindrical attachment systems used to retain and support mandibular implant overdentures.	22 Patients	68–81 years	Semi- structured interviews	Thematic content analysis	The importance of retention and stability The importance of improving oral function Presence of pain Hygiene Previous experience with attachments Confidence

Table 3: Database: Ovid MEDLINE(R) ALL <1977 to November 19, 2019>

Search Strategy:

- 1 exp Patient Satisfaction/ (85255)
- 2 exp Oral Health/ (15203)
- 3 exp "Quality of Life"/ (181255)
- 4 exp Patient Reported Outcome Measures/ (3827)
- 5 exp Health/ (345494)
- 6 patient* satisfaction.tw,kf. (37485)
- 7 quality of life.tw,kf. (259828)
- 8 exp Patient Outcome Assessment/ (8467)
- 9 exp Treatment Outcome/ (997485)
- 10 patient* preference.tw,kf. (5157)
- 11 (patient* and (centered or reported)).tw,kf. (706391)
- 12 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (2223276)
- 13 (complete adj3 tooth adj3 loss).tw,kf. (55)
- 14 (edentulous* or edentate or edentulism).tw,kf. (12236)
- 15 Mouth, Edentulous/ or Jaw, Edentulous/ (8341)
- 16 13 or 14 or 15 (15364)
- 17 Dentures/ or Denture, Complete/ or Denture, Overlay/ (16345)
- 18 Dental Prosthesis, Implant-Supported/ (8221)
- 19 Dental Prosthesis/ (3662)
- 20 exp Dental Implantation/ (21195)
- 21 exp Dental Implants/ (22174)
- 22 ((implant\$ or restor* or rehabilitat*) and (dental* or oral*)).tw,kf. (58442)
- 23 (denture* or overdenture* or prosthes?s).tw,kf. (104370)
- 24 17 or 18 or 19 or 20 or 21 or 22 or 23 (175072)
- 25 12 and 16 and 24 (3019)
- 26 limit 25 to english (2822)

Table 4: Database: Embase Classic+Embase ALL <1977 to November 19, 2019>

Search Strategy:

- 1 exp Patient Satisfaction/ (132298)
- 2 exp "Quality of Life"/ (480480)
- 3 exp Patient Reported Outcome/ (17790)
- 4 exp Health/ (689766)
- 5 exp Treatment Outcome/ (1564492)
- 6 patient* satisfaction.tw. (53955)
- 7 quality of life.tw. (408330)
- 8 patient* preference.tw. (7990)
- 9 (patient* and (centered or reported)).tw. (1201091)
- 10 (complete adj3 tooth adj3 loss).tw. (60)
- 11 exp edentulousness/ (8504)
- 12 (edentulous* or edentate or edentulism).tw. (12257)
- 13 10 or 11 or 12 (16021)
- 14 exp tooth implant/ (11320)
- 15 exp tooth implantation/ (27462)
- 16 exp tooth prosthesis/ (89659)
- 17 exp implant-supported denture/ (983)

18 denture/ or complete denture/ or overlay denture/ or complete lower denture/ or complete upper denture/ (49493)

- 19 ((implant\$ or restor* or rehabilitat*) and (dental* or oral*)).tw. (68920)
- 20 (denture* or overdenture* or prosthes?s).tw. (123177)
- 21 14 or 15 or 16 or 17 or 18 or 19 or 20 (239574)
- 22 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 (3616914)
- 23 13 and 21 and 22 (3359)
- 24 limit 23 to english (3135)



Figure 1: PRISMA Flow Diagram of Study Selection:



Figure 2: Number of Publications per Year

Figure 3: Number of Studies per Country



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Zygogiannis, K., Aartman, I. H., & Wismeijer, D. (2018). Implant Mandibular Overdentures Retained by Immediately Loaded Implants: A 1-Year Randomized Trial Comparing Patient-Based Outcomes Between Mini Dental Implants and Standard-Sized Implants. *International Journal of Oral & Maxillofacial Implants, 33*(1), 197-205. doi: https://dx.doi.org/10.11607/jomi.6009 The previous chapter presented an original scoping review that summarized and synthesized the current state of empirical, peer-reviewed, scholarly literature examining the impact of using two-implants overdentures in treating completely edentulous patients on patients satisfaction and quality of life.

From this review, we can understand the complexity and the impact of complete tooth loss and dental implant treatment on edentulous patients. The edentulous individuals often go through different life experiences due to the physical, social and psychological aspects related to their condition. These complex and different aspects related to complete edentulism drive many dental clinicians and researchers who are interested in this area to investigate in-depth the consequences for living with complete tooth loss edentulism and dental implants prostheses.

The review in this area has shown a wide range of findings, it becomes apparent that this literature lacks clarity and consistency that are sufficient to explain the wide variation observed. Most of the included studies have shown that the two-implants overdentures enhanced patients' satisfaction and quality of life. However, they reveal the lack of information and understanding in the participants' perspectives towards this prosthetic treatment modality. In addition, they have not explained the reasons for these variations in studies outcomes and the process by which these outcomes are reached. Finding the reason behind these variations from the point of view of the individuals who are experiencing the phenomenon of interest themselves, might be the

most critical perspective that could enhance our understanding to plan the most favorable treatment outcome for these individuals

The importance of edentulous patients' perspectives is increasingly emphasized for it's potential to describe this complex process in a more combined way. Thus, understanding the lived experiences can help the clinician and dental care providers reach the optimum treatment choice for edentulous individuals.

Additionally, a specific methodology may be needed to explore the experience of living with a specific phenomenon, as edentulous individuals may have unique experiences that can be hard to examine and explore with constructed questionnaires. One such methodology is interpretive phenomenology analysis, used to explore the lived- experience of a phenomenon. In particular, this approach focuses specifically to uncover and expand our understandings of the often missed and unclear human lived experience (Gadamer, 1996). Interpretive phenomenology analysis stems strength from having data rooted in the reality of participants, and from the inductive nature of this methodological approach which generates data with depth and complexity that could hardly have been obtained through traditional quantitative methodologies.

To date, patients experiences with two implants-supported prostheses by using qualitative methods remain unexplored; for that, we intend to explore in depth this phenomenon. To enrich our knowledge, further research is required through which patients could clearly express their perceptions and views of being completely edentulous and having implant prosthetic rehabilitation. As such, the purpose of this study is to explore the experiences of edentulous patients with two-implants overdentures opposed with upper complete dentures. Exploring this phenomenon can benefit dental clinicians as well as patients themselves to achieve more optimal oral and general health quality.

The third Chapter presents the detailed methodological approach that I used.

In this chapter, I present the research approach used for this study, Interpretive Phenomenological Analysis (IPA). I follow this section with a discussion of the philosophy behind this approach, and a description of the specific methods used throughout the research process, including participant recruitment, sampling strategy, data collection, and analysis methodology. Finally, I discuss how I ensured trustworthiness, credibility, and methodological rigor, as well as the steps taken to respect ethical considerations as a researcher towards the participants in the study.

3.1. Qualitative Approach

This qualitative study is positioned within an interpretivist paradigm. The ontology that guides this study endeavors to "understand the human lived experience of a phenomenon" and thus considers that "reality is socially constructed by study participants" (Smith et al., 2009, p. 54). This paradigm is best represented by interpretive phenomenological study, as defined by Smith and his colleagues (2009). This methodology is a form of naturalistic inquiry which allows the researcher to offer a thorough interpretation of a phenomenon of interest (Lincoln & Guba, 1985). It also enables the study participants to share in more depth their personal lived experiences in a natural context. Using this methodology, we are better able to acknowledge and understand the participants' experiences living with complete edentulism and implant-supported overdentures, the meaning they gave to these experiences, and why they gave those meanings to their experiences.

The main focus of this study was to explore the meanings of the lived experience of complete tooth loss for edentulous patients as treated with the two-implants overdentures (minimum standard of care). Since this study best suited in a qualitative paradigm, I adopted a qualitative interpretive phenomenological approach to guide the research process (Hovey, 2007; Reiners, 2012).

This approach, Interpretive Phenomenology Analysis (IPA), is a qualitative research approach that has been recently developed for use within the practice of psychology, human health, and social sciences to explore, examine, and interpret the lived experiences of the research participants (Smith et al., 2009; Alase, 2017). IPA draws heavily from phenomenology and hermeneutic philosophical theories that were developed in the 20th century. As Max van Manen (1990) a phenomenological scholar and educator offered, phenomenology is the lived

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experiences of study participants (phenomenology), the interpretation of narratives (text) and the experiences in life that they had lived and experienced (hermeneutics).

3.2. Phenomenology

Phenomenology is a qualitative research approach grounded in a complex philosophical tradition concerned with exploring and understanding human lived experiences (van Manen, 1990; Wojnar & Swanson, 2007; Smith et al., 2009; Englander, 2012). It helps to ground researchers within an inquiry paradigm, and to make philosophically based methodological considerations when exploring human experiences and their meanings. In essence, phenomenology as a research approach is one that allows the researcher to explore lived experiences from the participants' own perspective in relationship with others (Smith et al., 2009; Tuohy et al., 2013; Hovey et al., 2016).

Phenomenological research can be conducted from multiple perspectives, two of which include: Husserl's empirical (descriptive) phenomenology and Heidegger's hermeneutic (interpretive) phenomenology (Smith et al., 2009; Sloan & Browe, 2014). Descriptive phenomenology endeavors to describe a phenomenon as they appear to the human consciousness, and was introduced in the early 20th century by Dutch philosopher Edmund Husserl (1859-1938), a man most often known as the "founding father" of phenomenology. This phenomenology is a self-reflexive philosophical approach and utilizes 'intentionality', which means to intentionally direct one's focus to identify the essences of phenomena of interest and explore the nature of human consciousness. Husserl assumed that understanding and describing a phenomenon requires set away 'bracketing out' from pre-understanding and preconceived notions that would otherwise impact how phenomenon is understood, and therefore focuses mainly on the objective essence of "lived experience" as it appears through consciousness (Burch, 1990; Smith et al., 2009; Sloan &

Browe, 2014). Thus, phenomenological researchers must go back to the phenomenon itself while setting aside (bracketing) their pre-understandings in order to access the essence of a phenomenon directly. This shapes the intention of descriptive phenomenology; to give a deep and rich description of the essence of the phenomenon rather than just provide an interpretation of its meaning (Silverman, 1984).

A former student of Edmund Husserl, Martin Heidegger (1889-1976) argued that human consciousness is a construction of a human's own context, and as human beings in this world, we are thrown into our individual experiences and life context. Heidegger argued that it is not possible to bracket out subjectivity and meaning is constructed through communications between people and within their relationships.

Heidegger also considered the phenomenologist or the researcher as a participant themselves who is making meaning through his/her interpretation and self-understanding, dispensed through language and experiences of beings-in-the-world (Heidegger 1962; Smith et al., 2009). In addition, Heidegger believed that it was impossible for individuals to set aside pre-understandings and preconceived notions and they rather were seen to be integral to the research process (Heidegger, 1962; Smith et al., 2009; van Manen, 2017). Therefore, human understanding of a phenomenon of interest is a product of the relationship between reality and consciousness (Moustakas, 1994). Heidegger's phenomenological understanding that intersubjectivity represents how human experience is constructed through interpersonal interactions of the subject personal world. Smith and others identified the term of intersubjectivity as "the shared, overlapped and relational nature of our engagement in the world" (Smith et al., 2009, P.17). From a Heideggerian perspective, a human understanding stems from experiencing the world intersubjectively and consequently making inevitable interpretation of his' own understanding. Smith et al. (2009) argues that "our

being-in-the-world" is always temporal and related to something. Heidegger and Smith's ideas moved phenomenology away from Husserl's theory about the existence of essential reality, to an understanding of reality as grounded in having descriptive and interpretive construction of meaning (Laverty, 2003).

Hans-Georg Gadamer (1900-2002), a hermeneutic scholar and educator, portrayed a dynamic process between participant narrative and the researcher's pre-understanding, which resonates with Heidegger's description of the relationship between fore-understanding and phenomenon. Gadamer highlighted the importance of history and the effect of tradition on the interpretive process, and also emphasized the importance of language between reader and text (Gadamer, 1990; Smith et al., 2009; Malpas, 2016). He invited the reader to be open to the text and to bring his/her fore-understandings and preconceived notions to enhance the narrative's meaning (Gadamer, 1990; Smith et al., 2009). Gadamer was more interested with the meaning of texts as opposed to the writer's objectives, and thus he aimed to promote the researcher and the reader to interpret meanings using their own understandings, beliefs, and experiences.

3.3. Interpretive Phenomenology

Interpretive or hermeneutic phenomenology explores the lived experience as described by a person as their own interpretation of a reality or life event (Smith, 2015; Hovey et al., 2016). Interpretive phenomenology increases sensitivity to humans' ways of 'Being-in-the-world' rather than providing a theory for the generalization or prediction of a specific phenomenol (Crist & Tanner, 2003). Thus, in phenomenology, the main facet of interpretive phenomenology is *co-constitutionality*— the notion that meanings are the result of the researcher and the participant's interpretation together, rather than adopting the process of bracketing out one's own experiences

and perspectives (Smith et al., 2009; Tuohy et al., 2013). As mentioned, this study is exploring the completely edentulous patients' lived experience of edentulism and having two-implant overdentures to replace their missing teeth, and thus an interpretative phenomenological approach is most appropriate which specifically investigates to uncover and expand our understandings of the human lived experince. Therefore, the findings of this study will include the edentulous participants' narratives of their experience and the interpretations from the researcher exploring this phenomenon of interest to achieve new insights on the edentulous patients' experiences of complete tooth loss and implants overdentures.

According to Heidegger (1962), the interpretive process toward enhanced understanding is circular, moving back and forth between the whole and its parts, and between the researcher's foreunderstanding and what was gathered through the research process. This process brings together a combination of meanings from both the researcher and the participants, and is referred to as the hermeneutic circle of understanding (Koch, 1995). This process moves from the individual experience of each research participant to the interpretation of these individual narratives by the researcher into one of shared experience that encompasses common experiences and understanding. Gadamer (1976) described the process of understanding and interpretation as the "fusion of horizons". In interpretive exploration, this refers to meanings that reflect different realities of study participants rather than one single true meaning or reality (Smith et al., 2009; Moules et al., 2015). Hovey et al. (2017) further used this metaphor of horizons to describe a way of communication in order to understand subjects, other perspectives, or the world. In the context of this study, the fusion of multiple perspectives from patients and dental clinicians in the field of dentistry can create a broader horizon, given that different elements such as education and personal history have uniquely impacted each person' way of thinking and understanding (Reiners, 2012; Hovey et al., 2017). In addition, the interpretive phenomenological approach relies on a philosophical notion that researchers' knowledge, values, and beliefs are imperative to guiding the research inquiry and help make this inquiry more meaningful (Lopez & Willis, 2004; Gadamer, 2007; Hovey et al., 2017). Assuming that researchers cannot bracket out fore-structures and presuppositions, the variability amongst individuals might lead to unique research questions and approaches, and should be considered valuable in enhancing the quality of the research process (Koch, 1995).

