COMPARING OCCUPATION BASED INTERVENTION WITH TRADITIONAL THERAPY FOR PATIENTS WITH DE QUERVAIN'S DISEASE

Jaqueline Meier

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Declaration

I, Jaqueline Meier declare that this Dissertation is my own work. It is being submitted for the degree of Master of Science in Occupational Therapy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University

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To my parents for their unconditional love and endless support throughout my life.

I owe my success to you.

Abstract

Introduction: There is a need for occupational therapists working in hand rehabilitation practices in South Africa to realign with the profession's philosophy by providing occupation based interventions (OBI). A growing body of evidence points towards OBI for producing favourable outcomes in physical rehabilitation practices, however no studies have reported the outcomes of this method with de Quervain's disease. This research was conducted to develop and compare the outcomes of an OBI programme to a traditional immobilisation protocol for de Quervain's disease.

Methodology: A quantitative- longitudinal pre-test post-test research intervention design was used in this study. Total population sampling was used with 54 patients diagnosed with de Quervain's disease at Helen Joseph Hospital, with 27 patients conveniently recruited into each treatment group in the order they were referred. A demographics questionnaire was developed for the study and the outcome measures included the Finkelstein Test, Visual Analogue Scale, Disabilities of the Arm, Shoulder and Hand questionnaire (DASH), and the Canadian Occupational Performance Measure (COPM). Data were analysed using Statistica 13.2, and descriptive, parametric and non-parametric statistical tests were used to compare the outcomes within and between the two treatment groups.

Results: No significant differences in outcomes were shown between the two treatment groups at the end of a six-week intervention period. Significant improvements in scores were however shown for the OBI group compared to the traditional group for the DASH work ($p=0.010$) and COPM performance ($p=0.014$) and satisfaction ($p=0.041$) assessments three weeks into the intervention.

Conclusion: Both the OBI and traditional groups produce favourable outcomes for de Quervain's disease at the end of a six-week intervention period, however the process to achieve these outcomes is more satisfying for patients who receive OBI.

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Table of contents

List of figures

List of tables

Nomenclature

Activity limitation

Any internal or external factor that may limit an individual's ability to execute a task or action (Hemmingsson & Jonsson 2005).

Biomechanical approach

A treatment method that focuses mainly on the remediation of physiological features of an individual that may be affected by injury or disease (Turner et al. 2002).

Client- centred

A type of approach which "ensures that the therapist welcomes the individual's expert knowledge of his or her situation and how it impacts on function, and integrates that knowledge into the practice process" (McKee & Rivard 2011 p.157).

Hand rehabilitation

A service that is "directed at restoration of function in the injured hand to enable the individuals to return to their day to day activities with least restrictions" (Che Daud et al. 2016 p. 31).

Idiopathic

Refers to a disease that has an unknown cause.

Occupation based

An occupation based approach considers an individual's engagement in occupation as being the fundamental part of the assessment and treatment methods that are used (Fisher 2014).

Occupational performance

Refers to the "actions executed, usually within patterns and habits, which form part of the normal and expected content of a person's existence and are aimed at meeting that individual's needs" (Turner et al. 2002 p.639). This term is also conceptualised as

being the output of the interaction between the person and their physical, occupational, social and cultural contexts (Hemmingsson & Jonsson 2005; Fisher 2014).

Occupational perspective

Refers to “occupational therapists’ focus on humans as occupational beings, who perform and engage in occupations that impact on their health and wellbeing within the context of their environments” (Burley et al. 2018 p.299).

Occupational profile

All the factors within an individual’s life including their personal, psychosocial, spiritual, environmental, cultural and occupational contexts that have an influence on their participation and performance in everyday activities.

Occupational well-being

Refers to “the meaning and satisfaction that individuals derive from their occupational lives” (Doble & Santha 2008 p.186).

Outcome measure

Used within this study to refer to four assessments including the Finkelstein Test, Visual Analogue Scale, Disabilities of the Arm, Shoulder and Hand questionnaire, as well as the Canadian Occupational Performance Measure. These outcome measures were used to measure the change in outcomes in terms of symptoms, participation in activities, as well as performance and satisfaction in everyday activities.

Symptoms

Used within this study to refer specifically to the experience of pain.

List of abbreviations

APL	Abductor pollicis longus
COPM	Canadian Occupational Performance Measure
CPD	Continuing professional development
CSI	Corticosteroid injection
DASH	Disabilities of the Arm, Shoulder and Hand questionnaire
EPB	Extensor pollicis brevis
ICF	International Classification of Functioning, Disability and Health
MRI	Magnetic resonance imaging
NSAIDs	Non-steroidal anti-inflammatory drugs
OBI	Occupation based intervention
OTASA	Occupational Therapy Association of South Africa
PEO	Person-Environment-Occupation Model
RSI	Repetitive strain injury
SASHT	South African Society of Hand Therapists
VAS	Visual Analogue Scale
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter provides an overview of current hand rehabilitation practices in South Africa and internationally, which led to the development of this research. Background on de Quervain's disease and the problem regarding current occupational therapy treatment practices in relation to intervention approaches for hand conditions such as de Quervain's disease are described. Factors relating to patient demographics and the health care system in South Africa are discussed, and hand rehabilitation within a South African context in relation to treatment approaches is considered. Furthermore, the rationale for this research is discussed and the research question, aim and objectives of this study are stated.

1.1.1 Background to the study

De Quervain's disease is characterized by pain and swelling over the radial styloid, particularly with flexion of the thumb and ulnar deviation of the wrist (Coldham 2006; Ilyas 2009).

It is a relatively common condition with a higher prevalence in women, people who are aged over 40 as well as in the African race (Wolf et al. 2009). Women who are pregnant or lactating as well as new mothers also have an increased tendency to develop this condition (Avci et al. 2002; Goel & Abzug 2015). One of the most common predisposing risk factors for de Quervain's disease is of work related origin. People who perform work tasks that require repetitive wrist movements or heavy manual labour such as construction workers, carpenters, production line workers, typists, domestic workers, and butchers are of higher risk of developing this condition (Calvo-Cerrada et al. 2012). This condition is also exacerbated by movement and activity, especially if it is repetitive and requires resisted grip into ulnar deviation (Ilyas et al. 2007; Shehab & Mirabelli 2013). This affects occupational performance in personal management, care of others when children need to be lifted, as well as work and sport activities (Che Daud et al. 2016; Goel & Abzug 2015).

In South Africa, the availability of hand injury statistics are limited (van Stormbroek & Buchanan 2017). It has however been reported that in developing countries like South Africa, hand injuries are common (Che Daud et al. 2016). Although the burden of de Quervain's disease is not well known, there is a high incidence of work related or repetitive strain injuries (RSI) as a result of a large percentage of the population working in the manual labour sector (Schultz et al. 2012; Coovadia et al. 2009). In a sample of South African community service occupational therapists, 40.9% reported treating patients with RSI's at least on a monthly basis, which indicates the need for an effective treatment method in managing de Quervain's disease (van Stormbroek & Buchanan 2017).

Treatment for de Quervain's disease includes non- surgical or conservative management options such as corticosteroid injections (CSIs), non-steroidal anti-inflammatory drugs (NSAIDs) and immobilisation by means of a splint (Ilyas et al. 2007). Surgical intervention is only recommended if conservative management has failed (Ilyas et al. 2007). Immobilisation of the thumb and wrist by use of a thumb spica splint over a six week period has shown to be effective in pain management, reducing swelling and relief of symptoms (Goel & Abzug 2015; Ilyas et al. 2007). This is the widely used protocol in occupational therapy for the management of de Quervain's disease. However the use of such protocols in hand rehabilitation has resulted in the use of prescribed biomechanical treatment approaches for the management of hand injuries, where reduction in physical symptoms is the prioritised goal for therapy (de Klerk et al. 2015). This treatment approach mainly focuses on body structure and function, addressing physiological problems such as the reduction in pain and improvement of performance components. This has potentially contributed towards what has been described as a paternalistic approach to hand rehabilitation, where therapists are more inclined to make decisions for patients rather than giving them the opportunity to actively participate in their therapy (Fitzpatrick & Presnell 2004).

Used in isolation, this approach omits a conceptualisation of the patient as an occupational being, the impact that the patient's occupations have on the onset of the condition, as well as how these occupations may exacerbate their condition (Fitzpatrick & Presnell 2004). Furthermore, this approach overlooks the understanding of the

patient's environment and context, which may affect the onset and aggravation of their condition as well as how treatment will be tailored for the patient (Law et al. 1996; Fitzpatrick & Presnell 2004).

In recent years, it has been well documented that occupational therapists working in hand rehabilitation need to consider providing holistic treatment, as they have deviated from using occupation based assessment and treatment in their practices (Grice 2015; Colaianni & Provident 2010). The introduction of occupation based intervention (OBI) as an effective and holistic treatment approach where individuals are actively involved in their therapy, enabling them to reach their short and long- term occupational goals has been suggested (Amini 2011). Furthermore, the application of an OBI approach has been proven to attain higher client satisfaction rates and better functional outcomes compared to the use of a biomechanical approach alone (Jack & Estes 2010).

Occupation based intervention supports a client- centred and holistic intervention as it enables individuals to engage in meaningful occupations, and is also an efficacious treatment modality as it utilises resources from one's own environment during the assessment and treatment process (O'Brien & Mcgaha 2014; Amini 2004). The use of OBI supports the underlying philosophy of occupational therapy that the restoration of a person's health is achieved and maintained through engagement in meaningful occupations, and that the experience of physical impairment is unique for people as this is influenced by an individual's personal beliefs and values, as well as their context (Cooper 2011; Amini 2004). De Quervain's disease in particular is closely related to the activities that individuals perform, as well as their interaction with their environment, causing many functional restrictions, which has significant implications in one's everyday life. There is however limited research and information that describes how to address these environmental factors and overcome functional restrictions in the management of this condition (Fitzpatrick & Presnell 2004). This has resulted in occupational therapists struggling to deliver more holistic interventions. Studies have concluded that the reasons for this are mostly related to cost containment and reimbursement issues, increased caseloads, limited therapy time, poor availability or unfamiliarity with occupation based assessment and treatment protocols, restrictions in physical environments and equipment, as well as reliance on routine intervention

protocols (de Klerk et al. 2016; Grice 2015). Therapists' reluctance to use OBI has also been influenced by the referring doctors' orders who may have limited insight into more holistic treatment methods (O'Brien & Mcgaha 2014).

In South Africa, as a direct result of the countries' political history which is characterised by discrimination and inequality, the development and transformation of systems has led to poor health care services, a dysfunctional health care system, high unemployment rates and poverty. (Coovadia et al. 2009). The 'one size fits all' biomechanical intervention approach taken by hand therapists when treating de Quervain's disease may not address factors such as limited access to employment, finances, education and health care in the context of significant language and cultural differences. Therefore, there is a call for health services to be more holistic, client-centred and contextually responsive in South Africa. However, the provision of holistic and effective health care services in South Africa has been affected by poor health policies, health inequalities and restrictions in the settings and environments in which occupational therapists work. This is particularly true in the public sector, where therapists delivering hand rehabilitation are faced with limited human resources, high patient loads with quick turnover of patients and restrictions in physical work environments and available resources (de Klerk et al. 2016). The poor perception of the credibility of OBI by health care professionals, insufficient supervision and mentoring from experienced therapists, as well as unfamiliarity and lack of understanding of OBI adds further challenges in the provision of more holistic and client-centred treatment in hand rehabilitation in South Africa (de Klerk et al. 2015; de Klerk et al. 2016; van Stormbroek & Buchanan 2017).

1.2 Problem statement

The traditional protocol that is currently being used by occupational therapists at Helen Joseph Hospital for the management of de Quervain's disease involves immobilisation by means of a thumb spica splint. The purpose of this splint is to immobilise the wrist and thumb, thereby resting the tendons affected by de Quervain's disease, in order to reduce swelling and control pain (Ilyas et al. 2007). This mechanistic treatment approach mainly addresses these physiological issues where the success of treatment

is measured by a reduction of physical impairment (Cooper 2011). Changes in physical symptoms however does not necessarily result in improvement of their functional performance (Colaianni & Provident 2010). Due to the impact that this condition has on one's daily living, this treatment method does not address all the issues that arise from having this disease, with lack of attention to the long-term outcomes and impact that this condition has on one's everyday life (Coldham 2006). It also does not take cognisance of the fact that this condition commonly arises from how occupations are performed (Chan & Spencer 2004; Fitzpatrick & Presnell 2004).

In addition, this treatment method does not support the client- centred and holistic approach which provides the foundation for the occupational therapy practice (Fitzpatrick & Presnell 2004). The traditional immobilisation protocol also requires long periods of immobilisation which may cause potential muscle wasting, difficulty performing everyday activities, increased costs and time off work, production losses and poor compliance of this protocol by patients (Coldham 2006).

There is increasing evidence and research to suggest the efficacy of OBI in physical rehabilitation practices (Colaianni & Provident 2010), however there is no literature or published studies that document the development of an OBI programme or the use of this intervention with de Quervain's disease. Thus, the development of an OBI programme specifically for de Quervain's disease, and the uncertainty regarding the outcomes of treatment for de Quervain's disease based on a routine immobilisation protocol in comparison to OBI needs to be investigated.

1.3 Justification for the study

In literature, there is inconclusive research regarding the outcomes of current treatment methods for successfully managing de Quervain's disease (Ilyas 2009). There is also concern that occupational therapists working in hand rehabilitation tend to be more focused on the biomedical nature of intervention, which detracts them from addressing patients' function and performance in their everyday occupations (de Klerk et al. 2015). Treating patients using a medical model has also shown to be inadequate in regaining patients to full participation in their everyday activities (Hemmingsson & Jonsson 2005).

Unfortunately, the continuation of health inequalities in South African creates challenges and barriers to the provision of OBI in this country (de Klerk et al. 2016). It is anticipated that, like at Helen Joseph Hospital, prescribed treatment methods and predetermined protocols are readily available in most South African health care institutions, which discourages occupational therapists from delivering client- centred and occupation based practices (Colaianni & Provident 2010). Studies that provide examples of how occupational therapists can shift their practices from a protocol-driven approach to a more holistic and occupation based approach have also not been conducted (Jack & Estes 2010). Due to the extreme health inequalities, poor socio-economic conditions, and diversity in South Africa, the provision of a more holistic and cost effective treatment such as OBI may however be very relevant within our context. In addition, the high incidence of repetitive strain injuries in South Africa warrants the necessity of research in this area.

In a study conducted by Colaianni and Provident examining the perceptions of hand therapists on the benefits and challenges of OBI, 97% of all therapists agreed that there are many benefits of using this treatment approach. Despite their findings, occupational therapists working in hand rehabilitation still struggle to deliver OBI (Colaianni & Provident 2010).

It is therefore evident that research regarding the validity and application of OBI for hand related injuries should be conducted in order to enhance hand rehabilitation practices in South Africa (de Klerk et al. 2016). As holistic intervention and successful engagement in one's everyday occupations is the core value and ultimate goal of occupational therapy, OBI should be advocated for and used more readily by occupational therapists working in hand rehabilitation, if found to produce more favourable outcomes in this research (Grice 2015; Jack & Estes 2010).

1.4 Research question

Do the outcomes of an OBI programme developed specifically for patients with de Quervain's disease differ from the outcomes of a traditional immobilisation protocol?

1.5 Aim of the research

The aim of this research is to develop an OBI programme for de Quervain's disease as well as to determine the outcomes of an OBI programme for de Quervain's disease in relation to symptoms, participation in activities as well as patient performance and satisfaction in everyday activities compared to the traditional immobilisation protocol.

1.6 Objectives of the research

This study was completed in two phases:

Phase 1

1. To develop an OBI programme for patients with de Quervain's disease.

Phase 2

2. To determine the change in symptoms, participation in activities, and performance and satisfaction in everyday activities for patients with de Quervain's disease who receive the traditional immobilisation protocol.
3. To determine the change in symptoms, participation in activities, and performance and satisfaction in everyday activities for patients with de Quervain's disease who receive OBI.
4. To compare the outcomes for the changes in symptoms, participation in activities, and performance and satisfaction in everyday activities for patients across the two different treatment approaches.

1.7 Null hypothesis

There will be no difference in the change in symptoms, participation in activities, and performance and satisfaction in everyday activities for patients with de Quervain's disease who receive OBI compared to those that receive a traditional immobilisation protocol.

1.8 Layout of the report

1.8.1 Chapter 1: Introduction

This chapter provides an overview of de Quervain's disease, the South African health care system, as well as an understanding of hand rehabilitation within a South African context. The problem statement, justification, research question, aim, objectives and null hypothesis of this study is also discussed in this chapter.

1.8.2 Chapter 2: Literature review

This chapter provides a detailed explanation of de Quervain's disease including the medical and rehabilitative management of this condition. A comprehensive description of OBI is also contained within this section.

1.8.3 Chapter 3: Methodology

The methodology includes a description of the research design, population and context, sampling methods, outcome measures, research procedure, ethical considerations as well as the data analysis strategies used in this study.

1.8.4 Chapter 4: Results

This chapter presents the results of the study, including the demographics as well as a within and between group analysis of the outcome measures.

1.8.5 Chapter 5: Discussion

This chapter provides an interpretation of the results, including an integration of these findings with literature. The achievement of the research objectives is also discussed in this chapter.

1.8.6 Chapter 6: Conclusion

The concluding chapter summarises all previous chapters and presents the most significant and central developments of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher provides an in depth understanding of de Quervain's disease including the diagnosis, anatomy, presentation, history, naming, diagnosis, aetiology, incidence and prevalence of this condition. Medical practices relating to the management of de Quervain's disease, including conservative and surgical interventions are discussed. Traditional rehabilitation approaches that are currently being used by occupational therapists to treat this condition are explained. Furthermore, a description of OBI including the importance of this approach in the field of occupational therapy, the OBI process, as well as the models and frameworks on which this intervention is constructed are described. The benefits and challenges of using this intervention; as well as its application to the management of hand conditions such as de Quervain's disease are also considered. Finally, this chapter concludes with literature regarding the development of an OBI programme as well as the outcomes and outcome measures employed in this study.

Literature was sourced from the following databases: Science Direct, PubMed, EBSCO Host, Ovid, Wiley and PubSage.

2.2 De Quervain's Disease

2.2.1 Definition, anatomy and presentation

De Quervain's disease is described as a stenosing tendinosis, caused by mucoid changes and collagen disorientation, resulting in the thickening of the extensor retinaculum and tendon sheaths that run through the first dorsal compartment of the wrist (Ilyas 2009). This process causes narrowing of the fibro-osseous canal through which the tendons of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) pass (Ilyas et al. 2007). These two tendons make up the lateral border of the anatomical snuffbox of the wrist (Shehab & Mirabelli 2013). Both the APL and EPB tendons originate on the distal radius. Insertion of the APL is on the thumb metacarpal

and trapezium and the EPB on the proximal phalanx of the thumb. The primary function of the APL tendon is to abduct the thumb but also assists with radial deviation at the wrist. The function of the EPB tendon is to extend the thumb metacarpophalangeal joint (Ilyas et al. 2007). The overall function of these tendons working together is to move the thumb into radial abduction (Shehab & Mirabelli 2013).

Narrowing of the fibro-osseous canal in de Quervain's disease restricts the gliding of the APL and EPB tendons. This results in localised tenderness, swelling and a gradual onset of pain along the radial aspect of the wrist and forearm, with decreased range of motion of the thumb, particularly in extension and abduction. Pain at the base of the thumb is usually worsened by certain movements such as gripping, grasping, twisting and raising objects, as well as ulnar deviation of the wrist (Ilyas et al. 2007). As a result, individuals with de Quervain's disease experience severe discomfort when using the hand during everyday activities. Furthermore, literature suggests that de Quervain's disease may be a 'self- limiting condition', where it is believed that symptoms can resolve spontaneously, with minimal long term effects on an individual's life (Kachooei et al. 2015; Ilyas 2009). This term is often described in literature that considers the association and development of de Quervain's disease for women in the peri-partum period. (Ilyas et al. 2007; Avci et al. 2002).

Symptoms caused by de Quervain's disease such as pain and decreased range of motion in the hand also impacts on one's participation in everyday occupations. As a result, individuals living with this condition experience many functional limitations in all aspects of their lives. Daily living activities such as washing, dressing, driving, preparing meals and performing household tasks can therefore become challenging (Che Daud et al. 2016). New mothers also experience difficulty picking up and looking after their children (Shehab & Mirabelli 2013). This in turn may create a burden on people living with family members who have been diagnosed with this disease, as they often rely on others to assist them in performing their daily activities (Che Daud et al. 2016).

De Quervain's disease is listed as one of the main occupational diseases (Calvo-Cerrada et al. 2012). The onset of this condition therefore has a major impact on one's

work, particularly for those who perform job tasks that require repetitive, manual or bilateral use of their hands. This in turn affects their financial security as individuals may become temporarily disabled, resulting in them being absent from or losing their jobs following diagnosis (Che Daud et al. 2016). It is assumed that in South Africa, the risk of unemployment following occupational illness is high, which may be due to the scarcity of job opportunities and high unemployment rates within this country (Coovadia et al. 2009). Consequently, this may result in production losses which may ultimately affect the country socio-economically (Calvo-Cerrada et al. 2012).

The experience of many hand injuries such as de Quervain's disease often leads to emotional and psychological burden as an individual's loss of function creates stress, frustration, anger and decreased motivation to perform their everyday activities. In many instances, individuals may also avoid social activities as a result of their discomfort and loss of confidence to perform certain tasks (Che Daud et al. 2016).

2.2.2 History and naming

In 1895, a Swiss surgeon, Fitz de Quervain (1868-1940) first described this condition as a stenosing tenosynovitis involving the first dorsal compartment of the wrist during a series of case presentations (Calvo-Cerrada et al. 2012; Ilyas et al. 2007). De Quervain treated this condition surgically by dividing the tendon sheaths at the wrist (Wolf et al. 2009). Over the years, there has been some misconception regarding the naming of this condition. Initially, it was described as a tenosynovitis which is the inflammation of the tendon sheath. However, in 1912 it was discovered that in some cases, the thickening of the tendon sheath and extensor retinaculum occurred without the presence of inflammation. In more recent literature, studies that examined the histopathology and microanatomy of the tendons affected by de Quervain's disease concluded that this condition is caused by an intrinsic degenerative process rather than an inflammatory one (Coldham 2006; Ilyas et al. 2007). Understanding the histopathology of this condition is of high significance as it may affect the reasoning and outcomes of various treatment methods (Coldham 2006).

2.2.3 Diagnosis

The diagnosis of this condition is made clinically and is based on the individual's occupational history as well as physical examination using the Finkelstein test. As there are many differential diagnoses for non-traumatic wrist pain, it is essential that the health professionals obtain a comprehensive history of the patients physical, social and vocational roles and environments as well as a review of their neurological symptoms, in order to make the correct diagnosis (Shehab & Mirabelli 2013). Wrist extensor tendinopathy, intersection syndrome, radial nerve entrapment, thumb basilar arthritis, ganglion cyst, scaphoid and radial styloid fractures as well as radial neuritis are all differential diagnoses for de Quervain's disease. Imaging studies such as bone scans, ultrasounds, MRI's and electromyography studies are only required if a differential diagnosis is suspected (Shehab & Mirabelli 2013; Ilyas et al. 2007).

The Finkelstein test is the most recognized and commonly used physical examination to diagnose de Quervain's disease (Dawson & Mudgal 2010). Traditionally, this test was performed by the examiner holding the individuals thumb while ulnarly deviating the wrist. This manoeuvre pulls the tendons through the narrowed canal producing excruciating pain over the first dorsal compartment of the wrist (Shehab & Mirabelli 2013). In more recent years, there has been some concern regarding the reliability of this test as it was discovered that this manoeuvre may elicit slight pain in normal individuals, resulting in a false positive test. Therefore, a three stage Finkelstein test, which will be discussed in more detail in the next chapter, was introduced to ensure accurate diagnosis of this condition (Dawson & Mudgal 2010).

A similar and alternative test described in literature is called the Eichoff manoeuvre. This is performed by instructing the individual to clench the thumb in the palm with the fingers and briskly deviating the wrist ulnarly (Ilyas et al. 2007).

A third diagnostic test, although not widely used, was proposed by Brunelli. This test involves abducting the thumb while radially deviating the wrist. This movement is thought to provoke pain as it causes APL and EPB tendon irritation against their pulleys (Ilyas et al. 2007).