To provide an example in dentistry, IPA has been used to explore the meaning of living with orofacial pain (Hazaveh & Hovey, 2018). Havaveh and Hovey (2018) found that many orofacial pain sufferers were not satisfied with the healthcare system. Orofacial pain patients, who felt judged and criticized by dental care practitioners, wanted to be treated with sympathy and compassion (Hazaveh & Hovey, 2018). This highlighted the need for patients' experience to be considered when treating orofacial pain patients. Using interpretive phenomenology, Italia (2017) were also able to better understand the influence of orofacial pain on diet and social life. The authors claimed that a change in diet is a common consequence of orofacial pain, and may contribute to a change in personal identity. However, health care providers could help them to go away from social isolation to social engagement by helping them learn specific strategies to cope with pain (Italia, 2017). Thus, the interpretive phenomenology approach provides a unique insight of understanding chronic orofacial pain patients' experiences (Hazaveh & Hovey, 2018; Italia, 2017).

The adoption of IPA allows the researcher to explore the meaning of lived experiences as presented by participants, rather than following the available theoretical conceptions. Through interpretive phenomenology, participants can tell their story in conversation rather than a structured interview. Thus, participant can reflect and elaborate on their lived experience, at the same time allowing the researcher to reflect on their previous experiences and preconceptions and how this may relate to their interpretation and understanding of the patient's experiences (Benner, 1994; van Manen, 2014; Hovey et al., 2016).

3.4. Methods

Research Questions

As identified in the scoping review manuscript presented in the previous chapter, there exists a lack of clarity about the lived experinces of tooth loss and prosthetic rehabilitation with two-implants overdentures as the minimum standard of care. This study was designed to fill in that gap and focuses on the experiences of completely edentulous patients.

Through this study, I explored four questions:

- How do edentulous patients experience complete tooth loss?
- How do complete tooth loss is perceived functionally and socially?
- How do completely edentulous patients experience the two implants lower overdenture?
- How is the two implants lower overdenture perceived functionally and socially?

As mentioned, the intention of researchers adopting IPA methodology is to collect data that describes patients experiences and understandings of particular phenomena from the people who experience them (Smith et al., 2009; Davis, 2013; Hovey et al., 2016). Hence, this approach is the most appropriate to answer research questions that focus on personal meaning and sense-making

in a particular context, for people who share a particular experience (van Manen 1990; Smith et al., 2009).

Using the IPA approach, data was collected from completely edentulous patients who have been edentulous for a long time and treated with the minimum standard of care. The research questions explore patient experience and are aligned with the philosophical underpinnings of IPA and conform with the IPA guidelines (Laverty, 2003; Finlay, 2009; Smith et al.,2009; Hovey & Craig, 2012). As a researcher, I am specifically interested in how these participants make sense of the meaning of complete tooth loss, and of the experience of dental implant rehabilitation, and what we could learn as researchers and health care providers about this treatment modality implications for dental practice.

Participants

As this study was concerned with the lived experience of complete tooth loss and the prosthetic dentistry minimum standard of care, participant selection was based on the following inclusion and exclusion criteria to ensure that the research questions were answered by participants who would provide first-hand experiences, while keeping with the phenomenological research framework.

Inclusion criteria

- 1. Patients who experienced complete tooth loss;
- 2. Patients who had been treated with conventional complete upper and lower dentures before they receive the implants overdenture;
- 3. Patients who are wearing upper complete dentures and lower two implants overdentures;

4. Patients who are able to communicate in English and are able to sign the informed consent form.

Exclusion criteria

- 1. Patients who are completely edentulous and have been treated with dental implants other than the two implants overdentures (minimum standard of care);
- 2. Patients who are unable to provide informed consent and/or participating in the study.

All of the study participants were recruited from two cohorts of patients treated in the same dental institution, thus our sample in this study was homogenous in respect to treatment standards and practices. Despite the fact that there are many similarities among participants recruited from a homogenous sample, it is important that the sample be as diverse as possible in order gather rich and relevant data (van Manen, 1997; Polkinghorne, 2005). Participants' demographic data was collected including age, sex, educational background, age when they become completely edentulous, age of their conventional dentures, and age when they first had implant overdenture. This information helped to elicit the comprehensive meanings of lived experiences of complete tooth loss and having dental implants across patients of different backgrounds, experiences and perspectives. Heterogeneity among research participants allows for conducting in-depth examinations across areas of convergence and divergence among the sample participants (Patton, 2002). Given that the McGill Faculty of Dentistry is located in a city with a diverse, multicultural population, I felt confident that my sample choice would be diverse enough to provide rich accounts of the phenomena under investigation.

Recruitment and Sampling Strategy

Participants were recruited from two cohorts of patients treated at the McGill Faculty of Dentistry. Participants from the first group (n = seven) had been treated with implants overdentures more than fifteen years ago, while the second group (n = five) had been treated in the last three-to-eight years. Although more patients were available for recruitment from this location, the choice to limit recruitment to older patients only was made to ensure that all patients would have adequate time to experience the transition of having dental implants overdenture.

Prior to the start of this study, I was engaged in informal communications with other clinical staff members of the prosthodontics while I worked for two years as a teaching assistant. This was strongly supportive of this project and offered the opportunity to identify potential patients and understand the system of care within this department.

I sought to recruit 10 to 15 individuals who met the inclusion/exclusion criteria. Patients who met these criteria were approached by an administrative staff member from the research unit in the faculty. This member then forwarded a list of the patients who were interested in talking to me about this study. At the initial contact point, the staff explained to the patient that this research was conducted as part of my thesis and to fulfill the requirement for my doctoral studies in the Faculty of Dentistry. Patients were informed that I had no authority to discuss with them any clinical complaints that they might have nor to give them any clinical advice related to their dentures. In addition, they were informed that their choice to cease or refuse to participate in this study would not have any influence on the quality of care they would receive in future visits to the dental clinics.

The patients who agreed to take part in this study were approached to explain the purpose of the study and obtain informed consent. I made sure to the best of my ability that patients understood the need and context of their participation in this study by repeating important information and emphasizing that they understand the scope of this study prior to signing the consent form. They were also reminded that they were free to refuse to answer any questions, could discontinue their participation in the study at any point, could request that their data be removed from the study at any time. They were also informed that they could ask questions at any time during the interview or afterward.

Interpretive phenomenology sampling strategy is considered flexible and generally conducted with a small number of participants, as the main goal of the IPA approach is to give a detailed account about the perceptions and understandings of a particular phenomenon, rather than make general claims (Smith & Osborn, 2009; Englander, 2012; Mason, 2017). According to the nature of the data that is gathered, the number of participants necessary for a phenomenological study may be different between studies depending on the collected data saturation point (Laverty, 2003; Morse, 2015; Polit & Beck, 2017).

Sample sizes ranging from one to 10 participants is typically suggested for phenomenological study (Starks & Trinidad, 2007; Moser & Korstjens, 2018). Furthermore, the initial projected sample size can be adjusted depending on the saturation of the data gathered from study participants (Benner 1994). An initial sample size of 10 - 15 participants was sought during participant recruitment. Based on the quality and richness of the data collected, 12 participants data were used in analysis. Data from this group size enabled our study to uncover core elements to the patient's experience (Starks & Trinidad, 2007; Hovey, 2007).

Generally, the sample size is considered adequate when the resulting interpretations are rich and clear (Benner 1994; Hovey, 2007; Morse, 2015). The 12 participants in this inquiry afforded richness of data from a diverse population which allowed for rich and visible interpretations of the phenomenon of interest.

Data collection and Interviewing

In phenomenology, data can include information gathered from research participants as well as the researcher's reflections on the subject of inquiry in order to help draw out particular aspects of the experience from the study participants. This type of phenomenological data identifies deeper meaning, and thus helps to better interpretations and reflections as a researcher (Finlay, 2003; van Manen, 2017).

Data was gathered from one-on-one interviews, a common method of data collection in phenomenological research (Mason, 2017). This method allows for the participants' stories to be thoroughly explored, illuminated, and gently questioned (Kvale, 1996). Using an interpretive phenomenological approach as a research methodology requires the researcher's ability to get at the "lived experience" of the participants (Wimpenny & Gass, 2000). To do so, the researcher can use specific skills such as attentive listening techniques, reflectivity, seeking clarification, and asking participants to give examples, provide metaphors, and in-depth description (Jasper, 1994). The researcher needs to have a close proximity with study participants, which helps the participants be open and express their experiences during data collection. My extensive clinical experience in prosthesis dentistry also enabled me to engage with participants in a more intimate manner, while being sensitive to reported difficulties or stresses associated with edentulism and prosthetic rehabilitation. Use of an interview guide including clear open-ended questions and additional probing questions can also be used to encourage participants to elaborate and recall their experiences. However, these questions must be specific to the investigated phenomenon (Smythe et al., 2008). The research questions used in this study's interview guide aimed to evoke descriptions rather than to confirm a theory or a concept (Pollio et al., 1997). The guide started with open-ended questions then followed by more specific ones that focused on the research phenomenon of inquiry (Creswell & Creswell, 2018). Examples of some questions in the interview guide can be found in the appendices (Appendix B).

The interviews were conducted in a comfortable, safe, and private environment. Eleven of the interviews were conducted at the participants' own home out of respect for restricted mobility and hearing difficulties. I ensured that they felt comfortable to speak without disruptions or noise. Only one participant requested to conduct the interview in a public venue. In cases where the patient preferred to have the family present, the interview was conducted after ensuring that both the participant and the family member understood that it was only the patient being interviewed, and that the family should not contribute to the interview process. Only two participants of the 12 participants had family members present during the interview. Interviews were audio-recorded and transcribed verbatim for analysis. In order to be deeply engaged with the data, I consciously conducted all the transcription process of the audio-recordings.

Data Analysis

The intention of data analysis using an IPA approach is to gain a deeper insight into the participants' lived experiences and does not follow a prescribed or strict process (Giorgi, 2009; Smith et al., 2009; Englander, 2012; Hovey & Craig, 2012). The initial analysis develops early on during data collection, which helps guide subsequent interviews and direct future sampling in order

to provide a deeper, richer understanding of patient's lived experience of completely edentulous patients treated with the minimum standard of care and the meaning-making of specific phenomena in particular contexts (Smith et al., 2009; Hazaveh & Hovey, 2018; Szwimer & Hovey, 2019). Data analysis and interpretation began as soon as data begins to be collected during listening to the recordings. Throughout the interpretive process and the analysis, I wrote, reflected, and rewrote in order to develop my understanding and interpretations (Smith et al., 2009; van Manen, 2014).

In the first stage, the close reading and re-reading (multiple line-by-line reading of each transcript and understanding of each participant narrative) was performed. The goal of this stage is to help the researcher enter the participant's world and engage with the participant's narrative. In addition, this stage aids the researcher in gaining a general feeling of the nature of the data and how to develop a preliminary sense of narratives.

In the second stage, I made initial notes, including the identification of the emergent patterns or themes within this transcribed material, emphasizing both similarities and differences, convergence and divergence for single cases and across cases and lastly, providing comments on how language has been used and proposing an interpretation of the collected data.

In the third stage, I identified the emergent themes, including the development of a 'dialogue' between the researchers, their data, and their knowledge, about what it might mean for participants to have these concerns in this context, leading in turn to a more interpretive account. This aids in directing the researcher to identify "discrete chunks" of the transcript (Smith et al., 2009) which remain connected to their related descriptive, linguistic, and/or conceptual comments. However, it is necessary that the analysis of these chunks be linked back to the context of the entire interview.

In the fourth stage, I searched for connections across themes; through the development of a frame or a structure, the researcher can illustrate the relationships between emergent themes by looking for connections across the emergent themes. There are multiple common strategies for exploring connections across themes, for instance, through abstraction by putting similar themes together to create hierarchical structures of superordinate themes, or by contextualization, by looking for narrative themes that can provide a frame of understanding of referenced transcripts. Smith et al. (2009) suggested that researchers follow step one-to-four to complete one transcript and then they repeat all the steps with the next step of analysis. Thus, they can identify connections among emergent themes, and then they can then move to the fifth step of analysis.

In the fifth stage, which is moving to the next case; the organization of all of this material in a format that allows for analyzed data to be traced throughout the process, from initial comments on the transcript to initial clustering and thematic development of the final structure of the themes. Finally, looking for patterns across cases; once the analysis of all cases has been accomplished as a single case, to look for any divergences and convergences among cases.

Throughout the analysis process I followed a clear and logical order as described in the previous steps, however; it is recommended to revisit specific steps through the analysis process if needed (Smith et al., 2009). This could change the themes and the structures organization from the initial analysis, and it is in line with the interpretive phenomenology analysis theory where there is no strict rule to adhere to these specific strategies (Polkinghorne, 1989; Smith et al., 2009).

Reflective Approaches:

As mentioned, IPA researchers are encouraged to challenge their own interpretations of collected data given the difference in perspectives between them and the study participants

(Larkin, 2016). Thus, I engaged in a self-reflexive process where I asked myself what I knew and believed prior to the interview process with each participant. During the process of data analysis, I reflected on how my perspective, fore-understanding, and personal reactions came to bear on how I made sense of these accounts. This distinction between what was being said and how it was being said often struck me through my observations of participants' reactions to their own stories. I then recorded my reflections about these as notes within the transcripts. These reflections, as I had noted them during the interviews, and as I experienced them while reading the transcripts, influenced my understanding during the reading and rereading of each transcript. My own analysis of the data thus helped me to become meaningfully engaged within the interpretive process.

Smith et al. (2009) explained that "understanding the lived experience is available through a process of interpretation that takes place between the participant and the researcher" in interpretive phenomenology analysis (p .53). Thus, the participants engage in an interpretation process of their own experience through narrating this experience in the interview. While recounting their narratives, I attentively heard what participants were saying, noticing their way of disclosing their stories, and then reflecting on all that. I participated in the construction of meaning about their experience of being edentulous and treated with two-implants overdentures through my own knowledge, clinical experience and what I had read in the literature, and meanings generated by the participants' data.

3.5. Rigor and Trustworthiness

Maintaining rigor in qualitative research is essential to enhancing the credibility of research findings (Sandelowski, 1986; May & Pope, 1995). Hence in this qualitative research, credibility was created through the employment of a phenomenological approach. I chose participants with

relevant experiences to my research questions, and I gathered a thick description of data to develop in-depth knowledge about the phenomenon of interest and interpretations of each participant's narrative. In addition, I asked plain language research questions to be able to explore the study participants' lived experience, describe in detail the steps that had been taken, and explain how these questions were informed by the research process (Morse et al., 2002). To further achieve rigor and trustworthiness, I also employed reflexivity within the research process. Reflexivity is defined as "acknowledgment of the researcher biases, how these biases may influence the research study and challenges to incorporate them into the study findings" (Lamb & Huttlinger, 1989). During data collection and analysis, I maintained reflexivity by writing memos and completed an interview report form at the end of each interview. The responses helped me to analyze how my pre-understanding and experiences potentially influenced data collection and the interpretation of study results (Macbeth, 2001). Throughout the data collection process, I kept in mind that my position as a dental clinician who potentially could influence the participants' degree of disclosure about their experiences during interviews. Also, it was not possible to guess whether or not the study participant would be open about their experience. Hence, I decided to hide my identity as a dental clinician and I again reassured them that our interviews were confidential and that information that they shared with me would be confidential.