2.2.4 Aetiology

In literature, it is well known that there are many risk factors associated with the onset of de Quervain's disease, however the exact aetiology of this condition is idiopathic (Shehab & Mirabelli 2013). Historically, the most common risk factor for developing de Quervain's disease was overexertion from performing household tasks (Ilyas et al. 2007). In more recent literature, it was concluded that the highest risk factor associated with this condition is of occupational origin. Occupations and work environments, particularly in the construction and manufacturing industries, that involve manual force and repetitive movements of the hand and wrist is the most predominant risk factor for this condition (Calvo-Cerrada et al. 2012; Che Daud et al. 2016). De Quervain's disease is currently considered as a 'work-related upper limb disorder' (Cavaleri et al. 2016). Hormonal changes such as in pregnancy and lactation during the peri-partum period are also considered risk factors for developing this disease. Symptoms however usually resolve spontaneously once lactation has stopped. (Avci et al. 2002). New mothers or caretakers of children are also at higher risk of developing this condition as a result of repetitively picking up and carrying their child (Shehab & Mirabelli 2013; Goel & Abzug 2015). Other possible, yet not so common risk factors for de Quervain's include inflammatory conditions, biomechanical compression, trauma, anatomic abnormalities as well as the use of drugs such as fluoroquinolone (Ilyas et al. 2007; Stahl et al. 2015).

Understanding the aetiology of de Quervain's disease is of high importance as this may guide health professionals in treating the underlying cause of this condition, preventing reoccurrence and reducing the need for surgery (Stahl et al. 2015).

2.2.5 Incidence and prevalence

Limited research has been conducted regarding the epidemiology of de Quervain's disease, and therefore the incidence of this condition is not well known (Wolf et al. 2009; Ilyas et al. 2007). Studies have however concluded that de Quervain's disease is a relatively common injury, affecting women six times more than it does men (Ilyas et al. 2007). According to a study conducted in the United States of America, the prevalence of this condition is 1.3-2.1% in the female population and only 0.5-0.6% in

the male population (Kachooei et al. 2015). A study done by Ranney *et al* also revealed that this condition is the most prevalent wrist injury in women working in environments that require repetitive movement of the upper limb (Ilyas et al. 2007). Furthermore, it has been shown that pregnant and lactating women have an increasing tendency to develop this condition (Avci et al. 2002; Ilyas et al. 2007). Research that has analysed the occurrence of this condition within the different age groups found that it is more prevalent in people who are aged between 30 and 50 with the highest occurrence rate at ≥40 (Wolf et al. 2009; Ilyas et al. 2007). The prevalence of this condition in people who are aged over 30 is between 1 and 2.2% (Calvo-Cerrada et al. 2012). There is also a higher prevalence of this condition in the black population compared to whites with a rate ratio of 1.31 in the African race and 0.81 in the white population (Wolf et al. 2009).

2.3 Management of de Quervain's disease

2.3.1 Conservative medical management for de Quervain's disease

Non- surgical treatment methods are the first course and most preferable treatment options for managing de Quervain's disease (Oh et al. 2017; Ilyas et al. 2007). The more commonly used conservative medical treatments include corticosteroid injections (CSIs) and non- steroidal anti- inflammatory drugs (NSAIDs) (Ilyas et al. 2007).

2.3.1.1 Corticosteroid Injections

Corticosteroid injections involve injecting a corticosteroid into the tendon sheath of the first dorsal compartment of the wrist. This injection consists of 1ml of corticosteroid combined with 0.5 to 1ml of local anaesthetic (Ilyas et al. 2007). The most frequently used corticosteroids injected for patients with de Quervain's disease include dethamethasone, triamcinolone, methylprednisolone and betamethasone. Additional CSIs are administered four to eight weeks after the initial injection if the individual experiences some relief of symptoms, but still reports discomfort (Ilyas et al. 2007).

Research has shown that CSIs have a short term success rate (>70%) and are effective in alleviating pain provided that this procedure is done accurately (Kachooei et al. 2015; Oh et al. 2017) There is however a lack of evidence to suggest that these

corticosteroids change the natural history of the condition (Kachooei et al. 2015). De Quervain's disease develops as a result of a degenerative process rather than an inflammatory one, and therefore the effectiveness of CSIs remains unclear (Cavaleri et al. 2016).

Furthermore, very few clinical trials have been conducted comparing the outcomes of this conservative treatment method to others in the management of de Quervain's disease. Studies have however shown that patient outcomes are more successful when a combination of treatment modalities such as CSIs, splinting and multimodal hand therapies are administered when compared to the use of CSIs alone (Cavaleri et al. 2016; Oh et al. 2017). As a result, there is conflicting evidence and a lack of clarity as to which treatment method when used in isolation is more effective in the management of this condition (Mardani-Kivi et al. 2014; Cavaleri et al. 2016).

Moreover, studies have concluded that there is a 36% risk of developing post-injection complications (Calvo-Cerrada et al. 2012). Adverse reactions or complications such as pain, fat necrosis, neuritis, steroid flare, skin depigmentation, local infection, subcutaneous atrophy and elevated blood glucose levels may occur after administering the CSI (Ilyas et al. 2007; Cavaleri et al. 2016; Oh et al. 2017). There is also an increased risk of weakening or rupturing the tendon if the corticosteroid is injected directly into the tendon as opposed to the tendon sheath (Ilyas et al. 2007). In addition, obesity is another risk factor for developing complications or failure of this treatment method, as the presence of increased subcutaneous adipose tissue makes it more difficult to access the tendon sheath (Oh et al. 2017). Due to the contraindications of this treatment method, there is some apprehension from doctors to use it (Cavaleri et al. 2016). Furthermore, a study conducted by Kachooei *et al* revealed that individuals who received CSIs were also likely to eventually undergo surgical intervention (Kachooei et al. 2015).

2.3.1.2 Non-steroidal anti-inflammatory drugs

The use of NSAIDs are usually prescribed in conjunction with CSIs and immobilisation for the management of pain on initial presentation of the disease (Goel & Abzug 2015). NSAIDs are often given to patients with de Quervain's disease, however it is difficult to

determine the efficacy of these drugs as they are rarely used in isolation when treating this condition (Ilyas 2009).

2.3.2 Surgical management for de Quervain's disease

Surgical intervention for de Quervain's disease is discretionary and is usually only advised when all other pathologies are ruled out, and if symptoms do not resolve after six months of conservative treatment (Ilyas et al. 2007). Surgical management is usually not preferable due to its invasive nature and extended recovery period (Oh et al. 2017).

Surgery involves release of the fibro-osseous roof of the first dorsal compartment, and decompression of the APL and EPB tendons. This surgical procedure is usually done under local anaesthesia which involves a chevron-style incision over the first dorsal compartment of the wrist. This style of incision is preferred as it generally reduces the risk of tendon injury, increases visualisation of the radial nerve, and promotes better wound healing (Ilyas et al. 2007).

Studies have shown that success rates for surgical intervention is between 10-88% (Coldham 2006). Although the outcomes for surgical release are relatively good, complications such as: volar subluxation of the APL and EPB; radial sensory nerve injury; scar hypertrophy and hypersensitivity; as well as complex regional pain syndrome may occur (Ilyas et al. 2007). Chronic pain may also develop if there is injury to the sensory radial nerve during the surgical procedure (Ilyas et al. 2007).

Occupational therapy intervention is often recommended after surgery. Treatment post de Quervain's release focuses on initial immobilisation of the thumb in a thumb spica splint. It is recommended that this splint is worn for approximately 7-14 days post op, while the wound and surrounding tissue is healing and until the sutures are removed (Goel & Abzug 2015). Occupational therapy treatment following discontinuation of the splint includes oedema and scar management, desensitisation, range of motion and strengthening exercises, as well as therapeutic exercise (Goel & Abzug 2015).

2.3.3 Traditional rehabilitation approach for de Quervain's disease

Traditionally, the most common rehabilitation method for the management of de Quervain's disease involves immobilisation through the application of a thumb spica splint (Coldham 2006; Ilyas et al. 2007). In 1895, De Quervain himself first introduced immobilisation as a treatment method for this condition (Coldham 2006). This traditional rehabilitation protocol is currently available and used by occupational therapists working at public hospitals in South Africa to treat de Quervain's disease. This protocol includes a brief verbal explanation of de Quervain's disease to the patient. It also involves the fabrication of a thumb spica splint, including patient education on the purpose and wearing regime of the splint. A thumb spica splint is an external assistive device that holds the wrist in a neutral position with the thumb in 30° palmar abduction and the interphalangeal joint free to move (McKee & Rivard 2011; Ilyas et al. 2007; Goel & Abzug 2015). This splint is made of thermoplastic material and velcro straps to secure the device on the patient's hand. The aim of this splint is to immobilise the wrist and thumb in order to reduce ulnar deviation and thumb flexion, therefore preventing friction of the APL and EPB tendons (Ilyas et al. 2007). In literature there is no clear indication of the exact period that the splint should be worn, however the existing traditional protocol suggests a period of six weeks, and if pain persists, the patient's thumb should be immobilised further until their symptoms have resolved. This protocol includes a follow up treatment session three and six weeks after initial consultation and fabrication of the splint. During these follow up sessions, the occupational therapist monitors and modifies the splint if necessary, and revises the purpose, care and wearing regime of the splint with the patient. The full six week programme for this traditional approach including the procedure, equipment and materials needed to fabricate the splint is contained in Appendix A.

The use of splinting has shown to provide comfort and relieve pain, however there is limited evidence to suggest that immobilisation provides long- lasting pain relief, as symptoms often return on removal of the splint and resumption of everyday activity (Goel & Abzug 2015; Ilyas et al. 2007). A reason for this may be that de Quervain's disease is not initially caused by an inflammatory process, but rather by degeneration from overuse of the thumb tendons (Ilyas et al. 2007). Therefore, full time splinting and

immobilisation of the thumb tendons only addresses the inflammatory process, however, neglects other occupational issues that result in overuse of these tendons. A study conducted by Weiss et al concluded a 57% resolution of symptoms in patients who received CSIs together with splinting, and only a 19% resolution of symptoms with splinting alone (Ilyas 2009). Moreover, splinting together with NSAIDs has been recognised as a beneficial treatment method in individuals who only experience mild symptoms (Ilyas 2009). Another study conducted by Lane et al regarding the effectiveness of splinting together with NSAIDs discovered an 88% success rate in individuals who experience mild symptoms, and only a 32% success rate in those with moderate to severe symptoms (Ilyas 2009). Therefore, there is a general consensus that splinting may only be an effective treatment tool in patients who experience mild symptoms, and when used in conjunction with other treatment modalities (Coldham 2006). Other limitations of splinting include cost implications as well as poor compliance of splint wear due to the functional restrictions it causes (Coldham 2006; Cavaleri et al. 2016).

Although not well researched and described in literature, other biomechanical treatment modalities that are used in hand rehabilitation for managing this condition include therapeutic exercise and preparatory methods (Cavaleri et al. 2016; Goel & Abzug 2015; Amini 2004). Therapeutic exercise involves gentle active range of motion of the wrist and thumb joints to the patient's tolerance to improve of the APL and EPB tendons (Goel & Abzug 2015). Preparatory methods include soft tissue massage over the first dorsal compartment, which aims to relax tendons and decrease pain (Goel & Abzug 2015; Amini 2004). In addition, although OBI has been suggested as an approach to be used in hand rehabilitation, this treatment method has not been reported in relation to de Quervain's disease.

2.4 Occupation based intervention

2.4.1 Occupational therapy and occupation based intervention

Occupational therapy is a unique profession which primarily focuses on promoting and restoring physical, emotional and cognitive health, and enhancing participation through active engagement in occupations (Colaianni & Provident 2010; Fitzpatrick & Presnell

2004). The term ‘occupation’ refers to any purposeful or culturally meaningful activity of daily living that an individual performs in their physical and social contexts to occupy their time (Grice 2015). Activities of daily living include personal management, education, work, social participation, leisure, and rest/sleep (Che Daud et al. 2016). Occupational therapists are trained to use these occupations “as a means” and “as an end’’, where occupations are the focus during the assessment and intervention process, in order to achieve specific occupational outcomes (Grice 2015). Some authors suggest that using occupations as a means to an end is the fundamental basis of OBI (Che Daud et al. 2016).

Occupation based intervention supports occupational therapy’s core values and philosophy of “engagement in occupation supports participation in context’’ (Amini 2004). This intervention is an integrated, holistic and client- centred practice which aims to achieve short and long term occupational goals set by the individual in conjunction with the therapist that reflect the individual’s values, desires, wants and needs (Amini 2004; Fitzpatrick & Presnell 2004). OBI focuses on using real- life occupations in the context of one’s everyday life as a remediation agent to improve function and performance in one’s everyday activities, and enable them to return to their meaningful life roles (Che Daud et al. 2016). Occupation based intervention acknowledges an individual as a whole, where their physical, cognitive, psychosocial, spiritual and environmental problems related to their condition or injury are addressed in therapy (Amini 2004). Furthermore, the intervention recognises that true improvement in one’s everyday functioning only occurs when treatment outcomes reflect personal meaning to individuals’ lives (Fitzpatrick & Presnell 2004).

Occupation based intervention is built on an analysis of occupational factors that are contributing to the onset and exacerbation of a condition, and re-engagement in occupations that an individual needs to do or wants to do, is the main goal of therapy (Grice 2015; Doble & Santha 2008; Fisher 2014). OBI uses a top- down approach which addresses the individual’s personal needs, goals and participation in occupations before focusing specifically on their physical components (Burley et al. 2018). This treatment method also incorporates activity modifications as well as task and environmental adaptations to assist individuals in adjusting to their performance

limitations (Preissner 2010). Occupation based intervention is not intended to disregard a biomechanical approach but rather uses a biomechanical frame of reference, in addition to a client- centred frame of reference (Amini 2004; Che Daud et al. 2016; Colaianni & Provident 2010). This treatment approach still recognizes the positive influences of physical modalities such as splinting and manual exercise to facilitate the individual's active involvement in occupations (Amini 2004). Occupation based intervention therefore incorporates the restoration of physical impairments such as pain, oedema and scarring by using physical modalities in combination with individualised activities within one's context to achieve functional performance in everyday occupations (Fitzpatrick & Presnell 2004).

2.4.2 The occupation based intervention process

The OBI process consists of three main phases including: assessment and setting of goals; intervention; and re-evaluation. When following an OBI approach, an occupational perspective must be maintained. This enables therapists to view people as occupational beings and understand all factors that influence their lives. Throughout the OBI process, therapists must develop a positive, trusting and respectful therapeutic relationship with the patient (Fisher 2014). This is done by following a client- centred approach, encouraging patients to become actively involved in their therapy and by adopting a narrative model of reasoning (de Klerk et al. 2015; Fisher 2014).

In recent years there has been growing interest in literature regarding the use of a narrative model within clinical practice (Mattingly 1991). Narrative medicine or reasoning involves eliciting retrospective and prospective stories from individuals, which focuses on the subjective experience of their disease or illness (Finlay 2004; Mattingly 1991). The experience of one's illness helps therapists gain an in-depth understanding of: the interrupted and changing lives and relationships of individuals; the precipitating factors and environmental influencers of their illness; their support structures, coping strategies or ability to adapt to their condition; their values, needs and interests; as well as gaining an understanding of how they picture themselves living with their condition in the future. (Mattingly 1991; Finlay 2004; Cooper 2011). This storytelling allows therapists to make sense of the illness experienced by the patient

within their context which is different and unique to each individual (Mattingly 1991). It also guides therapists to generate meaningful and relevant therapeutic experiences that connects an individual's life to therapy, rather than setting a list of generic objectives or goals (Mattingly 1991; Finlay 2004). Consequently, patients become more motivated to actively engage in therapy and overcome personal challenges more confidently (Mattingly 1991).

In order to adopt this narrative approach, therapists are encouraged to listen empathetically to patients, avoiding interruptions and constantly absorb, acknowledge, validate and interpret the patient's story (Cooper 2011; Finlay 2004). Listening to an individual's story helps the therapist understand the relationship between the patient's roles and occupations and their ill-health. This has a significant impact on their healing and can be more successful in treating pain than other physical modalities. Furthermore, therapists should facilitate and encourage patients to reflect on their lives and unique needs, which fosters a sincere, appreciative and caring relationship between the therapist and patient (Cooper 2011).

As a disease or injury is affected by and disrupts all aspects of an individual's life, the use of narrative medicine is essential as it enhances the overall well-being of the patient, rather than focusing specifically on the reduction of disease (Cooper 2011). Narrative reasoning is therefore central to the practice of occupational therapy and should be used throughout the OBI process (Finlay 2004). This ensures that therapy and recovery from disease or illness is unique and personally meaningful to the individual (Mattingly 1991; Finlay 2004).

2.4.2.1 Occupation based assessment and goal setting

For assessments to be occupation based, they must focus on analysing occupations and measure subjective and objective performance in all activities of daily living (Grice 2015; Fisher 2014). In keeping with the WHO ICF, assessments should always be client-centred, functionally oriented and occupationally focused (Grice 2015). Evaluation of occupational performance is done by means of an interview as well as observation of the patient performing their valued occupations (Fisher 2014). Standardised assessments are also of great importance to provide accurate and

measurable evaluations of occupational performance (Grice 2015). One of the most reliable assessment to measure occupational performance is the Canadian Occupational Performance Measure (COPM). This assessment enables the individual to relate to their injury within the context of their own lives (Amini 2004).

Evaluation of performance must be assessed in all aspects of the individuals life including their personal management, work, leisure as well as their rest/sleep activities (Grice 2015). In order to gain an accurate understanding of occupational performance, assessment should be done by observing the individual perform their everyday tasks within their physical and social contexts (Grice 2015; Law 2002). This also enables the therapists to identify resources that are available within the individuals context, and which resources should be used during intervention (Fisher 2014).

When analysing occupations, the therapist needs explore all the underlying internal and external factors such as personal, bodily and environmental factors that are either supporting or limiting performance (Fisher 2014). In order for the assessment to be client- centred, strengths and problems related to occupational performance should be identified by the patient as well as their family, and information gathered from the assessment should clarify the contextual factors that influence this performance (Grice 2015).

Once the assessment of occupational performance is complete, the therapist works collaboratively with the patient to identify and prioritise occupational goals that they would like to address in therapy (Fisher 2014). The therapist should encourage the individual as much as possible to address a variety of issues within their self-care, work and leisure occupations so that a balance of occupation is achieved (Doble & Santha 2008) If the patients' goals are not occupation centred, the therapist should consider referring them to other professionals who are better equipped to address their desired goals (Fisher 2014).

2.4.2.2 Occupation based intervention

The overall goal of treatment when following an OBI approach is 'engagement in meaningful occupation' so that individuals can experience a sense of occupational well-

being (Fisher 2014; Doble & Santha 2008). Engagement in occupation is also the therapeutic agent that is used to reach this goal (Fisher 2014).

In order for individuals to experience occupational well-being, intervention as a whole should consider the patients' occupational needs including: accomplishment; companionship; affirmation; coherence; pleasure; agency and renewal. A deficiency in these areas may contribute to the experience of illness, and therefore addressing them in therapy may help to support an individual's health and participation in their everyday lives. Accomplishment in occupation may be achieved by adapting one's environment and allowing them to engage in activities in order to achieve and master their personal goals with improved competency. The need for companionship may be addressed by encouraging the patients' family and friends to actively engage and be part of the treatment process, so that the individual gains a sense of belonging (Doble & Santha 2008). The presence of family support has also shown to promote the patients' participation in therapy (Law 2002). Furthermore, by recognizing and encouraging individuals to choose and engage in valued occupations that brings a sense of enjoyment and inner peace, the need for affirmation, coherence, pleasure, agency and renewal may be facilitated (Doble & Santha 2008).

Throughout the intervention phase, therapists should practice principles described by four models, namely the compensatory, educational, acquisitional and restorative model, in order to enhance therapeutic outcomes (Fisher 2014).

The compensatory model encourages patients to learn and practice the use of adaptive techniques such as compensatory strategies, adaptive equipment, assistive devices as well as environmental and activity modifications when engaging in their daily occupations (Amini 2011; Fisher 2014). Ergonomic interventions including workplace adjustments and preventative measures such as the adoption of correct postures are also implemented to prevent further disablement or disability (Calvo-Cerrada et al. 2012). This allows individuals to perform their everyday activities during all phases of tissue healing (Amini 2011).

The educational model stresses the importance of engagement in occupations and encourages the therapist to make recommendations relating to how patients can

improve their occupational performance (Fisher 2014). Throughout the education process, therapists should implement adult learning principles to create a sense of collaboration, shared power and partnership between the patient and therapist. These principles will be discussed further in the OBI programme for de Quervain's disease.

Acquisitional occupation or occupational skills training involves teaching the patient specific skills such as joint protection and energy conservation principles to overcome functional impairments so that they can generalise these skills to all activities performed in their daily lives (Jack & Estes 2010; Fisher 2014; Hammond & Freeman 2004). Therapists should use occupation 'as a means' by encouraging patients to bring their own tools and equipment to the treatment session so that they are able to practice the occupation during therapy (Che Daud et al. 2016).

Lastly, the restorative model encourages patients to actively perform their daily occupations in order to facilitate problem-solving strategies and overcome functional limitations (Fisher 2014).

In addition to the use of these models, occupational therapists should follow a behavioural approach throughout the intervention process, as this encourages patients to practice skills they have learned in therapy in order to enhance therapeutic outcomes (Hammond & Freeman 2004).

2.4.2.3 Occupation based re-evaluation

The purpose of re-evaluation is to assess whether patients have improved quality and satisfaction with regards to their occupational performance, and whether they have achieved their occupational goals. The same assessments should be used when re-evaluating occupational performance so that assessment results are accurately compared (Fisher 2014). This determines whether the intervention plan was successful or whether new treatment strategies should be implemented to achieve the patients desired goals (de Klerk et al. 2015; Fisher 2014).

The second step of designing the OBI programme for de Quervain's disease was to specify the programme structures and processes. This involved extracting principles from literature that were used in the OBI programme for de Quervain's disease and describing in detail a six-week programme which incorporated these principles. This

programme was reviewed by qualified occupational therapists at Helen Joseph Hospital as well as supervisors at the University of the Witwatersrand. Content of the programme was expanded and changed based on professional opinion.

2.4.3 Models and frameworks on which occupation based intervention are constructed

Numerous occupational therapy models and various conceptual frameworks and classification systems exist in the literature that assist clinicians in translating theory to practice and assist therapists in conceptualising their patients as occupational beings. The Person- Environment- Occupation Model (PEO) has been selected as an occupational therapy model, and the International Classification of Functioning, Disability and Health (ICF) as a classification tool by the researcher as lenses through which patients can be appreciated as occupational beings. These two models/ frameworks are useful in understanding the relationship between the environment, occupational participation and one's health, and may assist therapists in developing occupation based assessment and treatment approaches (Law et al. 1996; Hemmingsson & Jonsson 2005; Fitzpatrick & Presnell 2004).

2.4.3.1 The Person-Environment-Occupation Model

Law, et al, 1996 proposed the PEO model for understanding individual behavior and occupational performance. The PEO is a transactive model that emphasizes occupational performance as the product of a dynamic relationship, interaction and interdependence of the person, their occupations and the contexts in which they live. The concept of the person is described holistically, each with their own unique set of skills and includes qualities of the mind, body and spirit. Occupations are defined as a variety of purposeful activities that a person engages in within the context of their environment in order to meet their everyday needs (Law et al. 1996). The environment in which one performs their everyday occupations also has a strong influence on an individuals' health and participation (Hemmingsson & Jonsson 2005; Law 2002). Environmental factors are made up of the physical, social, cultural, temporal, political and attitudinal contexts in which one lives. The environment has a strong influence on

one's behaviour, and can either facilitate or inhibit participation, and impact on one's occupational performance (Law et al. 1996; Hemmingsson & Jonsson 2005).

Figure 2.1 demonstrates how occupational performance is produced by the overlap of three inter- related components (person, environment and occupation). The PEO model emphasises that personal characteristics, both physical and psychological, as well as contextual influencers are interwoven and both have an influence on one's occupational performance (Law et al. 1996). It also recognises that disability is often caused by environmental influences on an individual and their performance in occupations, rather than by bodily structures and functions (Law et al. 1996).

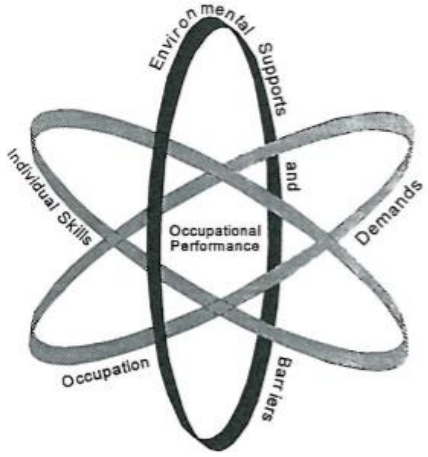

Figure 2.1: A Person-Environment-Occupation Model (Law et al. 1996)

The PEO is a useful model in the clinical practice of occupational therapy and can be used to assist therapists in applying theory to practice (Law et al. 1996). This model provides a guide to treatment, such as OBI, that is aimed at improving the abilities of a person, the enabling characteristics of their environment, as well as changing or adapting activities to improve their occupational performance (Law et al. 1996).