I also employed transferability to ensure rigor and trustworthiness. Transferability involves the researcher's ability to identify the meaning presented in the research findings by people in similar contexts for providing readers with sufficient information (Schwandt, 2015). Transferability also invites other researchers who are interested in the same area of inquiry as well as general readers to find convergences and divergences and draw connections between findings and their own interests, practices, and experiences. Therefore, I discussed my research findings

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with my supervisor, committee members, and colleagues. However, I did not request my participants to review and confirm the consistency of the text with their accounts. This practice is not required in phenomenological research once the researcher maintains a thick description of their accounts to ensure the credibility of data (Ricoeur, 1994)

3.6. Ethical Considerations

This project was approved by the Research Ethics Board of McGill University and by the recruitment site in June 2017. The submitted application package included the study proposal, a lay abstract, and a sample consent form for study participants. Two amendments were submitted and accepted, and both were requested to extend recruitment of participants.

When seeking informed consent prior to beginning an interview, I used a clear consent form that explained the aims of our study and the rights of the participants to ensure transparency and coherence. When seeking informed consent prior to beginning an interview, participants were made aware of the strict confidentiality. All participants consented to take part in the study by signing the consent form.

While there were no risks anticipated from taking part in this study, sensitive information and experiences were discussed. Participants were asked and reminded to stop their participation at any time of the study.

To ensure participants privacy, confidentiality, and to protect their identity, participant's information was not revealed in any form of communication. After data was collected and transcribed into written transcripts, the actual names of participants were replaced by pseudonyms and were removed from transcriptions to maintain confidentiality in reporting.

The recorded and transcribed data were stored in a safe place in the Division of Oral Health and Society as recommended by the McGill Research Ethics Board. The McGill Policy on Research Ethics recommends that all original data be maintained for a period of at least seven years from the date of publication. Thus, the consent forms, files and questionnaires will be kept at the Faculty of Dentistry for this time. Our sample consisted of 12 completely edentulous individuals who are treated with upper conventional complete denture opposed by lower two-implants overdenture from one dental school's clinic, McGill Dentistry, Montreal, Quebec.

The interviews conducted with these 12 individuals yielded rich information about their experiences of living with tooth loss, conventional dentures and implants overdentures answering the study's aim and objectives. Despite the main objective of this study to explore the study particiapnts lived experinces with two-implants overdentures, the colleted narratives also involved the participants long experinenes with complete tooth loss and conventional denture use as shared by them. Thus, the results of this study are presented in two separate articles. The first article (Manuscript 2) addresses the study participants lived experience with complete tooth loss and long use of conventional complete dentures. The second article (Manuscript 3) focuses on the main objective of this study, which is exploring the lived experiences of these completely edentulous individuals treated with the two-mplants overdentures as considered the minimum standard of care in prosthetic treatment.

Chapter Four (Manuscript 2): Patient's Experience of Complete Tooth Loss and Conventional Complete Dentures

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4.1. Abstract

Introduction:

Complete tooth loss and replacement of missing teeth using dental prostheses continue to rise due to the growing number of elderly populations. Consequently, it becomes a necessity for dental care providers to understand in-depth the lived experinces of complete tooth loss and prosthetic treatments on patients to help reach an appropriate and personalized decision about the choices of rehabilitation. Therefore, the intention of this study is to understand in-depth, the research participants lived experiences of edentulism and being treated previously with conventional complete dentures.

Methods:

Interpretive phenomenology analysis was adopted as the study's methodology. We conducted twelve semi-structured open-ended face-to-face interviews with completely edentulous patients who are who had long experience of using conventional dentures. The interviews were audio-recorded and transcribed verbatim. The collected data were then analyzed according to the interpretive phenomenology analysis tradition. The common findings from participant narratives were placed into themes for analysis.

Findings:

Two main findings were identified: the long experience of tooth loss and experience of conventional complete dentures. Several study participants blamed their clinicians for losing their natural teeth, and a few blamed themselves and their families. Complete tooth loss has major impacts on oral function and their social life. Replacement of missing teeth with conventional dentures guided some participants to develop coping strategies to manage the conventional dentures negative experiences. While some others perceived dentures positively and were able to express their self-enhancement and improved chewing ability.

Conclusion:

This study offers pertinent information that can guide completely edentulous patients, conventional denture wearers, and oral health providers. The adoption of qualitative design provided a foundation for study participants to tell their narratives on aspects related to their prolonged experience of tooth loss, using a conventional prosthesis and, therefore, gave them a chance to share their experiences and perspective to inform oral healthcare providers. These experiences have a significant impact on edentulous individuals life, however, each participant has a unique experience with tooth loss and conventional denture use.

Keywords:

Edentulism, conventional dentures, experience, phenomenology.

4.2. Introduction

Complete edentulism is an irreversible condition and defined as the complete loss of allnatural dentition (Cunha-Cruz et al., 2007; Emami et al., 2013). Complete tooth loss is more common in those who are 65 years and older. The number of elderly people is rapidly increasing all over the world (Zarb, 2004), which results in a rise of age-related conditions such as tooth loss (edentulism). In Canada, elderly people are rapidly increasing and the rate of tooth loss among elderly Canadians who are 65 years and older is about 22 per cent (Health Canada, 2010). In addition, it has been estimated that Canada's aging population will reach 23.7 per cent of Canadians by the year 2036 (Bohnert & Dion, 2015). Complete dentures have a significant impact on individuals, in terms of oral and general health quality (Gagliardi et al., 2008). Complete loss of natural dentition impairs oral functions and thereby affects oral health quality of life (Awad et al., 2003; Emami et al., 2013).

Some studies have demonstrated that the replacement of missing teeth using dental prosthesis will continue to rise due to the growing number of the elderly (Douglas et al., 2000; Emami et al., 2009). Hence, dental care providers' understanding of the impact of edentulism and prosthetic treatments on patients in order to reach a proper decision about their choice of rehabilitation is necessary. However, this impact is highly individualized and influenced by the patient's perception which makes it difficult to assess quantitatively.

Fisk and other colleagues (1998) investigated the emotional effects of tooth loss on patients in the United Kingdom. The results of their study identified "bereavement, loss of selfconfidence, concerns about appearance and self-image, tooth loss as a taboo subject, keeping tooth loss secret, behavior change, premature aging, and a lack of preparation for the loss of teeth". Another qualitative study was carried out to explore partially edentulous patients' expectations with partial dentures before implant rehabilitation. This study showed that study participants experienced a huge social impairment despite their coping mechanisms (Øzhayat et al., 2016). Moreover, edentulous patients' expectations regarding their participation in decision making and treatments of tooth loss are considered exceptionally high (Cronin et al., 2009). Thus, researchers suggest that the effect of tooth loss on edentulous patients should not be underestimated (Davis et al., 2000).

Many quantitative studies focusing on the impact of tooth loss and dental treatment on quality of life had been established through the employment of structured questionnaires and surveys (Davis et al., 2000; Heydecke et al., 2003; Scott et al., 2006; Emami et al., 2013). This type of study design mainly applied to assess the relationship between variables and to measure study outcomes (Green & Thorogood, 2009). Thus, it has been advocated that qualitative studies focusing on exploring complete tooth loss and replacement of missing dentition with conventional dentures are still needed in order to understand the human experiences and explain the variations in experiences among study participants in quantatiave studies (Nordenam et al., 2013; Kashbour et al., 2015).

A qualitative research inquiry may help enhance our understanding of patients' perception of treatment, thereby improving the clinician's understanding, which may facilitate communication and more appropriate decision-making (Britten, 2011; Narby et al., 2012; Nordenam et al., 2013). Thus, the study intended to explore, in- depth, the study participants' lived experiences of complete tooth loss (what it means to be edentulous), what it meant for them to wear a conventional denture for many years, and what the implications of these experiences were on their oral functions and social life.

4.3. Mode of Inquiry:

Qualitative Approach

The Interpretive Phenomenology Analysis (IPA) is an interpretive approach which was adopted to explore the completely edentulous patient's experience with complete tooth loss as illustrated by Smith, Flowers, and Larkin (2009). IPA is a qualitative research approach recently elaborated for use within the practices of psychology, human health, and social sciences, and it is rooted in the phenomenological and hermeneutic traditions (Smith et al., 2009). In addition, it allows the researchers to explore, examine, and interpret the lived experiences of study participants and how they make sense of their experiences (Hovey, 2007; Reiners, 2012; Alase 2017). Furthermore, IPA allows the study participants to express their lived experience narratives in the most suitable way for them without any modifications or actions (Smith et al., 2009). Therefore, the adoption of interpretive phenomenology analysis in this qualitative inquiry places emphasis on finding the main essence of the research participants' lived experiences.

Research Participants

Within the frame of this study, the researcher intended to explore the phenomenon of interest in complete tooth loss. The interest would be evaluated in relation to participants who have the experience of interest, rather than focusing on the number of participants recruited into the study (Giorgi, 2009; Englander, 2012). This study sought to recruit approximately 10 to 15 patients, it is along with the scope of phenomenological traditions, which also suggests the sample size to be between two and 25 (Polkinghorne, 2005). Relating to sample size, this study intended to use a small sample size to gather more detailed information and deeper insights into

the phenomenon of our inquiry (Giorgi, 2009; Smith et al., 2009; Finlay, 2009; Englander, 2012). Thus, a purposive sample was selected according to certain inclusion criteria: 1) female and male patients, 2) aged 18 years and older, 3) who wear two implant-supported lower denture and upper conventional complete denture, 4) English language speakers and 5) willing to participate in the study and sign the informed consent form.

Recruitment Procedure

The study participants were recruited from two cohorts of completely edentulous patients who had been previously treated with conventional complete dentures at McGill University's Dentistry Clinic in Montreal, Quebec, Canada between February 2017 and February 2019. Eligible patients were approached by an administrative staff member who was not involved in the study. The patients who agreed to participate had their contact information forwarded to a researcher to provide them with more information and to answer their questions.

Twelve completely edentulous participants wearing upper conventional dentures opposed by lower two- implants overdenture were recruited for this study. Within the frame of an interpretive phenomenology study, the number of study participants (12) is considered appropriate and suits the conditions set out by the researcher's intention to explore, in-depth, the phenomenon of interest. Before signing the consent form, the nature of the study was explained in detail to each participant, in order for both the researcher and the research participant to achieve a shared understanding about the research process and expectations.

Data Collection:

Qualitative research relies on methods that enable researchers to gain access to the personal attitudes, concerns, behaviors, and experiences of their participants' lives (Mason, 2017). Due to the nature of this study, face-to-face individual interviews with study participants were conducted between February 2018 and December 2019 by the same researcher, EA. These interviews were conducted in the English language, in a quiet venue that was chosen by study participants to provide them with a relaxing and comfortable environment for expressing themselves (Rubin & Rubin, 2012).

During interview, participants were asked to talk about their experience with implants overdenture and how they came to their decision of having this prosthetic treatment modality.

An interview guide with semi-structured and open-ended questions encourages study participants to express detailed information about their thoughts and give detailed narratives and explanations of their experiences with complete tooth loss and implant overdentures (Appendix B). Moreover, the use of open-ended questions enables the researcher to define certain areas that need to be explored and might have not been covered by the interview guide (Mason, 2017). Thus, the open-ended questions will allow the interviewer or interviewee to diverge in pursuing an idea or response in more detail (Britten, 2006). The interview questions were designed to be utilized by the researcher for the sole purpose of this study, started with general questions, and then followed by more specific ones that focused on the research phenomenon of inquiry (Creswell & Creswell, 2018).

The interviews were audio-recorded with the permission of participants and the range of these interviews was between 40 to 90 minutes. The use of audio-recording is important for collecting qualitative and narrative data because this data is transcribed verbatim to be analyzed

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later in the study. Recording of interviews allows the interviewers to focus more on conversation rather than detailed note taking, and reduces their potential bias because of poor note taking or relying on their memory of the interview. In addition, the transcriptions assist in providing a detailed account of the participant's responses, such as a change in speech, pauses, laughing, or any other response.

Data Analysis:

The rationale for any data analysis in IPA is to gain an in-depth understanding of the participants' lived experiences of a specific phenomenon in order to answer the proposed research questions. Parahoo (2006) recommended that qualitative data would be directly analyzed after collection. In order to achieve coherence, this study used an IPA thematic framework, as adopted by Smith and his colleagues (2009). This framework recommends that the investigators completely immerse themselves in the data in order to become familiar with each narrative, and to begin to form the key interpretations as findings (Smith, 2007). IPA analysis provides the data provided by the participants as they attempt to make sense of a phenomenon under investigation and at the same time document the researcher's interpretation (Smith, 2007; Szwimer, 2019). The interpretive phenomenological initial analysis develops early on during data collection, which helps guiding subsequent interviews and direct future sampling.

The analysis provides a deeper and richer understanding of the lived experiences of the completely edentulous patients treated with conventional dentures and the minimum standard of care. The analysis also elaborates on the meaning-making of a specific phenomenon in particular contexts (Smith et al., 2009; Szwimer, 2019). In general, the IPA approach to research
provides a set of flexible guidelines that can be adapted by each researcher according to their research objectives. The process of qualitative IPA analysis includes several inductive and iterative systematic stages. The emergent themes are used to facilitate the reporting and interpreting of study findings (Braun & Clarke, 2006).

4.4. Methodological Rigour

To ensure credibility and trustworthiness of the study findings, methodological rigor is an essential component to qualitative research (May & Pope, 1995; Sandelowski, 1986). Thus, an interview reflexive form was completed at the end of each interview to help ensure the quality of the research inquiry. Reflexivity refers to the "recognition that the researcher is part of the process of producing the data and their meanings, and to a conscious reflection on that process" (Macbeth, 2001; Lamb & Huttlinger, 1989).

4.5. Ethical Considerations

This study has been ethically approved by McGill University's Institute of Research Ethics Broad Office. Signed consent forms were collected from all study participants and participants anonymity and confidentiality were maintained.

4.6. Study Findings

Description of Participants

Twelve completely edentulous patients (four females and eight males) participated in the open-ended and semi-structured interviews. The participants' ages ranged from 65 to 87 years old and they have experience with complete tooth loss. The experiences of edentulism have lasted

from three to more than 60 years of edentulism. Participants have been treated with upper complete denture opposed with lower two implants overdenture and their experience with this treatment modality ranged from two to 16 years at McGill University's Faculty of Dentistry's Dental Clinic in Montreal, Quebec, Canada. All study participants were retired and only three of them were engaged in voluntary work at the time of the interviews. Ten of them have general health issues and are taking medications, and two of them are healthy. Most of the participants had a level of education ranging from secondary school to university degree as shown in (Table 2). To safeguard the confidentiality and protect the participants' identity, numbers from one to 12 will be used to refer to the participants.