2.4.3.2 The International Classification of Functioning, Disability and Health

The ICF (World Health Organisation, 2001) is a holistic framework that was designed to provide an interprofessional foundation for understanding health influencers and outcomes of an individual. This classification assists health professionals in assessing

the dynamic interaction between one's body functions and structures, their activity and performance areas, as well as the contextual factors that influence their overall health (Fitzpatrick & Presnell 2004). The three health outcomes that are identified by the ICF, and that should be assessed in any health condition include impairment, activity limitations and participation restrictions (Dixon et al. 2008).

Participation is one of the most central concepts described by the ICF, and is defined as 'an individual's involvement in life situations' (Doble & Santha 2008; Hemmingsson & Jonsson 2005). Participation in meaningful occupations allows individuals to connect with other people and their environment and helps them find meaning and purpose in their lives (Law 2002; Doble & Santha 2008). This creates a sense of control and competence in ones' everyday occupations, which has a positive impact on their overall health (Law 2002). The concept of participation is also unique for all individuals, as people have different interests, values, habits, circumstances, and life experiences, and therefore find satisfaction in different occupations (Law 2002; Doble & Santha 2008). Individuals living with disabilities or physical impairments are often unable to participate in occupations that are meaningful to them, which leads to occupational deprivation and social isolation. A complete understanding of participation is of great importance in this study, as the overall goal of OBI is to enhance participation in everyday occupations (Law 2002).

The ICF is a useful framework in occupational therapy as it provides a common language than can assist occupational therapists in communicating their conceptualisation of health and disability to other health professionals. It provides a more comprehensive and holistic understanding of health, which creates a shift from a pure disease oriented view to a more holistic cenceptualisation of the environmental and occupational influencers of health (Hemmingsson & Jonsson 2005). This is particularly important in this research study, as it assists the multi-disciplinary team in pursuing an understanding of health and health care that moves beyond the medical model.

The PEO and ICF are both useful in understanding the multiple factors that impact an individuals' ability to perform or return to their everyday occupations (Chan & Spencer

2004). By gaining a holistic perspective of all the factors that influence ones health and wellbeing, occupational therapists can provide a more comprehensive OBI approach to enhance participation, maximise one's potential, and prevent occupational deprivation (Law 2002).

2.4.4 The benefits of occupation based intervention

The benefits of using OBI in therapy are well documented in literature. This treatment approach facilitates holism, it enables individuals to reach their functional goals and preserves their life roles (Amini 2011). Consequently, this enhances their physical, social, psychological, emotional and occupational well- being (Doble & Santha 2008; Colaianni & Provident 2010). Engaging individuals in their daily occupations also creates a sense of autonomy, enjoyment, accomplishment and self-determination throughout their treatment (Fisher 2014; Hemmingsson & Jonsson 2005). This client-centred approach creates a positive patient-therapist relationship which enhances the individual's confidence in achieving therapy goals (Jack & Estes 2010).

Research shows that individuals appear to be more satisfied, invested and compliant with OBI, as treatment goals are set by them, and are therefore more relevant and meaningful to their everyday lives (Amini 2004; Jack & Estes 2010). Engaging individuals in meaningful occupations also creates a sense of competence, ownership and control over their treatment, which enables them to experience occupational well-being (Colaianni & Provident 2010; Doble & Santha 2008). As a result, OBI creates higher patient motivation and improved outcomes when compared to other treatment methods (Jack & Estes 2010; Colaianni & Provident 2010). Moreover, in a study conducted by Colaianni and Provident in 2010 examining the perceptions of occupational therapists specialising in hand rehabilitation, 97% of all participants reported that there were many benefits of using OBI.

As OBI follows a client- centred approach, where individuals are actively involved in their own therapy, treatment principles can easily be applied outside the clinical practice where patients follow a home programme (Che Daud et al. 2016). This provides generalisation of functional skills and ensures carry over of treatment into the home setting, which limits re-occurrence of disease and illness (Colaianni & Provident

2010). In addition, as individuals use their own tools and materials during therapy, OBI provides an accessible and cost- effective way for individuals to achieve their goals (Che Daud et al. 2016). Furthermore, with successful use of OBI, surgical intervention may be prevented (Amini 2004).

2.4.5 Challenges to occupation based intervention

Although there is evidence that OBI may be an effective and successful treatment intervention, many therapists still face challenges in providing holistic occupation based rehabilitation. Occupational therapists are often discouraged to use an OBI approach as there is some perception that using physical treatment modalities and following prescribed treatment protocols is easier and more efficient than providing individualised treatment (Colaianni & Provident 2010). Occupation based intervention is also time consuming, it demands specific skills from therapists, and it comes with reimbursement issues from medical insurance companies (Colaianni & Provident 2010; de Klerk et al. 2016). Studies have shown that time limitations, unfamiliarity, poor availability and lack of knowledge regarding OBI assessments such as the Disabilities of the Arm, shoulder and Hand questionnaire (DASH) and the Canadian Occupational Performance Measure (COPM) is another major challenge regarding the provision of this approach (Grice 2015; de Klerk et al. 2016). Consequently, these challenges drive occupational therapists away from using OBI, which may limit the patients ability to reach their functional goals (Colaianni & Provident 2010; Grice 2015).

In order to overcome some of these challenges, educational courses advocating for the use of this treatment approach should be made more available to occupational therapists, particularly those working in hand rehabilitation (Colaianni & Provident 2010). Furthermore, occupational therapists should communicate with referring doctors regarding the benefits of OBI so that they are more aware of and open towards the use of this treatment approach (O'Brien & Mcgaha 2014).

2.4.6 Occupation based intervention in hand rehabilitation

Hand rehabilitation is a specialised practice of occupational therapy, which is concerned with rehabilitation of the upper limb, including the shoulder, elbow, wrist and hand (Amini 2011; Grice 2015). Hand therapists treat a wide variety of upper limb

injuries including fractures, tendon and nerve injuries, lacerations, burns, amputations, arthritis, as well as repetitive strain injuries such as carpal tunnel syndrome and de Quervain's disease (Amini 2011). Research indicates that hand injuries directly impact on one's performance in everyday occupations (Burley et al. 2018). The aim of hand rehabilitation is to provide individualised therapeutic interventions to the injured upper limb in order to prevent further dysfunction, restore and optimise function and enable individuals to engage in their premorbid occupations without restrictions (Grice 2015; Che Daud et al. 2016; Case-Smith 2003). For hand rehabilitation to be effective, it is important that interventions address the physiological, emotional, psychological, spiritual, environmental, occupational and social consequences that the hand injury may have on the individual (Chan & Spencer 2004; Case-Smith 2003).

In recent years however, the use of this holistic OBI approach in hand rehabilitation has been destablished. This is due to many challenges that have previously been discussed in this chapter. Another challenge regarding the use of OBI specifically in hand rehabilitation is that hand rehabilitation literature generally tends to focus more on the remediation of physical deficits rather than emphasising an occupational perspective on health and disability (Winthrop Rose et al. 2011; Burley et al. 2018). A review of over 8000 hand rehabilitation articles by Winthrop Rose et al. (2011), examining the extent to which hand rehabilitation literature incorporates a holistic view of health and function concluded that more attention was given to body structures and functions when compared to context, activities and participation. As a result, a large emphasis has been placed on the biomechanical model, where treatment protocols typically focus on physical issues like deficits in body structure and function that underlie the condition or injury (Amini 2004; Amini 2011). It is however important that occupational therapists start to bridge the gap between this biomechanical approach and an occupation based approach in hand rehabilitation, so they can foster a more complex understanding of the impact that the hand injury has on the individual (de Klerk et al. 2016). It has been recommended that training institutions should focus more attention on educating students regarding the use of OBI in hand rehabilitation (de Klerk et al. 2016). Furthermore, occupation based methods are exclusive to the occupational therapy profession, which presents an opportunity for occupational

therapists to provide their expertise in successfully managing hand injuries (Fisher 2014).

2.4.7 The development of an occupation based intervention programme

The development of an OBI programme in this study is guided by four steps in intervention research created by Fraser and Galinski in 2010. The first step in intervention research for developing an OBI programme is to review the programme theories, constructs and intervention level on which the OBI programme is based. This involves revising literature on OBI including its process as well as the frameworks supporting this intervention. The second step is to specify the programme structures and processes. This involves designing an intervention strategy and specifying essential programme elements, which is displayed in the results chapter of this study. The third step is to confirm the outcome measures used to test the OBI programme, and the fourth and final step is to test and determine the outcomes of the programme in a practice setting, which is also presented in the results chapter (Fraser & Galinsky 2010).

2.5 The outcomes and outcome measures employed in this study to measure patients with de Quervain's disease

The outcomes and outcome measures chosen for this study consider not only the symptoms or client factors related to the disease process but also the activity participation involving the function of the upper limb, as well as the patients' performance and satisfaction with their everyday activities. The Finkelstein test and Visual Analogue Scale (VAS) are used in this study to measure the change in symptoms relating to the pain experienced by the patient over the first dorsal compartment of the wrist. The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire is used to measure the change in participation of activities, and the Canadian Occupational Performance Measure (COPM) is used to measure change in the patient's performance and satisfaction with their everyday activities.

The main objective of this study is to compare the outcomes in terms of change in symptoms, participation in activities and performance and satisfaction with

occupational performance for the two difference treatment approaches. In this study, a change in outcomes is measured by comparing the change in scores or results of the outcome measures over three consecutive occupational therapy sessions. A positive change in outcome for the Finkelstein test is indicated if the patient presents with a negative Finkelstein test after a positive Finkelstein test was shown at the previous assessment. For the VAS, a decline in scores over the therapy sessions indicates a positive change in outcome as the patient's pain levels would have decreased. For the DASH, a high score is indicative of greater disability and therefore a decrease in scores over the therapy sessions indicates a positive change in outcome, as the patient would have improved participation in activities. For the COPM however, an increase in scores for participation and satisfaction with everyday activities indicates a positive change in outcome.

2.5.1 The Finkelstein test

The Finkelstein test is the most commonly used clinical test to diagnose de Quervain's disease (Ilyas et al. 2007). A study performed by Cheimonidou, et al in 2019 evaluating the validity and reliability of the Finkelstein test concluded that this test does not appear to produce highly reliable and valid scores when used alone. In this study, the Finkelstein test produced 46.7% false positives and the percentage of agreement with the Wrist Hyperflexion and Abduction of the Thumb test (WHAT) was fair (0.210.40). The reliability of this test displayed a moderate agreement (Kappa=0.410.60) regarding the presence or absence of pain. The inter rater reliability of the Finkelstein test on assessment of the presence of pain or no pain displayed a moderate percentage of agreement (Kappa=0.410.60) and when pain was measured with the VAS, a fair percentage of agreement (Kappa=0.210.40) was shown (Cheimonidou et al. 2019). This study however was performed on a small sample (n=45), and it is mentioned that these scores should be viewed with caution as the only outcome variable for the Finkelstein test is pain, which includes many psychological and environmental factors. Despite the relatively poor validity and reliability scores, this test is still routinely taught and widely used (Dawson & Mudgal 2010). Over the last few years, the original Finkelstein test has been slightly adapted to include a three stage test, which limits the

patient's discomfort while performing the assessment, yet still produces an accurate diagnosis (Dawson & Mudgal 2010).

A positive Finkelstein test will produce radial- sided wrist pain when the wrist and hand is moved into ulnar deviation (Ilyas et al. 2007). In some cases, patients may even experience pain when attempting to oppose the thumb to the fifth metacarpophalangeal joint (Dawson & Mudgal 2010).

2.5.2 The Visual Analogue Scale

The Visual Analogue Scale is an assessment used to evaluate pain intensity (Williamson & Hoggart 2005). As pain is the main symptom experienced by patients with de Quervain's disease, the VAS is an appropriate measure for assessing their pain.

The VAS is an acceptable assessment to measure pain as it is practical, quick to administer and is easily analysed (Kelly 2001). It has also shown to have good internal consistency and sensitivity, it produces high repeatability and test-retest reliability, and it has the capacity to evaluate different dimensions of pain (Price et al. 2012). In a study done by Williamson, et al on the comparison of three commonly used pain rating scales, the VAS was the most superior as it provides ratio data. This study also revealed that the VAS has good validity and reliability (Correlation coefficient= 0.97-0.99) and is sensitive to treatment interventions, as there are many levels of discrimination (101) presented on the scale (Williamson & Hoggart 2005). Furthermore, studies have shown that the VAS is a reliable instrument for measuring chronic pain, and in 2001, Bijur et el conducted a study which concluded that it is also a reliable assessment in evaluating acute pain (Bijur et al. 2001).

2.5.3 The Disabilities of the Arm, Shoulder and Hand questionnaire

The DASH (Appendix I) is a standardised self- administered questionnaire that was developed in 1994 (Hudak et al. 1996). This questionnaire evaluates functional performance and activity limitations of any musculoskeletal upper- extremity disorder, and also considers activity limitations in leisure and work (Case-Smith 2003). It is the most commonly tested and highly recommended outcome measure that is used during

hand rehabilitation studies and for the assessment of wrist and hand injuries (Hoang-Kim et al. 2010; Case-Smith 2003).

In studies testing the reliability, validity and ease of use, the DASH displayed good internal consistency: Cronbach's alpha= 0.98 (Dias et al. 2008), and excellent test-retest reliability: ICC= 0.96 (Case-Smith 2003). It also demonstrates good construct and content validity (Hoang-Kim et al. 2010). The DASH is also easy to understand and complete and has shown to be very useful and relevant for a range of upper limb disorders (Dias et al. 2008). Furthermore, the DASH is able to measure the three constructs from the ICF, including impairment, activity limitations and participation restrictions (Dixon et al. 2008).

2.5.4 The Canadian Occupational Performance Measure

The Canadian Occupational Performance Measure (COPM) (Appendix J) is a standardised, client-centred, and evidence based assessment (Law et al. 2014). This assessment evaluates an individual's own subjective experience, perception and satisfaction with their participation and performance in everyday activities, including self- care, leisure and productivity (Hemmingsson & Jonsson 2005; Law et al. 2014). The COPM is designed as a semi- structured interview where the individual, in collaboration with the therapist identifies everyday problems that impact their occupational performance (Law et al. 2014). An occupational performance problem is defined as "an occupation that a person wants to do, needs to do or is expected to do, but can't do, doesn't do or isn't satisfied with the way they do" (Law et al. 2014 p.4). Once occupational performance problems have been identified, patients are encouraged to develop occupational goals that are of highest priority and importance to them (Law et al. 2014).

The primary outcomes of the COPM include the occupational therapy performance areas of self- care (personal care, functional mobility and community management); productivity (paid/unpaid work, household management and social/play) and leisure (quiet recreation, active recreation and socialisation). This COPM is designed to help understand and recognises the roles of the patient, the importance of their unique occupations, as well as the factors that support or inhibit occupational performance

(Law et al. 2014). Furthermore, the COPM allows the therapist to determine the effect of treatment by evaluating changes and successes of the patients' occupational goals over time (Case-Smith 2003; Che Daud et al. 2016).

The COPM is a well-researched and highly reliable and valid outcome measure (Amini 2004). Internal consistency and test-retest reliability for this assessment are within the acceptable range. The COPM has excellent responsiveness to detect change in occupational performance over time (SMR= ›0.7). It also demonstrates ease of use in terms of patient understanding, format, administration and scoring. In addition, this assessment is not diagnosis specific and can be used in a wide variety of cultures and settings (Law et al. 2014).

2.6 Summary

There is extensive literature describing de Quervain's disease including the medical management of this condition. There is however unconvincing evidence suggesting the efficacy of these treatment methods for successfully managing this condition. With regards to rehabilitation of hand conditions such as de Quervain's disease, many published journal articles have concluded that occupational therapists are generally focused on treating patients using a biomechanical approach rather than using a more holistic occupation based method (Fitzpatrick & Presnell 2004; Amini 2004). This has raised concern in the field of occupational therapy as hand therapists are not addressing the overall function and performance in one's everyday occupations.

Despite extensive literature describing OBI and evidence suggesting the benefits of this intervention, occupational therapists treating hand conditions in South Africa and internationally are still reluctant to shift their practices from a biomechanical approach to OBI (Colaianni & Provident 2010; de Klerk et al. 2015).

Furthermore, OBI as a whole is well documented in literature, however research concerning the use and outcomes of this treatment approach with hand injuries such as de Quervain's disease in South Africa is limited.

CHAPTER 3: METHODOLODY

3.1 Introduction

This chapter describes the research methods that were used during the study. The research design, population and context, and sampling methods are discussed. The outcome measures that were used to assess patients and collect data is then addressed. Lastly, this chapter outlines the procedure used to conduct this research, as well as the ethical considerations and data analysis strategies.

3.2 Research design

An intervention research design was followed in this study as the study included both the development and testing of an intervention. The development of the intervention was defined by explicit practice principles, goals and activities. The intervention was blended with existing research and theory supporting OBI specifically for de Quervain's disease, and the action strategies as described by Fraser and Galinski, 2010 in the programme were tested in a specific setting at Helen Joseph Hospital. Intervention research outcome studies follow the programme development, and the intervention programme is then tested. The testing phase of the study was used to estimate a treatment outcome when a programme is implemented in a routine practice environment and includes the use of a control or alternate treatment group (Fraser & Galinsky 2010).

The research intervention design involved two phases:

- **Phase 1**: Development of an OBI programme for de Quervain's disease.
- **Phase 2**: Comparing the change in outcomes of the OBI programme against the traditional intervention programme used at the research site using a two-group quantitative-longitudinal, total population sampling pre-test post-test intervention design.

3.2.1 Phase 1: Development of an occupation based intervention programme

In order to develop an OBI programme for de Quervain's disease, the existing protocol at the research site was reviewed under the critical lens of literature in chapter two. The existing treatment programme for de Quervain's disease involves the fabrication of a thumb spica splint which is worn by the patient throughout the day and at night for a six- week period. This programme also includes a brief verbal explanation of de Quervain's disease and education regarding the wearing regime and care for the splint. A protocol for this traditional intervention has been included in Appendix A.

Treatment principles for OBI intervention were extracted from the literature and used to modify, amend and enhance the traditional protocol. The OBI programme was designed and developed by following the steps in intervention research created by Fraser and Galinski, 2010.

Table 3.1a: Steps in programme development by Fraser and Galinski (2010) for Phase 1

PHASE 1
Step 1 Programme theories
• Review theories and frameworks supporting occupation-based intervention
• Confirm constructs and intervention level on which the OBI programme is based - occupation based assessment and goal setting, occupation based intervention and occupation based re-evaluation
Step 2 Specify programme structures & processes
• Design an intervention strategy
• Specify essential programme elements

Table 3.1b: Steps in programme development by Fraser and Galinski (2010) for Phase 2

PHASE 2
Step 3 Confirm outcome measures
• Finkelstein test
• Assessment of pain- Visual Analogue Scale
• Assessment of activity limitations- The Disabilities of the Arm, Shoulder and Hand questionnaire
• Assessment of patient performance and satisfaction- Canadian Occupational Performance Measure
Step 4 Determining the change in outcomes of the programme in practice settings
• Implementation with target group
• Assess changes at baseline and during intervention at three weeks and six weeks
• Determine significance and effect sizes
• Suggest adaptation based on findings

3.2.1.1 Step 1: Programme theories

The first step in developing an OBI programme for de Quervain's disease was to review theories which could be applied to the target group with de Quervain's disease. The researcher first examined the literature as shown in chapter two to gain a comprehensive understanding of OBI including its process, the models and frameworks on which this treatment method are constructed, as well as the intervention level, setting and constructs on which this programme were based (Fraser & Galinsky 2010).

The PEO model which is described in detail in the previous chapter assisted the researcher in understanding which components (person, environment, or occupations) described by the model were contributing to a compromised interaction between components, resulting in disrupted occupational performance. Figure 3.2 illustrates how the PEO model helped to guide the researcher's development and implementation of an OBI programme specifically for patients with de Quervain's disease in this study (Law et al. 1996).

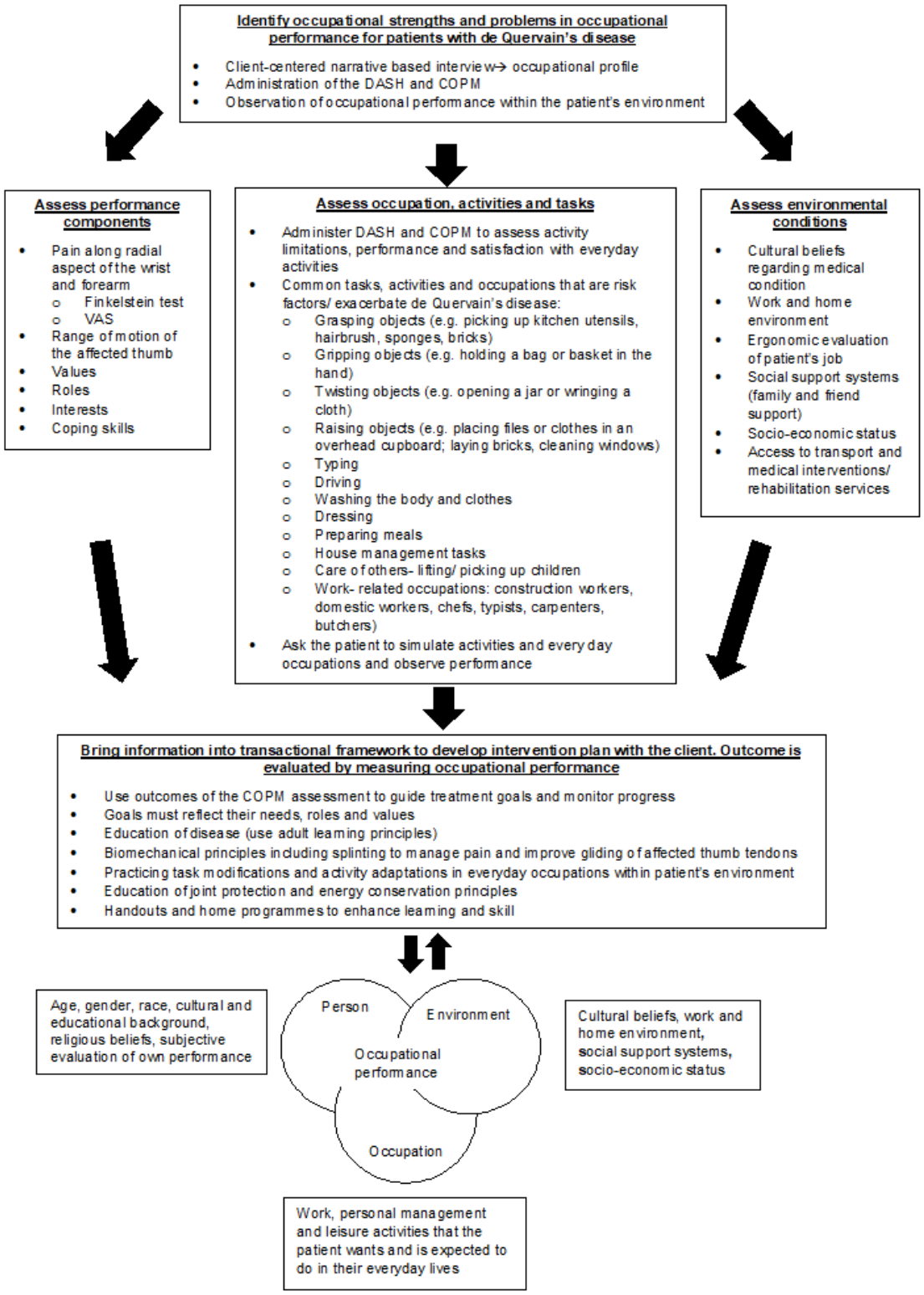

Figure 3.1: Conceptualisation using the Person-Environmental-Occupation Model for a typical patient with de Quervain's disease (Law et al. 1996)

The ICF model as described in chapter two also guided the researcher in the development of an OBI programme for de Quervain's disease. Figure 3.3 illustrates how the ICF assisted the researcher in focusing on the activity and participation domains of de Quervain's disease. This enabled her to conceptualise the bi-directional relationship between the different components for this condition. This also assisted in the selection of appropriate outcome measures and directed intervention towards a holistic approach.