Reference No	Age, y (Sex)	Level of Education	Age (Edentulous), y
P 1	87 (F)	Limited education	27
P 2	83 (M)	College	35
P 3	75 (F)	College	45
P 4	79 (M)	High School	25
P 5	85 (F)	Secondary School	30
P 6	86 (M)	High School	21
Р7	78 (F)	College	27
P 8	73 (M)	High School	69
P 9	65 (M)	College	57
P 10	73 (M)	College	25
P 11	78 (M)	University Degree	74
P 12	75 (M)	University Degree	71

Table 1: Sociodemographic characteristics of participants

Emergent Themes

Due to the irretrievable nature of tooth loss, two main themes emerged from the twelve interviews during the interpretive phenomenological analysis process. These superordinate themes are 'long experience of tooth loss, and 'experience of conventional complete dentures'. Sub-themes within the superordinate themes also emerged and are described within the superordinate theme headings and shown in the following table:

Table 2: Super-Ordinate and Sub-Themes of Edentulous Patients' Experiences ofComplete Tooth Loss and Conventional Complete Dentures

Super-Ordinate Themes	Sub-Themes	
	Subtheme1. Meaning of Tooth Loss	
Long Experience of Edentulism	Subtheme 2. Who's to Blame?	
	Subtheme 3. Impacts of Tooth Loss	
	Subtheme 1. Positive Experiences	
Experience of Conventional Denture	Subtheme 2. Negative Experiences	
	Subtheme 3. Coping with Dentures	

1. Long Experience of Edentulism

This super-ordinate finding reflects the participants' experiences of tooth loss, what it means to live without teeth for most of their lifetime, who they felt was responsible for losing teeth, and the implications of losing all-natural teeth on their oral functions and social life. The sub-themes of 'meaning of tooth loss', 'who to blame' and 'impacts of tooth loss ' were identified in the study.

Meaning of Tooth Loss

In response to being asked what it means to be edentulous, the majority of study participants identified the meaning of tooth loss as a "lack of awareness of losing teeth and as "a relief from many other dental problems of natural teeth".

The study participants experienced a lack of oral hygiene which subsequently led to many other future problems with their teeth and the surrounding oral tissues, such as dental decay and periodontal diseases. Most participants claimed that they were not brushing their teeth regularly and not following the necessary oral hygiene measures to adequately clean their teeth and gums, as the following narratives demonstrate:

"I remember when I was young....I had so many problems with my teeth...I can tell there was no single tooth that was intact...one here needed to be filled and another one was moving and needed to be pulled out...with so much pain and I remember the horrible nights of pain where I could not sleep....one day I decided to go and see a dentist to solve my problems...then I ended up spending much of my time fixing them but that did not fix them...oh I know I was not taking care of them at all, honestly, I did not know that one day I will end up with false teeth but I can say it is better than that pain and suffer."P7 In addition, participants were not aware of what would be the consequences of dental and oral health problems and the complete loss of teeth at an early age until later in their lives. They struggled with day-to-day functioning with their teeth, which were in poor condition. Having no teeth or conventional dentures, especially in social events, was a struggle to the patients. One participant said:

'I lost my teeth so many years ago...I have not had teeth since I was about twenty-seven years old...I was very young, I know that.... I had dentures when I was young even before I got married...I did not brush my teeth regularly and they started to have decay, one following the other.... I realized that later when I lost all of them." P1

In contrast, some participants experienced tooth loss as a relief from their continuous dental problems and the needed dental work to solve these problems. Additionally, they revealed that their natural teeth were often associated with pain, discomfort, and unpleasant symptoms related to subsequent dental work, such as post-operative pain and sensitivity. Several participants mentioned that they had suffered from complications related to dental treatments, which were significantly causing stress and trauma as one of the participants claimed:

"I can tell you frankly that it means nothing to be without teeth...it did not bother me at all...I lived most of my life with false teeth...and I had more problems when I had my normal (natural) teeth...one had to be removed, another one had to be removed...I had toothache...then they removed everything...I felt more comfortable when they did that...o, it was a real release not to have them." P5

Who's to Blame?

Losing natural teeth at an early age may evolve into major consequences on oral and general health and quality of life in later years. Patients and clinicians are responsible for preserving teeth and avoiding early tooth extraction, which is a collaborative approach to person-centered dentistry. While some of the study participants reported a sense of self-blame for losing their natural teeth, other participants blamed their family members and clinicians for their loss of teeth. The participants who blamed themselves think that being completely edentulous happened because of their neglect. They admitted that it was their responsibility of neglecting their teeth and poor oral hygiene practices for being edentulous. They also highlighted that they neglected to take adequate care of their teeth as required; they did not brush their teeth regularly, and consequently were unable to avoid oral health diseases and subsequent loss of more and more teeth until they needed tooth replacements. As one participant explained:

"I would say...losing my teeth is my own fault and I cannot blame anyone else...I was not following 100 per cent hygiene control as I did not brush my teeth regularly and then I started to have decay in my front teeth and I did not care. I do not know, probably I was careless towards them." P 7

A few participants blamed their family for their oral health issues, several named their mothers for not taking care of their teeth, not advising them to brush teeth, or informing them to avoid some food that harmfully causes tooth decay. In addition, they explained that when they were young, they used to have big families with many children. Therefore, the mothers did not have the time to take care of every child's oral hygiene practices as needed. As one of the participants said:

"I could see that years ago, my mother had children one after the other...you know she had so many children...she was not working just busy with them....she had 12 children...oh with no time to follow each one every single day...and by having too many children...I mean so close... she did not have time to take care of my teeth." P3

The majority of the participants mentioned that they felt that clinicians were a contributing factor to losing their natural teeth. Dentists followed what patients requested from them, like removing a tooth, without giving the proper advice to save their natural teeth and informing them of the long-term consequences of tooth loss. Furthermore, the participants claimed that they had a lack of education and were not fully aware of the consequences of extracting teeth like the clinicians, who the participants believed were the ones who were supposed to inform them of what would be the drawbacks of losing natural teeth later in life.

"My top front teeth were not straight, and I looked ugly... I went to see my dentist and I asked him to remove them as I do not want them anymore. The dentist pulled the teeth without any hesitation and by that time there was a lack of education and no motivation from the dentist's side." P5

One participant stated that she asked her dentist to extract her front teeth because she was not happy with her teeth. The four front teeth were maligned and not straight (broken), and she wanted to have a good smile and thought that extraction would be the proper solution for her problem. However, the clinician did not negotiate, extracted the teeth, and then replaced them with false teeth without hesitation, as she narrated:

"I did not like my teeth as they were crossed and big and one...here...was black and chipped from tooth decay...I was working in a factory by that time and I did not have time to fix that ugly broken tooth... One day my sister said 'go and fix them', then I went to my dentist and I asked him to take them all of them off as I just wanted to get rid of them...he did what I asked him to do....he extracted them and offered me false teeth." P 10

The Impact of Tooth Loss

Partial or complete edentulism may have negative implications on patients' oral and general health, as well as on their overall quality of life, social lives, and emotions (Scott et al., 2006; Brennan et al., 2008; Gerritsen et al., 2010). Nearly all study participants identified that they were struggling at different degrees and stages because of partial to complete teeth loss. Examples of these struggles are struggles with matters such as relationships and self-confidence. These sentiments indicated that tooth loss had direct implications on their personality and other aspects of their life. This negative experience of tooth loss included a dramatic change in self-perception for the majority of the research participants. As more than half of the participants indicated that living with tooth/teeth had made them less confident to perceive themselves positively, as one participant stated:

"I was much less self-confident despite the successful things in my life...I was working with people and I had a hard time living without teeth as it diminished my confidence and I was afraid of life situations because of my teeth." P5

On the other hand, some participants had problems either during eating, speaking, or in social events. Complete tooth loss negatively affected some study participants' masticatory functions, thus disrupting their social life especially when they join families or friends outside:

"My social life was terribly disturbed; I was working, and I have to join the other workers...I have to choose carefully stuff that I can manage when I am at work eating lunch.... In normal circumstances, I was not able to go and eat with my family and friends outside without teeth." P12

Some participants also complained about their difficulty chewing certain foods in public, which caused more stress of being unable to function comfortably in social settings. This sense of inability forced most of them to change their diet to be able to eat certain foods without struggling, as one of the participants explained:

"By that time when I started to lose my teeth because of gum disease, I was working as an engineer at one of the well-known companies here in Quebec. I can say I was feeling stressed...not easy to miss them or to live without them (teeth), I think perhaps when someone is working...and he is without teeth like being missing or looking (bad), eventually, you do not want to show them because everybody makes can notice and would make comments about them." P 2

2. Experience of Conventional Complete Dentures

Replacement of missing teeth with conventional complete dentures was considered the most common treatment choice in prosthetic dentistry. This treatment modality helps restore patients' oral health functions and esthetics (Carlsson, 2006; Emami et al., 2010). The majority of the participants described the experience of teeth replacement with conventional denture as a life-shifting experience. Hence, the main finding of 'experience of conventional complete denture' was identified with three sub-findings that emerged from this main theme; 1) positive experiences, 2) negative experiences, and 3) coping strategies to overcome negative aspects of having conventional complete dentures.

Positive Experiences

In prosthetic dentistry, conventional dentures are regarded as easy to construct and an affordable solution for many edentulous patients, when compared with other possible treatment options such as dental implants (Heydecke et al., 2008; Carlsson & Omar 2010). In addition, they can make a significant change for the completely edentulous patients' oral health status and esthetics (Ellis et al., 2007). These changes affect the patient's perception of treatment and are closely related to the condition of the remaining oral tissues.

In this current study, with the exception of two individuals, all other participants who have been used to replacing their missing teeth, perceived conventional dentures positively. In addition, the majority of the interviewees revealed that the experience was ultimately beneficial; having generally felt more confident to smile and speak in public situations. One of the participants explained the change that he perceived with conventional complete dentures:

"Once I had my dentures in my mouth, I felt better and I think I looked better, so I was more confident to sit down and talk to anyone else." P12

Furthermore, another participant appreciated the esthetic impact of wearing conventional dentures on his social life, explaining that his improved personal experiences were a consequence of the denture esthetic change:

"When I had a conventional denture and started living with...I felt much better because when I smile there are teeth here so cosmetically it feels better than an empty mouth." P9

Apart from the positive esthetic impacts of conventional dentures, some participants were able to function somewhat better and were able to eat more comfortably in social gatherings. Using conventional complete denture improved their ability to chew food and function (smile and talk) when they needed rather than being without teeth: "I was not happy with the final results after years of using them but I can say was able to smile and speak with people...not like when I was missing my teeth because you know if you are missing a back tooth, it is not that problem like when you miss a front tooth...which is very evident." P9

Although some participants perceived their experiences with dentures as difficult to adapt to at the beginning or being uncomfortable sometimes, they were ultimately happy to have the dentures. They further explained that the removable complete dentures exceeded their expectations. However, participants who adapted easily and quickly to their dentures related their experiences to the number of teeth the denture displays:

"I can say that the false teeth were just perfect....when I had them for about seven years or more...they worked well, and they snapped right away and were stable with no complaint to mention....I did not expect that...and my denturist told me you have to be patient with them as you might have a hard time, but no I did not...probably because I had them gradually from a few teeth missing to the full set."

Moreover, other participants expressed enhanced self-esteem, which appeared to be a notable improvement for them. The degree of enhanced self-perception was not radically different from one participant to another, despite the length of time they had with conventional dentures, which ranged from five years to more than 30 years. One of the participants reported his experience:

"Actually, I feel more of a positive person now, it was probably the best thing that could ever have happened, to choose to get them...everyone I speak with says that I seem to be happier and more relaxed with my new sets of dentures."

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Negative Experiences

Some of the participants experienced a negative change in their life living with dentures. They were less motivated to address conventional denture problems such as pain, trauma, and restricted life. These participants who experienced lesser ability to address denture problems, reported experiencing a kind of trauma associated with unstable dentures. The patients highlighted how this trauma became associated with continued oral pain. Consequently, they become less motivated to wear their dentures all day:

"My dentures were never stable...oh...Causing trauma to my gums and I had painful ulcers, and I used to take them out...It was always the lower one that causes this pain." P11

Moreover, several participants struggled to overcome these problems after a long time of denture use and experiencing changes in oral tissues (gums and bone). They were unable to manage functioning with their dentures, which were hard to stay stable in the mouth. Consequently, the patients went to seek help from their clinicians and asked them to change their old sets of dentures or to reline them:

"After months of pain and suffering from my dentures...they were moving about after a few months I can tell not from the beginning...you know they are not the same...they were not staying in place any more...then I went back to see my denturist and asked him if he could change them or reline them, and he made new ones." P3

The participants often experienced a forced change in their diet due to the difficulty of chewing their food with unstable dentures. While mealtime was considered a special time for family and friends to come together, completely edentulous patients did not have the pleasure of enjoying food after losing their natural teeth. Therefore, the social life of study participants was negatively affected because of this lifestyle change, as one of the participants mentioned: "Carrot was my favorite food that I really enjoyed....but not anymore...I was not able to chew it with my false teeth...they would not stay in place...it is impossible to eat anything hard with dentures unless I cut it into small pieces...I was not able to go out and eat with my friends...I preferred to eat alone, but when I was forced to go, I used to cut into small pieces like a steak or an apple, or I have to say 'sorry, I cannot', which was not possible in some events." P5

For some individuals, having unstable dentures affected their eating and chewing ability. Therefore, they could not eat hard or sticky foods in social settings; adversely affecting their social life. Additionally, some participants appeared to identify undesirable social situations in connection to their unstable lower dentures. They could not enjoy certain foods anymore, which might explain their struggle to eat these foods in public. Moreover, they were not feeling comfortable choosing different types of foods in social settings. This dilemma explains their desire to change their diet to address their chewing problems that might lead them to feeling embarrassed or ashamed:

"I was shy when talking to anybody and stranger and I am not a shy person at all...but I started to feel that my teeth are loose and annoying, and dentures are not a good thing to start with ...maybe they work well for other people but sure not for me." P7

Coping with Dentures

Several of the study participants recounted their experience with conventional complete dentures where they accepted the moving dentures and developed coping strategies to manage living with unstable dentures for many years. In response to being asked what they did to deal with problems related to the conventional dentures, most of the participants attempted to avoid or modify their diet to stay away from these problems, and thus avoid experiencing the undesirable self-perception of tooth loss and restricted function. Participants used various strategies to cut and grind hard food, and most often spent more time chewing their meal:

"Food was a big problem and I have to make sure to mix my food in the mixer and to cut my meat and the hard food to very tiny pieces to be able to eat it" P3

Additionally, for some participants, avoiding eating outside was identified as a clear strategy to prevent any further stress, and to prevent them from the problems the dentures caused in their social life. One participant attempted to avoid these situations:

"I avoided going out to eat, it was very rare to do that though...and if I had to have a meal outside with family or friends, I would not eat a steak or something hard." P12

In contrast, some participants employed cognitive coping strategies to maintain a sense of acceptance of their dentures, which seemed to enable them to simultaneously cope with and address the problems

"I had my dentures for more than 30 years, I feel it's part of my body and I had to get used to them...my mouth has changed and I do not have much gum left there...I can manage with them when I forget they are there and I also used to put the stuff in if they needed (fixing materials) to manage and it worked well." P9

All the interviewees identified that having conventional complete dentures was a lifechanging experience, with some being more satisfied with their dentures than others. The majority of participants implemented practical strategies to overcome their problems, such as changing the type of foods they eat to be able to enhance their chewing effectiveness, avoiding socializing, and negotiated the use of adhesive dental materials to stable the denture to avoid their struggles when they could not avoid eating in public settings.