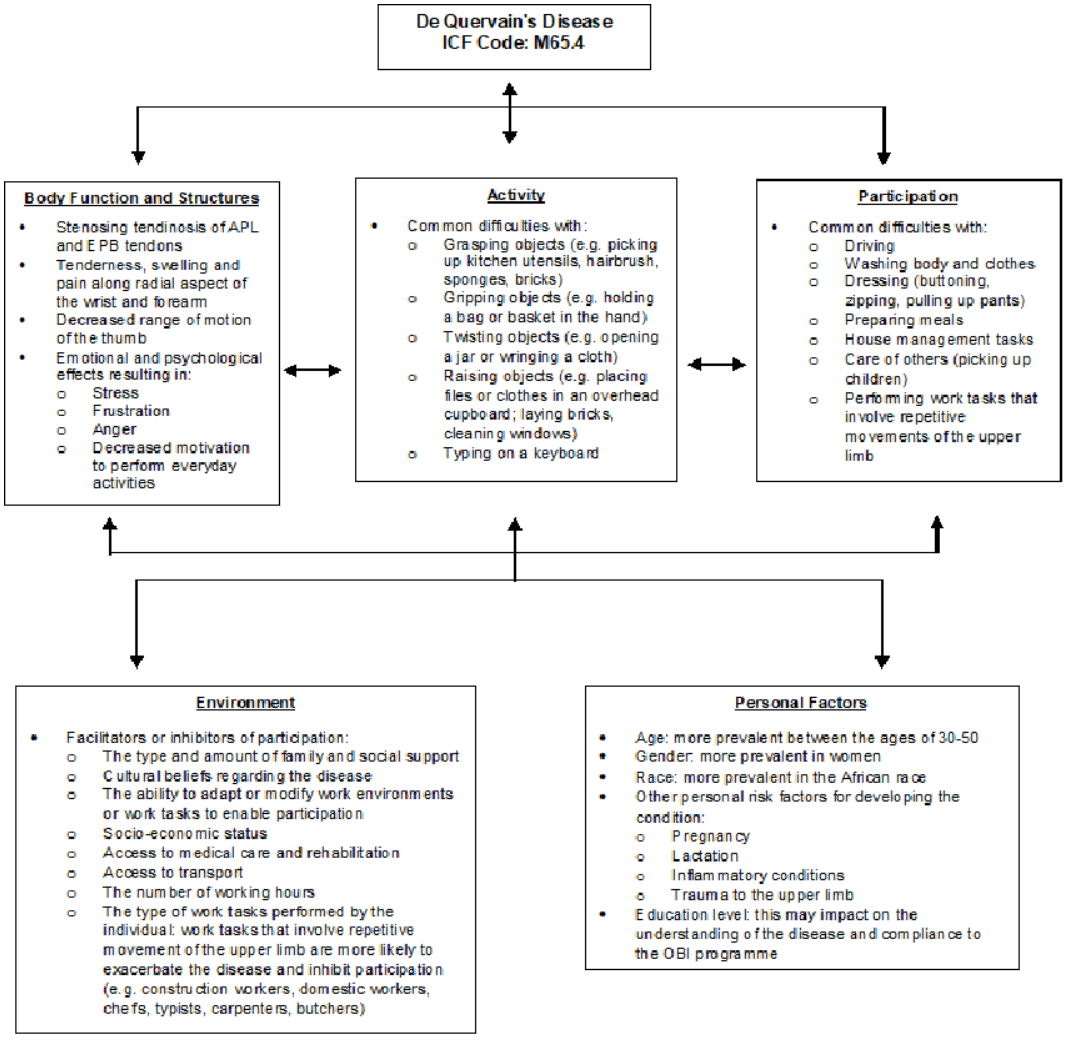

Figure 3.2: Interaction between the components of the *International Classification of Functioning, Disability and Health as applied to de Quervain's disease (Hemmingsson & Jonsson 2005)*

3.2.1.2 Step 2: Specify programme structures and processes

The OBI programme was designed specifically for patients with de Quervain's disease. This programme was tested on patients at Helen Joseph Hospital, which is a tertiary hospital that forms part of the government health care sector in South Africa.

Patients included in the traditional immobilisation programme were assessed using all four outcome measures for purposes of the research. Treatment of these patients mainly involved the fabrication of a thumb spica splint which was worn on a full time basis for a period of six weeks.

The assessment and treatment of patients that were included in the OBI programme was more holistic, client- centred and comprehensive compared to the traditional immobilisation programme. This programme involved an in depth evaluation of the patients' occupational profile by means of a narrative based interview, observation of occupational performance in everyday activities as well as the administration of client-centred standardised assessments. During the intervention phase, splinting was incorporated for initial pain relief if the patient felt it was necessary, however the wearing regime of this splint differed from the traditional protocol. Patients were advised to initially wear the splint for most of the day and at night while sleeping, only removing it to perform activities that could not be performed successfully with the splint on. During the second and third treatment sessions, they were advised to slowly discontinue wearing the splint if and as their pain subsided. Principles adopted from the biopsychosocial model were also included in this splinting programme such as patient education regarding how the splint may improve their symptoms as well as the wearing regime and care for splint. Other biopsychosocial principles included the use of client-centred approaches such as allowing them to choose whether they needed a splint or not, as well as the colour and type of splinting material they wanted. Other principles considered were minimizing the harm and optimizing comfort, compliance and cosmesis of the splint as well as optimizing usability, body structure and function and enabling activity participation (McKee & Rivard 2011).

The OBI intervention programme also included education of de Quervain's disease, the use of biomechanical principles, modifications to their everyday tasks, as well

teaching and practicing joint protection and energy conservation principles. These principles are aimed at adjusting movement patterns and reducing stress applied to the affected wrist in order to restore function and performance in their everyday activities (Hammond & Freeman 2004).

In addition, this programme contained handouts which were developed by the researcher and given to patients including a description of de Quervain's disease (Appendix B); information regarding the purpose, care and wearing regime of the thumb spica splint (Appendix C); as well as information on joint protection and energy conservation principles for de Quervain's disease (Appendix D). Information in the handouts regarding the description of de Quervain's disease was extracted from literature contained in the introduction (1.1 Background to the study) and well as the literature review (2.2.1 Definition, anatomy and presentation and 2.2.4 Aetiology). Information in the handouts regarding the purpose, care and wearing regime of the thumb spica splint as well as joint protection and energy conservation principles were obtained from notes given to the researcher from Wits University during her undergraduate studies and applied to de Quervain's disease based on information described in the literature review.

The essential programme elements including a six- week occupation based intervention programme for de Quervains disease is displayed in the next chapter.

3.2.2 Phase 2: Comparing the change in outcomes of the occupation based intervention programme against the traditional intervention programme used at the research site

The second phase of the project involved determining the change in outcomes of this programme in a clinical setting and comparing it with the change in outcomes of the traditional programme. A quantitative- longitudinal, total population sampling intervention design was used to test the change in outcomes of the OBI programme in patients with de Quervain's disease. The differences between the treatment method (independent variable) and the occupational performance and client factor outcomes for the two treatment groups (dependent variable) was examined and are displayed in

the next chapter. Statistical procedures were used to analyse the data that were collected.

3.2.2.1 Step 3: Confirming outcome measures

All data were collected using a demographic questionnaire, as well as administration of the Finkelstein Test, Visual Analogue Scale, Disabilities of the Arm, Shoulder and Hand questionnaire, and the Canadian Occupational Performance Measure over three occupational therapy sessions. Background literature regarding these outcome measures is discussed in the literature review. The demographics questionnaire as well as the administration and scoring of these outcome measures are discussed below.

Demographic questionnaire

A demographic questionnaire (Appendix G) was developed specifically for this study, which included the patients personal, medical and occupational history. This was formulated to gain information regarding the patients' age, gender, language, level of education, employment status, as well as a description of their work environment and work tasks. Medical information such as their diagnosis, onset of the condition, other medical conditions, medications, injections, hand dominance as well as their affected hand was also included. In addition, patients were asked questions regarding their pregnancy status and whether they were lactating (if applicable), what activity restrictions they were experiencing, as well as what activities relieved or aggravated their pain. Information regarding the patients' name and contact details was filled out on a separate sheet and kept in a secure location by the researcher, to ensure confidentiality.

Finkelstein test

On examination, the patient must be seated with their hand over the edge of a table and their forearm in neutral rotation with the ulnar aspect rested across the table (Dawson & Mudgal 2010). The first stage of this test is performed by the patient, where they are requested to actively ulnar deviate their wrist. Patients in the acute phase of the disease will present with pain over the first dorsal compartment and therefore no further manipulation is required (Dawson & Mudgal 2010). The second stage of this test is only performed if the patient presents with minimal or no pain in the first stage.

During this stage the examiner further passively ulnar deviates the patient's wrist which may produce pain over the first dorsal compartment (Dawson & Mudgal 2010). Patients in the chronic phase of the disease may not present with discomfort in the first two stages and therefore are required to perform the final stage of this test. During this stage, the examiner flexes the patient's thumb, in addition to ulnar deviating the wrist. The clinical diagnosis of de Quervain's disease is made if pain is produced during any of these stages of this test (Dawson & Mudgal 2010).

Visual Analogue Scale

The VAS is displayed as a 100mm line with 'no pain' and 'worst imaginable pain' written at each end of the continuum (Appendix H). The scale can be presented as a horizontal or vertical line, however studies have shown that less error is made when presented horizontally (Williamson & Hoggart 2005). When using this scale, the patient is requested to place a vertical line on the 100mm line at the point they feel represents their current level of pain. The score is then measured using the millimeter scale from the left-hand side of the scale (0mm) to the point marked by the patient. A mark that is placed between 0- 30mm is described as mild pain; 30-54mm as moderate pain and a score of 54mm or more is described as severe pain (Williamson & Hoggart 2005). In order to limit error when reassessing the patient's pain after a particular treatment intervention, the patient must be shown their initial score (Williamson & Hoggart 2005).

As the experience of pain is very complex and subjective, it is important that this scale is administered on the patient throughout the treatment process so that the magnitude of change in pain can be understood (Williamson & Hoggart 2005). Therefore, the percentage of pain reduction should be calculated by dividing the difference between the pre and post pain scores by the pre-treatment score and multiplying this by 100 (Williamson & Hoggart 2005).

Disabilities of the Arm, Shoulder and Hand questionnaire

This DASH questionnaire consists of 30 items which are rated on a scale of 1-5. These items include 21 physical function questions, which assess the degree of difficulty in performing every day activities and are scored from 'no difficulty' to 'unable' to perform the task. There are also nine symptom related questions which assess the severity of

symptoms, and are scored from ‘not at all’ to ‘extreme’ (Case-Smith 2003). In addition there are eight optional questions which are usually intended for athletes or workers who perform tasks that are physically taxing (Hudak et al. 1996). Studies have shown that this test takes approximately 6.2 minutes to complete (Dias et al. 2008). Scoring is done by summing up the circled items, dividing it by the number of completed responses and then subtracting one. This score is then multiplied by 25 to get the final DASH disability score which is scaled from 0-100 (Hudak et al. 1996). A high DASH disability score is indicative of a greater disability and this score cannot be calculated if there are more than three missing items. Scoring of the optional module is done in the same manner however this cannot be calculated if there are any missing items (Hudak et al. 1996).

Canadian Occupational Performance Measure

Before the COPM is used in a clinical setting, the therapist is required to read and fully understand the manual and become familiar with the assessment. (Law et al. 2014). Administration of the COPM takes approximately 20-40 minutes to complete, and begins with an interview between the therapist and the patient to define and identify occupations that are of importance to the patient, that they are currently experiencing difficulty in performing (Jack & Estes 2010; Law et al. 2014). Using a 10-point rating scale the patient is asked to rate the importance of each occupation to their lives. This allows the patient and therapist to gain insight into the patient’s priorities, which facilitates the goal setting process. The patient then selects the five most significant problems they would like to address in treatment (Che Daud et al. 2016; Law et al. 2014). These problems are written in the scoring section on the assessment form in order of priority (Law et al. 2014). Patients are then requested to rate their satisfaction and level of performance for these five problems using a 10-point rating scale where 1 indicates ‘not satisfied’ or ‘notable’ and 10 indicates ‘extremely satisfied’ or ‘able to do well’ (Jack & Estes 2010; Law et al. 2014). The average COPM satisfaction and performance scores are then calculated by adding each score and dividing it by the number of problems (Che Daud et al. 2016; Law et al. 2014). After intervention, this assessment is repeated, and the satisfaction and performance scores are calculated. Lastly, the change in performance and satisfaction between the assessments are then

calculated by subtracting the first assessment value from the second assessment value to detect if there has been change over time (Law et al. 2014).