4.7. Overview of Phenomenological Findings

The findings reveal that participants experienced a lack of awareness of the consequences of tooth loss, or of the importance of maintaining their oral hygiene for their general wellbeing. Despite their lack of awareness, most participants frequently experienced feeling healed from problems with their teeth and the subsequent pain after teeth extraction during early adulthood. These experiences represent the potential risks that can result from early tooth loss.

The influence of using conventional dentures to treat edentulism reported in this study reveals the extent of the negative impacts of unstable dentures, which completely edentulous patients were unable to manage. However, the positive experiences and coping strategies implemented by the participants demonstrate that conventional dentures could enhance selfperception, chewing function, and social life for completely edentulous patients.

4.8. Discussion

This interpretive phenomenological study explored the in-depth lived experiences of people who lost all their natural teeth for more than half of their lives. Narratives presented by twelve totally edentulous participants, currently wearing implants overdentures and treated previously with conventional complete dentures, constructed the findings of this exploration. By adopting open-ended and semi-structured interview questions, the study participants managed to tell their stories related to experiences of tooth loss and wearing conventional dentures. Two major themes emerged from narratives analysis: the long experience of tooth loss and the experience of conventional complete dentures. For each of the two findings, study participants explained their perspectives on their positive and negative experiences, which provides more insight into how tooth loss and prolonged denture use impacts completely edentulous patients' quality of life. Most of these implications might have been avoided by appropriate treatment plans, however, some of the research participants revealed that their dental clinicians chose to extract their natural teeth and provide them with removable dentures.

The findings revealed that complete tooth loss has different meanings among participants and varied from a lack of awareness to a sense of relief living with non-natural dentition. Most study participants were not aware of the possible consequences of tooth loss and wearing conventional complete dentures on their life. Since study participants were unmotivated to maintain their oral hygiene practices or not educated on how to preserve their natural dentition, they chose to opt for tooth extraction at an early age to avoid further pain, discomfort, and other related complications. Information from this study's narrative data demonstrates that tooth loss may create dramatic implications on self-perception and oral health functioning. Our study participants revealed how they had experienced changes in self-image and in their level of self-confidence. These findings are consistent with other qualitative studies related to tooth loss (Fiske et al., 1998; Smith et al., 2005). Likewise, it has been suggested that any loss of body parts, including teeth, can lead to grief and changes regarding one's body image (Parks, 1972). In this regard, Newton and Fiske (1999) explain that patients more often rely on the way the clinician uses to transfer distressing information related to health including their teeth. Therefore, dental care providers need to pay more attention to the emotional and psychological impacts of complete tooth loss on individuals and discuss the future consequences on quality of life.

In contrast, some study participants perceived tooth loss as a relief from dental problems and associated dental work. They explained that they had more problems when they had natural teeth, like tooth decay and periodontal diseases, where they spent days in severe pain and continuous suffering. They consequently required more time and money to undergo dental treatments and treat these problems. They also avoided discussing issues related to their teeth with close members, and rather requested help from clinicians to replace their natural teeth with conventional removable dentures. Thus, it is clear that tooth loss is usually associated with feeling embarrassed, shame, and not feeling comfortable engaging with family members and friends (Davis et al., 2000).

The study highlights the positive aspects of replacing missing natural teeth with a conventional denture. Where several participants experienced an inevitable change in their facial appearance which had been affected by tooth loss, they also managed to function at a certain level in public settings with eating specific foods and smiling comfortably. Trulsson and others (2002) found that when edentulous patients were treated with fixed prostheses, they regained their social, psychological, and physical health and were feeling extremely grateful to the prosthetic treatments. Hence, the study participants perceived the positive outcomes of tooth replacement with conventional dentures despite the fact that they are wearing implant overdenture at the time of the collection of the data.

On the other hand, due to the nature of complete tooth loss, some study participants were forced to change their diet to avoid struggles with unstable conventional dentures. This forced alteration in diet was revealed by the difficulty of chewing hard food and the avoidance

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of sticky food. Similar findings are found in a qualitative study in the United Kingdom which explores the effect of tooth loss and prosthetic rehabilitation on issues surrounding eating (Hyland et al., 2009). One of the findings from this study shows that the study participants were not confident to function in public. However, they accomplished the degree of functional enhancements and ease when they eat in public (Hyland et al, 2009).

Despite the negative consequences of using conventional dentures for a prolonged period, study participants managed to develop certain coping techniques and strategies to avoid problems related to unstable dentures. Thus, they either modified their diet, or avoided certain types of food that they usually considered hard to eat or chew, especially when they eat outside. Edentulous patients feel more comfortable eating in their own homes, where they could take off their conventional dentures to remove any trapped debris, which might distract their mealtime without social embarrassment (Meaney et al., 2017). Other study participants experienced the development of various cognitive coping strategies to accept their dentures and avoid any emotional effects. Davis et al. (2000) stated that some of the denture-related problems are usually attributed to the status of complete tooth loss, rather than because of conventional complete dentures use.

4.9. Contribution

This study offers pertinent information that can guide completely edentulous patients, conventional denture wearers, and oral health providers. The adoption of qualitative design provided a foundation for study participants to tell their narratives on aspects related to their prolonged experience of tooth loss, using a conventional prosthesis and, therefore, gave them a chance to share their experiences and perspective to inform oral healthcare providers.

4.10. Limitations and Strengths

To the best of the authors' knowledge, this is the first qualitative study that explores edentulous patients' experiences with complete tooth loss and removable denture use in Montreal, Quebec, Canada. While the results should be interpreted within the context of the study, they are transferable to similar contexts in Canada and abroad.

Strengths of this study include the rich data gathered from face-to-face interviews with open-ended questions, and the study sample that represents the elderly edentulous patients' long and lived experiences with edentulism in Canada. However, our study sample of 12 participants could be argued as a potential limitation.

4.11. Conclusions

Edentulous patients have negative experiences with complete tooth loss and conventional denture use. However; some completely edentulous patients experienced conventional dentures positively as one of the participants shared "" *I was not happy with the final results after years of using them but I can say was able to smile and speak with people..*"

In addition, they developed coping mechanisms to be able to function and socialize with unstable removable complete dentures. Adoption of inductive methodological approach which generated data with depth shows that each edentulous individual has a unique life experience with tooth loss and denture use.

4.12. Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

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Chapter Five (Manuscript 3): Edentulous Patient's Experience with Two-Implants Overdenture: An Interpretive Phenomenological Exploration.

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5.1. Abstract

Introduction:

Two-implant overdenture is considered the minimum standard of care for treating completely edentulous patients (Feine et al., 2002; Thomason et al., 2009). However, little is known about the patient's experience with this treatment modality. Therefore, this study's intention was to understand in-depth, the research participants lived experiences of being treated with the minimum standard of care.

Methods:

An interpretive phenomenology research approach was adopted as the study's methodology. We conducted twelve semi-structured open-ended, face-to-face interviews with completely edentulous patients treated with two-implants lower overdenture opposed by upper complete denture. The interviews were audio recorded and transcribed verbatim. An analysis consistent with the philosophical foundations of the approach and practice of interpretive phenomenology was used to identify the main findings from this narrative data.

Findings:

Although all study participants were able to express their satisfaction with the two-implants overdentures, a few of them had experienced some challenges related to their treatment with two-implants overdentures. Five main Findings were identified: 1) decision to change conventional dentures with implants overdenture; 2) experiencing implant procedure and healing; 3) overdenture as a life changing experience; 4) overdenture as a struggle and 5) long-term challenges and concerns.

Conclusion:

The narratives shared by the study participants provide a deep personal view of the experience of living with the implants overdenture. The interpretive phenomenological analysis of the narratives collected in this study revealed five major themes. This study has implications for dental education and clinical practice. Integration of interpretive phenomenology analysis in dental education and employing it in dental practice will have pivotal impacts in the care of edentulous patients by understanding the existential concerns living without teeth and considering implants overdentures as the minimum standard of care for treating these patients. Thus, the findings of this study could be used to improve patients' experiences through the implementation of more person-centered dental care that considers their needs, their difficulty accessing implant provision treatment, and shared decision-making.

Keywords: Edentulism, implants, overdentures, experience, phenomenology

5.2. Introduction

Tooth loss and denture use have a huge impact on individuals, in terms of oral and general health quality (Gagliardi et al., 2008). Recent studies have demonstrated that the replacement of missing teeth using dental prostheses will continue to rise due to the growing number of elderly population (Emami et al., 2009). Over the past three decades, dental implants prostheses have been widely accepted as a feasible option for replacement of missing natural dentition, especially for the elderly (Brånmark, 1977; Zarb et al., 2008; Jokstad, 2009).

Prosthetic rehabilitation with dental implants helps restore oral tissues health, chewing, esthetics, and speaking, and therefore improving a person's quality of life (Heydecke et al, 2003; Thomason et al., 2007). Until recently, many researchers have shown their interest in the field of implant prosthetic rehabilitation as an alternative option to treat edentulism (Awad et al., 2000; Heydecke et al., 2003; Emami et al., 2010). They have carried out many quantitative studies to understand the patients' experiences with dental implant prostheses (Walton et al., 2002; Heydecke et al., 2003). In addition, studies that reported patient-reported outcomes, especially for completely edentulous patients, show marked improvement in patients' satisfaction and quality-of-life after treatment with implant-supported prostheses (Awad et al., 2003; Heydecke et al., 2003; Emami et al., 2009; Al-Zubeidi et al., 2010).

This evidence consolidates the McGill and York consensus statements relating to twoimplants overdentures (Feine et al., 2002; Thomason et al.,2009). However, this evidence is based on constructed questionnaires and surveys which might offer limited representation of the patient's perspective with implants overdenture. It is difficult to gain a deep insight into the patients 'lived experiences from pre-determined options, and thus would not allow the

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researchers to explore a specific phenomenon of interest.

It seems that there is a paucity in the qualitative literature in the area of implant rehabilitation of completely edentulous patients. Hyland et al. (2009) and Pisani et al. (2017) utilized qualitative methodologies to explore some aspects of treating edentulism dental implants. Both studies were part of ongoing clinical trials, where the former study focused on issues related to eating, and the latter study focused on exploring patients' experiences with different attachment systems to retain implants overdentures. However, the patient's perspective towards the implants overdentures has not been widely investigated particularly for patients who have been treated with the two-implants overdentures as considered the minimum standard of care. Thus, to better understand the patients' perceptions regarding the effectiveness of this treatment modality, more qualitative studies should be considered.

Creswell (2013) suggests that qualitative research has the capacity to explore, examine, and interpret any topic or issue of interest to get to foundational understandings of that phenomenon.

Understanding the lived experience of people living with implant prostheses offers a unique perspective that can provide valuable insight into this phenomenon (van Manen, 1990; Creswell & Creswell, 2018). This additional knowledge and understanding from such experiences may offer values to the future patients in determining how to guide their decision-making processes and to meet their expectations (Paterson et al., 2002; Cronin et al., 2009). This inquiry also has the potential to inform clinicians about the treatment options that are most effective for specific patients. In addition, it will help to inform the development of a coherent, adaptive, and approachable health system for complete tooth loss management and to achieve

a better oral health quality for edentulous people. Exploring this phenomenon can benefit dental clinicians as well as patients themselves to achieve more optimal oral and general health quality.

Consquently, the main purpose of this qualitative study was to explore the completely edentulous patients experiences with two-implants overdenture opposed by upper complete denture.

5.3. Mode of Inquiry:

A Qualitative Research Approach

This study adopted an Interpretive Phenomenological Approach (IPA) to explore completely edentulous patients' experience with two-implants overdenture as described by Smith, Flowers, and Larkin (2009). IPA is a qualitative research approach utilized within research practices in psychology, human health, and social sciences, with its roots in phenomenological and hermeneutic philosophical traditions (Smith et al., 2009; Finlay, 2009; Englander, 2012).

This approach enables researchers to explore, examine, and interpret the lived experiences of study participants and how they try to make sense of their experiences (Hovey, 2007; Reiners, 2012; Alase 2017). Moreover, IPA allows the study participants to express their lived experience narratives in the most suitable way for them without any modifications or actions (van Manen, 1990; Smith et al., 2009). Thus, using the IPA in this qualitative inquiry emphasizes on finding the main essence of edentulous participants' experiences treated with two-implants overdenture.

Participants

In this study, the researcher intended to explore the phenomenon of interest that is not related to the number of participants recruited into the study but rather to the suitable participants who experienced the phenomenon (Giorgi, 2009; Englander, 2012; Smith et al., 2009). However, it is considered important to determine the size of the sample when choosing study participants (Creswell, 2012). Thus, we sought to recruit approximately 10 to 15 patients along with the scope of phenomenological traditions which suggests the sample size between two and 25 would be appropriate (Alase 2017). Relating to sample size, this study aimed to use a small sample size to gather more detailed information and get deeper insights into the phenomenon of our inquiry (Smith et al., 2009). Thus, a purposive sample was selected following to certain inclusion criteria: 1) females and males who were completely edentulous patients, 2) aged 18 years and older, 3) who are wearing two-implants lower overdenture and upper complete denture, 4) English language speakers and 5) willing to participate in the study and sign the informed consent.

Recruitment Procedure

The study participants were recruited between February 2017 and February 2019 from two cohorts of completely edentulous patients who had been treated at McGill University Dentistry Clinic, Montreal, Quebec Canada, and received two-implants overdenture opposed by upper maxillary conventional denture. An administration staff person working within the clinic, who was not involved in this study, contacted the eligible patients. The individuals who agreed to participate had their preferred contact information to be forwarded to the main researcher (EA) who provided them with more information about the study and answered their questions.

Twelve completely edentulous participants who are wearing upper conventional complete denture opposed by lower two-implants overdenture were recruited. This number of participants is considered suitable for an interpretive phenomenological study and within the aim of the researchers' intention to explore in-depth the phenomenon of interest.

Prior to signing the consent form, the nature of the study was explained in detail to each of the study participants to ensure that they understand their expectations and to read the informed consent form prior to taking part in the study. Participants were informed that their participation is completely voluntary, they have the right to decline to answer any questions, and they are also able to withdraw from the study at any time and to have their data removed from the analysis.

Data Collection:

Qualitative research in general applies methods that permit researchers to get a deeper insight into personals' attitudes, concerns, behaviors, and experiences (Mason, 2017). The most suitable data collection method in qualitative inquiry will help study participants give a detailed and rich personal account of their experiences (Gill et al., 2008; Smith et al., 2009; Englander, 2012).

Due to the nature of the current study, face-to-face individual interviews with study participants were conducted between February 2018 and December 2019 and were conducted by the same researcher (EA). These interviews were conducted in English language and took place in a quiet venue that was chosen by participants to let them feel more relax and comfortable expressing their narratives (Rubin & Rubin, 2012).

During the interview, participants were asked to talk about their experiences living with two-implants overdenture and how they came to a decision of having this treatment modality.

An interview guide with semi-structured, and open-ended questions encourages study participants to express detailed information about their detailed narratives and explanations of their experiences of having two-implants overdenture (Trede & Higgs, 2009). Moreover, the use of open-ended questions enables the researcher to define certain areas that might need to be explored which were not extensively covered by the current interview guide (Mason, 2017).

Thus, these questions allow the interviewer or interviewee to converge in order to pursue an idea or response in a more detailed narrative (Britten, 2006; Polkinghorne, 2005). The interview questions were designed to be used by the researcher for the sole purpose of this study and started with general questions then followed by more specific ones that focus on the research phenomenon of inquiry (Creswell & Creswell, 2018).

The interviews ranged between 40 to 90 minutes which were audio recorded. The use of the audio recording is a critical methodological aspect for collecting qualitative data, which is then transcribed verbatim for the subsequent analysis. Recording of interviews also allows the interviewers to focus on the conversation rather than taking detailed notes and reduces the potential bias through missing notes or relying on their memory. In addition, it helps in providing a detailed account of the participant's responses such as a change in speech, pauses, laughing, etc. (Britten, 2006).
Data Analysis:

In order to gain an in-depth understanding of participants' lived experiences of a phenomenon, provide the research participants the flexibility to answer the proposed research questions as completely as they wish (Mason, 2017). It has been advocated that data analysis is conducted simultaneously and after each data collection (Smith et al., 2009). For the sake of coherence, therefore, this study used the IPA thematic framework as adopted by Smith. This framework recommends that the investigators immerse themselves completely with the data (Smith et al., 2009). IPA analysis endeavors to explore the participants' "making sense" of a phenomenon under investigation and at the same time document the researcher's interpretive process (Smith et al., 2009; Creswell, 2013). In general, IPA provides a set of flexible guidelines that can be adapted by each researcher according to the research objectives. The process of qualitative IPA thematic analysis includes several inductive and iterative systematic stages. The emergent themes are used to facilitate reporting and interpreting of the study findings (Braun & Clarke, 2006).

5.4. Methodological Rigour

To ensure credibility and trustworthiness of study findings, methodological rigour is an essential component in all qualitative research (May & Pope, 1995; Sandelowski, 1986). Thus, an interview reflexive form was completed at the end of each interview, by the researcher, to help ensure the quality of this research inquiry. Reflexivity refers to the "recognition that the researcher is part of the process of producing the data and their meanings, and to a conscious reflection on that process" (Macbeth, 2001; Lamb & Huttlinger, 1989). Reflexivity hence was

insured during interviews as participants were asked open-ended semi-structured questions, allowing them to elaborate their narratives and to achieve a detailed description of the phenomenon of interest.

5.5. Ethical Considerations:

This study has been ethically approved by McGill University's Institute of Research Ethics Broad Office # A05-B38-17B. Signed consent forms were collected from all study participants and participants anonymity and confidentiality were maintained.

5.6. Study Findings

Description of Participants

Twelve completely edentulous patients (four females and eight males) participated in the semi-structured interviews. Participants' ages ranged from 65 to 87 years and their experience of complete tooth loss ranged from three years to more than 60 years. Participants had been treated with upper complete denture opposed with lower two-implants overdenture and their experience with this treatment modality ranged between two to 16 years at McGill University, Faculty of Dentistry, Clinic, Montreal, Canada. All study participants were retired and only three of them are engaged in voluntary work at the time of the interviews. Ten of them have general health issues and taking medications while two of them are healthy. Most of the participants had a level of education ranged from secondary school to university degree as shown in (Table 1). To safeguard confidentiality and protect the participants' identity, numbers from one to 12 will be used to refer to participants.

Table 1: Description of Participants

Characteristics	Categories	Number of Participants
Age (Years)	60 - 70	1
	71-80	4
	81-90	7
Gender	Female	4
	Male	8
Education	Limited education	1
	Secondary/High school	4
	High Diploma/ University level	7
Occupation	Working	3
	Not Working	8
Experience of Complete edentulism	Less than 10 years 5	
	More than 10 years	7
Experience of IOD Less than 10 years		5
	More than 10 years	7

Findings

Through the analysis of twelve individual interviews, five global findings emerged from participants' narratives that portrayed the lived experiences of completely edentulous patients. These participants were treated with a minimum standard of care (IOD) which were related to; replacement of conventional dentures with implants overdenture, experience of implant procedure, experience of implants overdenture as a life-changing experience; experience of implants overdenture as a struggle and patients' challenges and concerns (Table 2).

 Table 2. Super-Ordinate and Sub-Themes of Edentulous Participants' Experiences with Two

 Implants Overdentures

Su	per-Ordinate themes	Sub-Themes
1.	Replacement of Conventional Dentures with Implants Overdenture	 ⇒ Clinical Decision Making ⇒ Unable to Tolerate Loose Dentures ⇒ Invited to be Part of a Study
2.	Experience of Implant Procedure	$\Rightarrow Perception of Implants Placement$ $\Rightarrow Perception of Healing Time$
3.	Experience of Implants Overdenture as a Life-Changing Experience	 ⇒ Enhancing Self-Perception and Feeling Confident ⇒ Increased Chewing Ability& Enjoyment of Food ⇒ Worth it and Would Recommend it to Others
4.	Experience of Implants Overdenture as a Struggle	 ⇒ Unstable and Noisy ⇒ Struggle with Some Food ⇒ Struggle with Upper Denture
5.	Patients' Challenges and Concerns	 ⇒ Length of Treatment ⇒ Cost of Repair ⇒ Follow up Visits ⇒ Denture Manipulation and Hygiene.

1. Replacement of Conventional Dentures with Implants Overdenture

In recounting their experiences with two-implants overdentures, the study participants narrated their stories from being edentulous to having conventional complete dentures to finally deciding to choose dental implants to retain and support their removable dentures. Three subfindings emerged from participants' narratives regarding their decision to change their conventional complete lower dentures with implants overdentures, these themes can be summarised as the clinical decision; the patient inability to tolerate their loose denture; and the patient was invited to participate in an earlier study

Clinical Decision Making:

When I asked participants about the reasons that guided them to exchange their conventional dentures with implants overdenture after a long period of use, they claimed that it was their dental care provider's decision. Some study participants reported that they had visited their clinician to either reline or change their worn or unstable denture, however; the clinician refused to offer them a replacement denture. Due to long term use of unstable removable dentures, no enough gum and bone tissues were remaining to retain the denture in place. The clinician then advised them to consider implants overdenture prosthesis instead of further manipulation of the unstable dentures. The clinician also explained the whole procedure clearly and guided them towards the best treatment choice, they recounted that they were well informed about dental implants dentures before the start of the procedure and then referred them to the McGill University's, Faculty of Dentistry, dental clinic:

" It was my dentist who decided to go for implants, I went to replace my old denture and he said you do not have much gum left, you have to go for implants, and he sent me to McGill clinic" P 8

Unable to Tolerate Loose Dentures:

Participants with a previous history of unstable conventional dentures, especially the lower denture, were eager to look for other available options to replace their conventional dentures. Prolonged use of conventional dentures could affect the quality of underlying tissue especially the lower jaw which subsequently leads to unstable dentures (Hobkirk & Zarb, 2013). Thus, edentulous patients often approach their clinicians to reline and rebase their dentures which could occur quite frequently for some patients. The study participants asserted that they were well-informed about the implant treatment before they decided to choose that option. In addition, they were struggling with their denture during meals as they were not being able to chew food and got distracted.

" I was no longer able to chew meat and stuff like that and I had to cut them into small pieces, and it did not work well, so I was not being able to tolerate my old dentures any longer" P9

Invited to be Part of a Study:

While some participants explained that they were referred by their clinician to the McGill University dental clinic to have implants overdenture procedures performed at reduced price, others were involved directly in clinical studies conducted by other researchers. When these research participants went for what they believed to be a replacement of their conventional

denture, they found out they had been randomly allocated to the implant group to choose if they wanted the implants.

"It was them who decided to have this type of treatment, not me (study team), I was kind of surprised, as I thought I will get a new set of dentures, but they said it will fit and feel the same, and it did" P4

2. Experience of the Implant Procedure

The study participants recounted their lived experiences with implants placement surgery and healing time. During implant placement surgery, they were previously well informed about the possible consequences of surgical procedures. However, they experienced some pain and discomfort during surgery even though they were sedated, and some participants expressed some expected complications during healing time such as pain, bruising, and swelling.

Perception of Implants Placement:

Despite the anticipation of pain due to a fear of surgery, most study participants found the surgical placement of implants mildly painful and uncomfortable as they anticipated more pain than expected because of their fear and anxiety.

" Oh, I was so nervous about that and about having posts drilled into my bones. It is a scary thing ... I am not a brave person "P7

Only two participants reported that they had experienced some bleeding during surgery, and this was well controlled by the clinician. In addition, they were monitored for a few minutes after completion of implant placement surgery before they were discharged from the clinic.

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Another participant added that the pain was intolerable after the effect of anesthetic agent relapsed and they compared this with surgery time which was not comfortable without pain that he could mention

"I thought the surgery would be much more painful... when I went home and for a few days, I had so much pain ... I can say it is intolerable" P 2

"The implant surgery was good and not much of pain, the actual feeling of pain was afterward...it was the worst pain that I had in my life and I had to take medications for days to cope with pain" P6

The research participants expressed the importance of sedation prior to surgery, especially for those with heightened dental fear and anxiety. In addition, they appreciated the healthcare team who were welcoming and empathetic, which in turn provided them with psychological support to cope with anxiety and fear. However, despite the short length of the procedure, they still remember the implant placement surgery as unpleasant moments.

"The surgery was good and went really quick with no pain to mention as they free me, but I was hearing the noise of drills, it is not a pleasant thing to remember" P5

Perception of Healing Time:

The majority of study participants experienced some form of complications during their healing period, typically a few days after implant placement surgery. While, several participants experienced pain and needed to take medications for a few days to cope with their pain, others developed swelling at the implant site. These complications lasted from days to a few months. As some of the study participants had experienced a long period for the implant site to heal completely, this might be related to their general health status that affected the healing process of the implant's incision site (Kashbour et al., 2016).

"After surgery, my mouth took three months to heal well... Never thought it is going to be that long... I had to eat soft food and take much of drinks during that time" P11

3. Experiencing Overdenture as a Life-Changing Experience

Positive experiences related to implants overdentures were disclosed by study participants as a life-changing experience. These experiences were more related to the perceived self-confidence and improved chewing ability, while the negative experiences were mainly related to instability of denture which restricted their food choices.

Enhancing Self-Perception and Feeling Confident:

The majority of participants revealed that they positively perceived their new dentures which helped them to feel more confident to speak and function especially in social gatherings with family and friends. This perception also enhanced their self-esteem and helped them a maximum extent manage their life without stress and discomfort of unstable dentures.

"My new denture affected my attitude as I have much more positive attitude now than I did before and it is mentally encouraging. I feel great... I think it helps a lot because my bottom teeth are never gone out when I sneeze when I cough and no longer accepting ahead to be ashamed about and worried about my dentures" P7

Increased Chewing Ability & Enjoyment of Food:

Most participants had explicitly expressed the improved chewing function after receiving their implants overdentures. They shared their ability to chew hard food like carrots and apples which was not possible with conventional complete dentures.

"They are great as I chew bite un apple without need to cut it off into small pieces... like many people do...with my regular dentures I would not do that, and I ended up cutting all hard food ... Now I can eat meat and nuts... you know "P4

After wearing and functioning with new dentures, the majority of participants revealed that the implants overdentures positively influenced the enjoyment of eating

"I love food and now I can enjoy food more than before without cutting it into small pieces as my new dentures can do the job without worry and I would spend three/ four hours at the restaurant to enjoy the food and this was not possible before with the moving dentures". P4

Worth it and Would Recommend it to Others:

Although most of the participants complained about pain, discomfort, other complications during healing time, and the length of procedure, they think the end result is worthwhile and recommended it to others who might be considering it as an option. They explained that they would suggest this treatment modality to other patients who are either completely edentulous or struggling with conventional complete dentures. In addition, they recommended to receive as much detail as possible to be informed about the procedure and to search for well qualified clinician.

"I would advise anybody who has dentures if they would have the chance to have implants, they would be a lot happier... I appreciate so much what I had received from them, they are very nice, I think it is worth it if you do not have good gum or you have problems with your dentures" P5

4. Experiencing Overdenture as a Struggle

Some participants revealed that the two-implants overdentures did not solve all the problems that they experienced from their conventional complete dentures. They added that they are still having problems while eating and chewing some types of foods, due to their textures. The new denture did not remain secure enough over time and consequently not as stable as expected. Furthermore, the new dentures are not easy to manipulate inside their mouth as the study participants faced some difficulties taking the dentures out of their mouths. They also spend more time cleaning the dentures and the implants to avoid tissue infections and other comorbidities related to poor oral hygiene.

Unstable and Noisy:

Despite the increased denture stability and retention in comparison with conventional complete dentures, about half of this study participants still expressed some difficulty with denture stability. They reported that their dentures were still moving about and not staying in place after some time of use, as one of the participants explained:

"When I got my new dentures, I was very happy at the beginning as they were really secured but now, they are too loose, the lower denture is still loose" P10 Another participant complained about the dentures as being noisy when he eats. This may be attributed to the type of material used for artificial teeth. The type of material used for artificial teeth, as porcelain teeth are noisy on eating but are more durable than acrylic teeth that are not noisy (Winkler et al., 1992; Stober et al., 2006). He also added that he usually gets negative comments from his wife and friends about the sound of his dentures when they join him for a meal. Additionally, he did not feel comfortable anymore eating with others as he already realized the noise coming from his new denture teeth, as he explained;

"I can say they are just a copy of my natural teeth and I am very happy to have them... I do not see any change in my face and in the normal circumstances they are fine... It is all about the noise you know... they usually click when I eat... I can eat well with them with no problem to mention but my wife always complains about that... and she says this is not right, they are noisy at meal" P2

Struggle with Some Food:

Despite the improvement in overdenture stability, retention and chewing efficiency compared to conventional dentures, some participants confronted an inability to chew some types of hard food. They expressed their concerns and struggles when choosing what to eat outside in public settings. One of the participants explained that there might be specific techniques that need to be learned to manage chewing foods with overdentures (IOD). However, he describes his struggle with certain food as fights that he could not get away from, as follow:

"There is a certain food that I still stay away from because I have not learned the technique ...like corn on a cob and things like that and there are still other foods that I must fight with" P9

Struggle with Upper Denture:

Study participants revealed that once they changed their complete upper and lower conventional dentures with lower IOD, the upper denture becomes unstable. They further explained that they had never struggled with their upper denture stability before. This issue probably due to increased retention of the lower dentures, patients were able to notice the tiny movements of the upper conventional dentures that were previously unnoticed (De Albuquerque et al., 2018). One of the participants also complained about this problem which become more noticeable when he plays music instrument and he needs to fix his upper denture prior to any public performance as he said;

"I go to play troopmate, I have to make sure to put a stuff 'adhesive materials' otherwise my top one moves, and very often it comes off when I bit on a hard food like a carrot for example ... They are not stable like when I had my old ones" P11

5. Participant's Challenges and Concerns

Participants explicitly expressed many difficulties throughout the rehabilitation process with dental implants to replace their conventional complete dentures. Some participants complained from the length of treatment and the irreversible nature of the treatment once they got the implants placed. While for some others the follow-up visits and cost of repairs were among their main challenges. In addition, some participants were concerned about their ability to remove and clean the dentures which remained even with dental implants.

Length of Treatment:

The long waiting time was a major concern for participants who received implants overdentures from the McGill University's, Faculty of Dentistry teaching dental clinic. Study participants consider the procedure of having this treatment modality as taking a very long time to be finalized.

"It is a long procedure; it took more than a couple of years to be over... honestly, I had never thought it will take that long to get my new dentures...I am retired otherwise no way" P12

Follow up Visits:

All study participants complained about a lack of follow up visits after receiving their implants overdenture. In addition, they needed to see other clinicians when they faced any other problems related to their dentures and usually takes months to find one who accept to see them if they do not need to change the whole set of dentures. As one of the participants elaborated that each patient usually needs to be reminded and followed up for some time to avoid any future problems related to his/her denture that might happen at any time point.

"They did not send me a follow-up or check-up visits. I think patients need to be reminded constantly and people should be called for review visits which have to be convenient either every six months or so... as if something happened to my dentures where shall I go?!" P 8

Cost of Repair:

Some of the participants further elaborated upon the cost of repair that was related to their implant's overdentures In addition, when they needed to consult other clinicians or an issue to solve this problem related to their implant's overdentures, this costed them even more money As expressed below, the patient complained that she was not aware of this cost from the beginning. She also added these hidden costs should be clarified before commencing the treatment as it might guide their choices especially for older patients with financial difficulties.

"I got my denture 15 years ago (implants overdenture), for five years they were ok and after I have to get a new set as my bottom one got broken... You know, to get it fixed, I had to pay for a new set of dentures ... I paid around 2000 dollars... it is expensive because of implants" P2

Denture Manipulation and Hygiene:

While most of the study participants were able to insert and remove their overdenture quite easily, some others are still struggling to manipulate their dentures each time. The majority of study participants are among the elderly and, commonly, they experience some limitations with manual dexterity. In addition, they have even become concerned about the implants' overdenture manipulation when they get older and they feel this makes them more worried about that.

"I am worried when I get older and will have a hard time with my hands ... I am worried about how I will manage to take them out and clean them... that's why I am thinking to have fixed ones, so I do not need to take them out... as they are permanent" P 6

5.7. Overview of Study Findings:

The findings reveal that edentulous people treated with two- implants overdentures were well informed about the consequences of treatment with implants to replace their unstable conventional dentures, however; they did not expect the pain and length of the healing time. Most of them decide to have implants to retain their complete dentures to overcome the challenges with conventional complete dentures.

Although edentulous people considered the replacement of missing dentition or conventional complete dentures with implants overdenture is worthwhile and recommended, some still struggle with upper denture stability, chewing hard food, and denture noise. In addition, the length of the treatment process, lack of follow up visits, and high repair cost were sill among the concerns and challenges for the current study participants.

5.8. Discussion

To the best of our knowledge, this is the first interpretive phenomenological study in Canada exploring the edentulous patients lived experiences of mandibular two-implants overdentures which is considered the minimum standard of care for completely edentulous individuals (Fiene et al., 2002; Thomason et al., 2009). Five findings emerged from the analysis of their narratives: 1). replacement of conventional dentures with implants overdenture, 2). experience of implant procedure, 3). experience of implants overdenture as a life-changing experience, 4). experience of implants overdenture as a struggle and 5). patients' challenges and concerns. The adoption of interpretive qualitative methodology with an appropriate study sample with one-to-one interview data collection allows the richness of the insight to be gained into the participants' lived experiences of the phenomenon under exploration.

Our study participants length of experience with two-implants overdenture (IOD) ranged in duration between five to more than 15 years with their experience of edentulism. This might explain the depth of our findings surrounding the phenomena of interest under exploration.

The first finding of this study showed that the majority of study participants were well informed about the whole procedure of treatment, its consequences, and possible complications. However, they decided to change their conventional denture either as suggested by clinicians, their own decision to avoid further struggles with unstable conventional complete dentures, or had been selected by the research team to participate in a clinical trial. While many patients chose to undergo dental implants to replace their missing teeth despite their fear and anxiety prior to treatments (Seferli et al., 2014), some patients claimed that they refused to have dental implants to support their dentures due to their anticipation of pain and feeling anxious from surgery (Ellis et al., 2011).

Moving to the participants' experience of implant placement procedure, participants claimed that the implant placement surgery was slightly painful and uncomfortable. This finding is consistent with an earlier study which was carried out on partially edentulous patients (Seferli et al., 2014). In another study, patients perceived the implant surgery favorably with no pain to mention despite their fear and anxiety (Kashbour et al., 2016).

On the other hand, despite their knowledge about procedure complications related to implant placement surgery, the participants did not expect surgical healing complications such as pain, swelling, and discomfort during the implant healing time. Most study participants experienced pain and discomfort symptoms and were not able to wear their provisional dentures which restricted to some extent their function, which agrees with previous studies. (Bryce et al., 2014; Kashbour et al., 2016). In addition, some participants in the current study needed to take medications for some time after implant placement due to excessive bleeding during surgery. Complex surgical procedures such as bone removal and grafting during implant placement can lead to severe post-surgical symptoms of pain and swelling which are related to patient's health, age and sex, and the duration of surgery (Hof et al., 2012; Seferli et al., 2014).

Several of the research participants expressed that their two-implants overdenture as a life-changing experiences that reflect the patients' positive perception of implant overdentures. Firstly, participants experienced an improvement in the appearance comparable with their conventional complete dentures. It is clear that edentulous patients most often seek prosthetic rehabilitation mainly for the sake of appearance (Grey et al., 2013). This finding is consistent with earlier research, in which the participants discussed the aesthetic function in addition to physical functions such as chewing and biting (Meaney et al., 2017). Secondly, participants felt more confident to function with their stable dentures especially in social settings. Using dental implants to support and retain removable dentures increases patient's confidence to perform and function (Emami et al., 2013; Heydecke et al., 2003). Thus, the majority of study participants managed to chew and enjoy food better. These findings contrast other results of previous studies which found that patients experienced improved chewing ability and no longer avoid hard food (Hyland et al., 2012; Thomason et al., 2009)

Finally, the study participants think this treatment modality is worthwhile and recommended for other patients who are either struggling with unstable dentures or lost their dentition with no enough bone tissues to support conventional dentures. Nogueira et al. (2018) found that patients who had been treated with a single implant to support complete denture are willing to recommend it to family and friends.

Unstable upper dentures, noise, and inability to chew hard food are still considered among struggles that have been explicitly recounted by study participants. A few of the current study' participants claimed that they experience instability of upper maxillary conventional denture which was not an issue before receiving the two-implants lower overdenture which often occurs when they bite on their anterior teeth. The reduced denture retention and stability are possible due to the increased retention of the lower denture; patients were able to feel the upper dentures' movements and therefore results in a lack of ability chewing certain food (De Albuquerque et al., 2018).

Although some edentulous patients treated with implants overdenture perceived this treatment modality positively, some have experienced some concerns and challenges. While the majority of study participants complained about the length of the rehabilitation process which took months to a couple of years to receive their final denture, other patients think the impact of treatment outcome on function compensated the time required to finalize it (Osman et al., 2014). Some edentulous participants also experienced difficulties in maintaining their oral and denture hygiene. This is in contrast to a previous study where patients consider implant cleaning as simple and easy (Nogueira et al., 2018). Due to their age and restricted hand movement, they find it challenging to take off their dentures and clean the implant sites which

has been also reported in another study (Osman et al., 2014). Another concern to consider is the cost of repair as participants pointed out. However, a previous qualitative study showed that edentulous patients refused to participate to receive implants overdenture due to other concerns that were not related to the financial aspect (Ellis et al., 2009). Discussing these challenges with patients before commencing the implant procedure could help patients to make informed decisions.

5.9. Strengths & Limitations

To the best of our knowledge, this is the first study to provide insights into the edentulous patients' experiences of the two-implants overdentures (minimum standard of care for completely edentulous patients) in Montreal, Canada. The study participants' experience with two implants overdentures (IOD) ranged form five years to more than 15 years that might explain the depth of our findings surrounding the phenomena of interest under exploration.

Although our results should be interpreted within the clinical context of the study, the findings can be transferred to similar clinical settings within Canada and abroad. In addition, this exploration focussed only on completely edentulous patients' perspectives and experiences; thus, it did not address dental care providers' perspectives and insights. Further research that aims to explore in-depth healthcare providers' perception about this topic of concern is still required.

5.10. Contribution

This study contributes to our understanding of patients' experiences with the minimum standard of care for the edentulous patients. Participants included in this exploration have long experience of tooth loss and prosthetic rehabilitation and they were from a representative sample of the elderly population of Quebec. The adoption of a qualitative design enabled the study participants to explicitly give in-depth stories grounded in their lived experiences. Therefore, the study findings could be transferable to other settings in Canada and worldwide.

5.11. Conclusion

In this study, we aimed to understand the edentulous patients' experience of the minimum standard of care (Two-implants overdentures). The narratives shared by the study participants provide a deep personal view of the experience of living with the implants overdenture. The interpretive phenomenological analysis of the narratives revealed five major themes; 1) replacement of conventional dentures with implants overdenture; 2) experience of implant procedure; 3) experience of implants overdenture as a life-changing experience; 4) experience of implants overdenture as a struggle and 5) patients' challenges and concerns. This study has implications for dental education and elinical practice. Integration of interpretive phenomenology analysis in dental education and employing it in dental practice will have pivotal impacts in the care of edentulous patients by understanding the existential concerns living without teeth and considering implants overdentures as the minimum standard of care for treating such group of patients. Thus, the findings of this study could be used to improve patients' experiences through the implementation of more person-centered dental care that

considers their needs, their difficulty accessing implant provision treatment, and shared decision-making.

5.12. Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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6.1. Summary of Findings

In this thesis, I presented the findings of my project in the form of three manuscripts, which addressed several questions and provided an insight into the lived experiences of completely edentulous patients who were treated with the minimum standard of care.

The main goal of this study was to explore in-depth completely edentulous patients' lived experiences with complete tooth loss and treatment with two-implants overdenture. To address this, a scoping review was conducted first to summarize the available literature. Then, a phenomenological qualitative exploration was adopted through individual face-to-face interviews with the study participants in order to understand edentulous patients' lived experiences of what it means to be edentulous, having to live with two-implants overdenture, and understanding the functional and social implications of living with the two-implants overdenture for such patients.

In this research project, several questions have been raised and answered:

1."What do we know about the perceived impact of lower two-implants overdenture opposed by upper complete denture for treating edentulism?"

In order to answer this question, a scoping review of the available literature related to the impact of the minimum standard of care on patient satisfaction and oral health-related quality of life was conducted. The overall aim of this review was to report and map the findings of published qualitative and quantitative studies relating to the impact of using two-implants overdenture for treating complete edentulism.

The studies included in the scoping review provided considerable insight into the impact of using two-implants overdenture on improved patient satisfaction and quality of life. The results showed there was difference between two-implants overdentures and conventional complete dentures in relation to aesthetics, chewing ability, comfort, phonetic, social, psychological limitations, and overall satisfaction. Moreover, the included quantitative and qualitative review studies provided vitally important insight into the impact of using twoimplants overdenture on improved patient satisfaction and quality of life. This can be explained where the two-implants overdenture increased the oral health impact profile and visual analogue scale ratings on questionnaires used to evaluate patient quality of life and patient satisfaction respectively. However, there was no information about the lived experience of complete tooth loss and having the two-implants overdenture, which is considered the minimum standard of care (Fiene et al., 2002; Thomason et al., 2009).

Each research methodology provides unique and valuable insight into the completely edentulous patients' experience of living with complete tooth loss and implant treatment. However, qualitative explorations enhance understanding edentulous patients' personal experience, and offer rich data that could guide treating edentulous patients in a personalized way. Therefore, qualitative studies are needed to better understand the edentulous patients' lived experiences of complete tooth loss and two-implants overdentures.

2."How do completely edentulous patients experience tooth loss? What are the implications of this experience on their function and social life?"

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To address this question, an interpretive phenomenological approach supported by Martin Heidegger's philosophy was utilized (Smith et al., 2009) to allow for a more in-depth analysis of this phenomenon, which cannot be adequately explained merely by quantitative methods. My background in the field of dentistry as a clinical practitioner allows me to understand each participant's experience and to acknowledge the unique differences among patients with complete tooth loss and denture users. I specifically engaged in this research approach as it encouraged a detailed understanding of the phenomenon of my interest.

Two main findings emerged from the analysis of the participants' narratives; long experience of tooth loss, and experience of conventional complete dentures. The findings show that complete tooth loss experience has different meanings among participants. The meanings varied from reasons like a lack of awareness to the patient's sense of relief. The study participants revealed that they were not fully aware of the possible consequences of tooth loss and wearing conventional complete dentures. However, most of them experienced healing from other dental problems related to their natural teeth as they spent more time and money to solve dental-related problems, when compared with having to deal with conventional dentures.

Conventional dentures enhanced edentulous patients' self-perception, functions, and social life. The participants managed to function at a certain level in public settings, such as eating certain foods and smiling comfortably. Their narratives are evidence that the replacement of missing teeth with conventional complete dentures was crucial and meaningful for their appearance and eating certain foods in social settings.

On the other hand, participants adopted certain coping strategies to avoid problems related to unstable dentures after a prolonged period of denture use. Some had to change their diet to avoid struggles with unstable conventional dentures. Thus, they avoided certain types of

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foods that were hard to eat or chew and modified their diet, especially when they went out to eat. Once the struggle with conventional dentures continued, they decided to change their conventional dentures with two-implants overdentures.

3."How do completely edentulous patients experience two-implants overdenture which is considered the minimum standard of care? What are the implications of this treatment modality on function and social life?"

To answer this question, an interpretive phenomenology analysis was utilized to interpret the narratives of participants' lived experiences with implants overdentures. Interpretive phenomenology analysis is the most suitable approach to explore and understand the edentulous patients' lived experiences, while offering deep insight into the topic. This approach allowed an in-depth investigation into the participants' experiences by engaging with them and deepening my understanding of meanings within the narratives without setting aside or bracketing my pre-existing knowledge, beliefs, and thoughts.

To the best of our knowledge, this research is the first interpretive phenomenological study in Canada that explores edentulous patients' lived experiences of mandibular twoimplants overdentures. The participants have long experiences with two-implants overdentures, which might explain the depth of the findings surrounding the phenomenon we explored. The findings of this interpretive phenomenological exploration support the existing evidence about the positive impact of mandibular two-implants overdenture on edentulous patients' quality of life.

Five findings emerged from the analysis of the patients' narratives: 1) replacement of conventional dentures with implant overdentures, 2) experience of implant procedure, 3)
implant overdentures as a life-changing experience, 4) experience of implant overdentures as a struggle and 5) patients' challenges and concerns.

The participants chose to replace their conventional dentures in order to avoid further struggles with unstable conventional complete dentures or having to follow up with dental clinician referrals. However, a few participants had been selected to participate in clinical studies conducted by other researchers and were randomly allocated to the implant group

After implant placement procedures, most study participants claimed that they were not able to use their temporary dentures due to pain and discomfort. Their functions and social life were restricted during the implant healing time.

Despite the struggle with implant surgery and healing time, implant overdenture was considered worthwhile by the study participants, and was recommended to other patients who were either edentulous or struggling with unstable dentures. The participants perceived twoimplants overdentures positively and felt more confident speaking and eating in social settings. Thus, two-implants overdentures enhanced their confidence to perform and function. Moreover, The majority of participants managed to chew and enjoy food better. However, a few were still struggling to chew hard food and experienced unstable maxillary upper dentures when they bit on anterior teeth.

The long duration of the treatment process, cost of repair, lack of follow-up visits, and difficulties maintaining oral and denture hygiene are still among the challenges and concerns of edentulous patients treated with the minimum standard of care (two-implants overdenture). Therefore, these concerns and challenges need to be discussed before commencing with the implant procedure to help patients make informed decisions.

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6.2. Study Strengths

The strengths of this study include the chosen methodology, the Interpretive Phenomenology Analysis. The Interpretive Phenomenology Analysis proved to be suitable for the study's purpose, which was to gain an in-depth understanding of what it means to be completely edentulous and treated with two-implants overdenture. This qualitative approach increased the strength of the study by allowing us to gather rich narratives about the phenomenon of interest. The lived experience of edentulism and implants overdentures are rich and complex, which were confirmed by the collected study narratives. The phenomenological study findings provided deep and insightful meanings to gain an understanding of the experience being explored. Through gaining an in-depth understanding of patients' experiences, improvement of clinical practice and patient care would be possible

Many of the research participants were struggling with complete tooth loss and conventional complete dentures; many are still facing concerns and challenges with implant overdentures. Thus, the diversity of these lived experiences added depth and transferability to our study findings when understanding other edentulous patients on other dental care settings.

Another strength of this study is the combined work of expertise brought by the main study advisor, Dr. Richard Hovey, who is an expert in phenomenology, and the committee members, Dr. Christophe Bedos & Dr. Paull Allison, who are both involved in qualitative research. The main researcher, Entisar Abdulkader, who came to this study and has worked as a dental clinician in different clinical settings for many years, with previous dentistry knowledge of the group of patients studied. Finally, the study's main researcher had the chance to involve clinicians to reflect on patients' narrative interpretations and to also receive feedback from the main supervisor, committee members, and peers with both qualitative research and clinical expertise. This feedback helped to ensure trustworthiness and improve the accuracy in the study findings.

6.3. Study Limitations

Along with its evident strengths, there are some limitations pertaining to the methods used in this study. This study has provided new insights into the lived experience of edentulous patients who have been treated with two-implants overdenture, however, the study involves only twelve participants' interviews from one particular dental school.

Furthermore, all our study participants have lost their natural teeth for many years and findings do not include the experiences of patients who recently lost their teeth. This could be a limitation to our results for two reasons. First, the participants might not be able to recall some details related to their experience of complete tooth loss and conventional denture use. Second, the minimum standard of care that our study participants received may have been different when they begun using conventional dentures, relative to the current standards.

6.4. Future Research Directions

Despite the pertinent information provided from this study that can guide completely edentulous patients, conventional denture wearers, and oral health providers, more future dental research is needed to include the perspectives and experiences of patients from different dental clinical settings. Also, interviewing participants with more recent experiences of complete tooth loss and implant overdentures may generate different findings. The adoption of qualitative design provided a foundation for the study participants to tell their narratives on aspects related to their prolonged experience of tooth loss and using a conventional prosthesis, which gave them a chance to share their experiences and perspectives to ultimately inform oral healthcare providers. However, this study only focused on completely edentulous patients' perspectives and experiences, and the study did not address dental care providers' perspectives and insights. Further research that aims to explore the in-depth healthcare providers' perceptions about the studied topic of concern is still required.

6.3. Conclusions

This study is the first qualitative study that explores the edentulous patients' lived experiences with two-implants overdenture in Canada. Participants included in this exploration have long experiences of tooth loss and prosthetic rehabilitations and are from the elderly population of Quebec, Canada.

In order to improve the edentulous patients' quality of life; the rehabilitation process, costs of treatment, and following up on oral and denture hygiene maintenance must be focused on.

Understanding the outcomes of treating edentulism with two-implant overdenture requires a multidisciplinary collaboration in research. Thus, exploring the experiences and revealing the individual unique meanings of tooth loss and distinct prosthetic treatment modalities confirm that interpretive phenomenology can offer a pivotal insight into the present practice of clinical dentistry

Treatment of complete tooth loss with dental implants needs a multidisciplinary approach to better explore and understand the true nature of the lived experience of edentulous patients with prosthetic rehabilitation. Thus, exploring all elements together rather than independently is crucial.

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Appendix A: Informed Consent Form

Faculty of Dentistry McGill University, 2001 Ave McGill College, Montreal, QC H3A 1G1

Informed Consent Form

Project Title: Patients' Experiences with Implant Prosthetic Rehabilitation. Main Supervisor: Richard Hovey (PhD). Division of Oral Health & Society, Faculty of Dentistry, McGill University. 2001, McGill College, Montreal, Quebec, H3A 1G1. Tel: 514-398-7203, ext. 09056 Fax: 514-398-7220 Email: richard.hovey@mcgill.ca

Student Investigator: Entisar Abdulkader PhD (c). Division of Oral Health & Society, Faculty of Dentistry, McGill University. 2001, McGill College, Montreal, Quebec, H3A 1G1. Email: entisar.abdulkader@mail.mcgill.ca

This document is to provide you with information about this research project and your role as a participant. Please take a few minutes to read through so you understand the content and feel free to ask any questions you may have concerning the project. If you prefer, I can read

it out loud for you.

Introduction

You are invited to participate in a study about understanding patients' experiences with implant prosthetic rehabilitation. The purpose of this study is to gain insight into your experiences of with implant- supported prosthesis to enhance our understanding of our research participants lived experiences of having mandibular two implant-supported overdentures.

This study will recruit 10-15 people who had implant prosthetic rehabilitation. If you choose to take part in this study, you will be asked to participate in an interview with the researcher. The interview might take up more than 40 minutes to complete and will be scheduled at a time and place convenient for you. All interviews will be audio-recorded and transcribed to facilitate the analysis of the information collected for this study. The types of questions asked at each interview will be about your experiences with the implant rehabilitation process.

Voluntary participation and/ or withdrawal

Your participation in this research project is a voluntary decision and we do appreciate it. However, you can decide not to answer any question you are not comfortable with or withdraw from the study at any time without any negative consequences on you. In the case of withdrawal, you can choose to have the information collected to this point destroyed.

Confidentiality

All information you provide—including your identifying data, your health information, and the responses you give during the interview—will be considered completely confidential. This pledge of confidentiality means that the interview materials will be coded and stored in such a way as to make it impossible to associate them directly with any individual. The typed material will not contain any names. All the identifiable data will be stored on McGill University's OneDrive network, which is password-secured and only accessible by Dr. Entisar Abdulkader; access will be granted to supervisor Dr. Richard Hovey. The data will be transferred to Dr. Richard Hovey' OneDrive account after Dr. Entisar Abdulkader graduation, and eventually be destroyed after seven years as per University policy. Any printed material or drawings, including consent forms, will be stored in a locked filing cabinet in a secure central location accessible only to the principal investigator. The findings of this study will be published in a thesis, as well as in scientific journals and conferences. You might be quoted in these; however, we will make sure that these quotations will be anonymous. The readers will not be able to identify anyone - whether it is you or the people that you may mention during the interview. All names will be erased, and any information that would allow readers to recognize anyone's identity will be removed. A representative of the McGill Institutional Review Board, or a person designated by this Board, may access the study data to verify the ethical conduct of this study.

Potential risks

There is no known risk for the participants who will participate in this study.

Potential benefits

You may not benefit from your participation in this study. The information learned from this study may contribute to our understanding of patient experience with the implant rehabilitation process.

Compensation

You will be given up to 20.00CAD\$ for each interview to compensate your transportation fees.

Questions and Contact

If in the course of this research project, you find it necessary to get in contact with any member of the research team, do feel free to contact Dr. Entisar Abdulkader (604-363-0978) or Dr. Richard Hovey (514-398-7203 ext. 09056) from 9:00-16:00, Monday to Friday.

If you have any questions or concerns regarding your rights or welfare as a participant in this study, you can contact Ms. Ilde Lepore: Ethics Officer for the McGill Institutional Review Board, McGill University, Faculty of Medicine, McIntyre Building, #633-3655 Promenade Sir William Osler, Montreal, QC H3G 1Y6. Tel: (514) 398-8302. Email: ilde.lepore@mcgill.ca

Declaration of consent

I have read the information in this consent form. I am aware of the purpose of this study and what I am asked to do. I have asked my questions, and my questions have been answered. I was given enough time to make a decision. I am free to withdraw from this study at any time. I was informed that my name will not appear on any publications associated with this study. I do not give up any of my legal rights by signing this consent form. I will be given a copy of this signed consent form.

Name of the participant:	Date:
Signature of the participant:	
Person who obtained consent:	Date:
Signature of person who obtained consent:	

Appendix B: Sample Interview Guide



Faculty of Dentistry McGill University, 2001 Ave McGill College, Montreal, QC H3A 1G1

The Interview Guide

Patients' Experiences with Implant Prosthetic Rehabilitation

Research Project Leaders:

Main Supervisor: Richard Hovey (PhD). Division of Oral Health & Society, Faculty of Dentistry, McGill University. 2001, McGill College, Montreal, Quebec, H3A 1G1. Tel: 514-398-7203, ext. 09056 Fax: 514-398-7220 Email: richard.hovey@mcgill.ca Student Investigator: Entisar Abdulkader PhD (c) Division of Oral Health & Society, Faculty of Dentistry, McGill University. 2001, McGill College, Montreal, Quebec, H3A 1G1. Email: entisar.abdulkader@mail.mcgill.ca

The Interview Guide (Semi- Structured):

- 1. What does it mean to you to be completely edentulous?
- 2. Tell me about your experience of being edentulous. How about life since you lost your teeth?
- 3. What does it mean to life without teeth? In your daily life/ in social life?

- 4. How did you manage to cope with all that?
- 5. How has living with this edentulous status affected you eating?
- 6. Let's talk about the tooth replacement with implants. When did it start and how it was?
- 7. How did you cope with the implant rehabilitation process?
- 8. What does have implant-supported overdenture mean to you?
- 9. How would you describe your experience throughout the prosthetics treatment?
- 10. What foods do you usually like to eat? Are you able to eat food you regularly eat?
- 11. What was the effect of prosthetic rehabilitation on your oral health?
- 12. How has living with the implants overdenture influenced your social life?
- 13. Has this affected other aspects of your life?
- 14. How did you cope with treatment procedure or manage with all this?
- 15. Do you feel like your experiences with this denture have changed you as a person?
- 16. Is there anything else you would like to talk about or add?
- 17. What else would you like to share about your experience?

Thank you for your time.

Appendix C: Ethics Approval



Faculty of Medicine 3655 Promenade Sir William Osler #633 Montreal, QC H3G 1Y6 Faculté de médecine 3655, Promenade Sir William Osler #633 Montréal, QC H3G 1Y6 Fax/Télécopieur: (514) 398-3870 Tél/Tel: (514) 398-3124

May 15, 2018

Dr. Richard Hovey Faculty of Dentistry Division of Oral Health & Society 2001, avenue McGill-College, Suite 500 Montreal QC H3A 1G1

RE: IRB Study Number A05-B38-17B Patients' experiences of pain during implant prosthetic rehabilitation

Dear Dr. Hovey,

Thank you for submitting an application for Continuing Ethics Review for the above-referenced study.

The study progress report was reviewed and full Board re-approval was provided on May 14, 2018. The ethics certification renewal is valid until May 17, 2019.

The Investigator is reminded of the requirement to report all IRB approved protocol and consent form modifications to the Research Ethics Offices (REOs) for the participating hospital sites. Please contact the individual hospital REOs for instructions on how to proceed. Research funds may be withheld and / or the study's data may be revoked for failing to comply with this requirement.

Should any modification or unanticipated development occur prior to the next review, please notify the IRB promptly. Regulation does not permit the implementation of study modifications prior to IRB review and approval.

Regards,

Roberta las

Roberta Palmour, PhD Chair Institutional Review Board

cc: Entisar Abdulkader A05-B38-17B

McGill Faculty of Institutional Review Board - CONTINUING REVIEW FORM -

The completed form is to be submitted electronically to submit2irb.med@mogill.ca. The continuing review form must be received at least one (1) month before the expiration of the last ethics approval. If you require additional information, please visit the IRB website at: http://www.mcgill.ca/medresearch/ethics/ or by calling 514-398-3124.

Principal Investigator	Dr. Richard Hovey		
Faculty and Department	Oral Health & Soclety, Faculty of Dentistry		
Study Coordinator, if applicable			
Address:	Faculty of Dentistry, McGill University 2001 McGill Collage Avenue, Montreal, Quebec, H3A 1G1 10		
E-mail	richard.hovey@mogill.ca Telephone:		
Study Title	Patients' experiences of pain during implant prosthetic rehabilitation		
Grant title, if different from study title.			
IRB Study Number	A05-B38-17B Date of last approval 19 May 2017		
Has there been a change or addition to the financial support for this study?	O YES ● NO		
if yes, please specify the changes/additions.			
Status of the Protocol	Active enrolment When did this study begin? Recruitment complete Recruitment on hold Data analysis Secondary Analysis only Inactive/dormant**		
**If the study is inactive/ dormant (i.e., there are no participants enrolled in the study and no study activity is occurring), please specify the reason:	APR 1 0 2018 FACULTY OF MEDECINE		
If the study is is actively enrolling participants, or if enrolment is complete, please answer the following questions:			
Study sample size:	15-20 participants Total number enrolled in the study:		

Number of participants that have completed this study:	2	Total number of participants withdrawn
Projected date of completion of study enrolment:		Projected date of study completion:
Please provide a brief description of what has occurred since the IRB's last ethics approval.		
Has the study revealed any new findings or knowledge relevant to the potential benefits and/or study risks that may influence participants' willingness to continue in the study?	O YES O NO ● N/A	Has this new O YES Information been communicated to O NO participants? © N/A
If applicable, please describe the findings.		
Has an amendment(s) to the protocol been submitted to the IRB in the past year?	O YES © NO	What is the version date of the most recent IRB- approved protocol?
Has the consent form(s) been revised in the past year?	 YES NO N/A 	Have consent form O YES O NO modifications been reported to the IRB?
Version date/s of the most recently approved consent form(s):		
Have any adverse events occurred since the last approval?	 YES NO N/A 	If yee, how many at How McGill sites?
Have the adverse events been reported to the IRB? If no, submit all adverse events with this form.	O YES O NO	NIA MAY
Have there been any publications?	O YES NO	If yee, append list:
SIGNATURES	1	
Principal Investigator	(line)	Hom Date April 10/2005
IRB Chair	Rabuck	Palmon Date May 14, 243

McGill

April 29th, 2017

Dear Entisar,

I read the Protocol of your proposed research project on "Patient Experience of Pain During Implants Rehabilitation Process", which will be done under the supervision of Dr. Richard Hovey.

I understand that you will be recruiting participants from the Undergraduate Clinic of the McGill Faculty of Dentistry, after they will have been through the surgical phases of implants placement. I read in your protocol that throughout the research process, you will ensure that confidentiality of all research participants will be protected.

Thus, I will agree that you have access to the implant, post-surgical phase patients of the Undergraduate Clinic of the McGill Faculty of Dentistry, for the purpose of your research project.

Kind regards,

Maple Nathalie Morin

Nathalie Morin Clinic Director McGill University Faculty of Dentistry