3.2.2.2 Step 4: Determining the change in outcomes of the programme in a practice setting

This step involves implementing the programme with a target group, assessing the changes in outcomes at baseline and during intervention at three and six weeks, determining significance and effect sizes, as well as suggesting adaptations based on these findings. This step is displayed in the results and discussion chapters of this study.

3.3 Population and context

The research population included all patients that were diagnosed with de Quervain's disease and referred to occupational therapy at Helen Joseph Hospital. Most of the patients that attend Helen Joseph Hospital have not completed formal schooling and are generally of a lower economic status. Due to their low education levels many of the patients are unemployed or perform unskilled labour. There are no major informal settlements within close proximity to the hospital and therefore most of the patients live in formal housing structures. In terms of communication, language barriers do not seem to be a major problem between patients and health practitioners at Helen Joseph Hospital. Although English may not be their first language, most of the patients are able to understand and speak English. In addition, Helen Joseph Hospital does not have a paediatrics unit, and therefore most of the patients that attend the hospital are adults.

3.4 Research site

Helen Joseph is a public acute tertiary hospital located in urban Johannesburg, Gauteng. Generally, this hospital provides services to patients residing in the urban areas that surround the hospital. Nearby clinics such at Hillbrow and Discoverers Clinic also refer patients to Helen Joseph should they require more specialised treatment. Helen Joseph also has a specialised hands unit which includes a team of orthopaedic and plastic surgeons as well as occupational therapists working in hand rehabilitation. Hands clinics are run twice a week including Monday and Wednesday mornings. The

Monday clinic is run by the plastic surgeons and Wednesday clinic by the orthopaedic department. Two occupational therapists working in hands attend both of these clinics on a weekly basis. Approximately 80 patients are seen at each of these clinics on a weekly basis and although the exact incidence and prevalence of repetitive strain injuries at Helen Joseph Hospital is not known, these conditions are relatively common. On average the occupational therapy department receives two-four referrals for the treatment of de Quervain's disease per week.

3.5 Sample and sample size

A total population sampling method was used with all patients at Helen Joseph Hospital referred to occupational therapy with de Quervain's disease being recruited into the study. Patients were conveniently allocated in one of the two treatment groups in the order they were referred once they had agreed to participate in the study and signed the consent form. The planned and actual sample size of 54 participants with 27 in each treatment group was used in this study. This was calculated on a minimal clinically important difference (MCID) of 16 (SD 18) points on the DASH score on an individual level, established in a sample of 255 patients in Italy with various upper limb conditions including injury at the wrist (Franchignoni et al. 2014). The sample size was calculated at a power of 90% and significance level of 0.05. There is currently no reported evidence of the DASH MCID within a South African context and therefore this calculation was based on other sources (de Klerk et al. 2018).

3.5.1 Inclusion and exclusion criteria

All patients included in the study had to be 18 years or older in order to sign consent. They must be diagnosed with de Quervain's Disease and presented with a positive Finkelstein test on referral to occupational therapy. All patients recruited into the study must also have read the information letter and signed a letter of informed consent to participate in the research study. All patients diagnosed with a psychiatric condition such as depression or anxiety, or any cognitive impairment were excluded from the study as they would not have been able to sign consent or follow the intervention programmes.

3.6 Research procedure

Before commencing the research, a research protocol was submitted to the Human Research Ethics Committee at the University of the Witwatersrand as well as to the Research Committee at Helen Joseph Hospital. Permission to conduct research was obtained from the CEO and research committee (Appendix K) as well as the occupational therapy head of department (Appendix L) at Helen Joseph Hospital. Once the ethical clearance certificate (reference number: M160847- Appendix M) and permission to conduct the study was obtained, an occupational therapist working in hands at Helen Joseph Hospital was orientated to this study and her assistance was requested. The researcher became familiar with all administration manuals and assessments of the four outcome measures that were used in this study. The researcher also trained the assistant occupational therapist on how to administer the four assessments that were used in this study.

The period of data collection occurred between May 2017 to May 2018. The information letter explaining the research (Appendix E) was presented to all prospective participants that were diagnosed with de Quervain's disease and referred to occupational therapy from the outpatient clinics. Patients were then requested to sign a letter (Appendix F) informing their consent if they agreed to participate in the study.

Each participant was assigned in order of referral to one of the two treatment groups by the researcher. A short questionnaire was filled out for each participant regarding their demographic information. Participants were then assessed by the occupational therapists using the four outcome measures including the Finklestein's test, VAS, DASH and COPM. Although the COPM was not part of the traditional immobilisation protocol, this assessment needed to be included in both protocols for purposes of adequately comparing the interventions. All participants that were placed in the first group were assessed and treated by the assistant occupational therapist using the four outcome measures and traditional immobilisation programme (Appendix A). All participants placed in the second group were assessed and treated by the researcher using the same four outcome measures and OBI programme. Given the lack of human resources in terms of available staff members at Helen Joseph Hospital to participate

in the study, the researcher was compelled to use her own time and expertise to institute one of the treatment protocols. As the OBI programme was developed by the researcher, it was decided that this protocol would be more suitably administered by the therapist with a more comprehensive understanding of this programme. Step by step instructions of the traditional intervention programme (Appendix A) and OBI programme for de Quervain's disease which is displayed in the results chapter were printed out and followed by the occupational therapists and the researcher with each patient. This was to ensure that the assessments and treatments were done in the same way with each of the participants. Re-assessments were generally administered three weeks after the referral and again at the end of the six-week protocol, using the same outcome measures. Travel re- imbursement were offered to patients who were unable to afford traveling costs for their follow up sessions.

All data collected including consent forms, patient information and assessment forms were kept in a confidential file that was only accessible to the researcher. All data were captured on Microsoft Excel by the researcher and checked for accuracy using a research assistant. The research assistant did not have access to the names of the patients, as this information was recorded on a separate form and stored in a safe place by the researcher. Once data collection was complete, participants' outcomes were compared using statistical analysis.

3.7 Ethical considerations

Approval of the research protocol was obtained on the 14 October 2016 by the Medical Human Resource Ethics Committee at the University of the Witwatersrand. The ethical clearance certificate (reference number: M160847) is contained in Appendix M. Authorisation to conduct the study was given by individuals in authority at the research site including the CEO and research committee at Helen Joseph Hospital (Appendix K) as well as the Head of Department of the Occupational Therapy Department (Appendix L).

The four fundamental principles of biomedical ethics first described by Tom Beauchamp and James Childress (1985) were upheld throughout the course of the study. These principles include: respect for autonomy, nonmaleficence, beneficence

and justice (Ebbesen et al. 2012). Issues relating to patient confidentiality were also taking into consideration throughout the course of the study.

3.7.1 Autonomy

Patients' autonomy was preserved by providing all prospective participants with an information letter (Appendix E) explaining the purpose and benefits of the study, their confidentiality within the study, their right to participate or withdraw from the study at any time, as well as their right to access the results once the research is complete (Creswell 2009). This allowed patients to make an independent decision whether they would like to participate in the research or not. A translator was also used for any language barriers to ensure that patients gained a comprehensive understanding of all information pertaining to the study. If patients agreed to participate, they were requested to sign a letter of informed consent (Appendix F) which acknowledges the protection of their rights throughout the study (Creswell 2009).

3.7.2 Non-maleficence and beneficence

Research participants were not harmed in any way, nor did they directly benefit from participating in the study. Results obtained from this research will be submitted for publication to a peer-reviewed journal, which may benefit future patients and add value to body of knowledge concerning hand rehabilitation in occupational therapy. The researcher ensured that all collection of data was done objectively and that the interpretation of results was an accurate account of all information presented during the study (Creswell 2009).

3.7.3 Justice

Justice was upheld by ensuring that all participants were given the same information regarding the study, which enabled them to make an informed decision on whether to participate or not. All participants were assessed in the same manner and provided with high quality treatment that did not harm them in any way. No prejudice or discrimination was upheld as all participants were treated the same, regardless of their demographics including differences in education, language, culture, roles and socioeconomic status.

3.7.4 Confidentiality

Confidentiality was ensured by recording the patient's identity, including information pertaining to their name and contact details on a separate form, and stored in a file which was only accessible by the researcher. A research code was also assigned to each participant which was documented on the demographics and assessment forms, as well as an Excel spreadsheet where data were captured. This coding system ensured that participants could not be directly linked to their results. Information regarding the individual patient's results were never discussed with any of the multidisciplinary team members working at Helen Joseph Hospital. In addition, the research assistant did not have access to the participants names, and all data captured were stored on the researcher's personal laptop which is password protected. Furthermore, all data will be kept in a safe place by the researcher, and discarded after a recommended period of five years (Creswell 2009).

3.8 Data analysis

The analysis of all data were performed using Statistica 13.2 which was available at the University of the Witwatersrand. Assistance in using this programme was given by one of the researchers' supervisors who has expertise in statistical analysis.

Descriptive statistics such as frequency distributions and measures of central tendency were used to summarise and analyse the data collected during this study. The Chi-square non- parametric test was used to describe the statistically significant differences in calculated scores for the demographic information. Frequency distributions were calculated for the Finkelstein test as the data for this assessment is nominal. Parametric statistical tests were used to analyse the VAS scores as this assessment provided ratio data. The parametric single sample t- test compared the VAS scores within each treatment group over three assessment sessions. In addition, the Students t- test for independent samples was used to analyse the scores of the three VAS assessments between the traditional and OBI treatment groups. Furthermore, non-parametric statistical tests were used to describe the differences in scores for the DASH questionnaire and COPM as the scales on these assessments are ordinal. The Wilcoxon signed- rank test compared the differences in DASH and COPM scores within

each group over the three assessment sessions, while the Mann- Whitney U test compared the scores for patients receiving the traditional immobilisation protocol versus patients receiving OBI.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the results of the study. The essential programme elements of the OBI programme is initially displayed. The personal, educational and occupational demographic frequency distributions are then discussed, followed by the medical demographics. Precipitating and alleviating strategies for pain are then presented. and the results of the Finkelstein test, VAS, DASH and COPM including the within group and between group analysis are discussed.

The data collected included a total of 54 participants, with 27 participants allocated in order of referral into each of the two groups. All participants completed were assessed using the four outcome measures at three individual occupational therapy sessions. Two sections within the DASH questionnaire however are optional and were not completed by all participants.

All data were analysed and displayed in tables and graphs.

4.2 Development of an occupation based intervention programme: Essential programme elements

4.2.1 A six week occupation based intervention programme for de Quervain's disease

Day of the referral

- The patient diagnosed with de Quervain's disease must be referred to occupational therapy from the outpatient hands clinics
- An interpreter should be used throughout the assessment and treatment process if the patient does not understand English. This is to ensure that the therapeutic content is not lost during the interaction between the therapist and patient and the therapeutic outcomes are not compromised (van Stormbroek 2015)

For purposes of the research:

- Provide and thoroughly explain the research information sheet to the patient (Appendix E)
- Request the patient to sign the letter of informed consent if they accept the invitation to participate (Appendix F)
- Fill out the demographics form with the patient's information (Appendix G)

General principles to follow throughout the programme:

- Throughout the assessment and treatment process, the therapist must follow a client- centred and holistic approach (Amini 2004). This is done by:
  - Initiating a positive patient- therapist relationship (Amini 2004)
  - Facilitating the patients problem solving, motivation, compliance and active engagement in therapy (Colaianni & Provident 2010)
- Principles explained in narrative medicine should also be adopted throughout the assessment and treatment process (Cooper 2011). These include:
  - Understanding the patient as an occupational being across all therapy sessions to harness patient motivation and increased compliance to therapy
  - Actively listening to patients and allowing them to self- reflect to provide them with a sense of control over their injury and treatment
  - Avoid the use of medical jargon

Assessment and goal setting

- Interview and observe the patient performing their everyday activities to gain an in depth understanding of their occupational profile. This includes the patients:
  - Personal and medical history
  - Roles, values and support systems
  - Age, gender, income, employment status, ethnicity, religion, culture, national origin, political beliefs, homelessness, social support and health status, and how these factors affect their performance in occupations (Durocher et al. 2014)
  - Personal management, work and leisure tasks that the patient performs in their everyday lives and that are affected by their condition (Grice 2015)

- Psychological, spiritual, personal and emotional impacts of their condition (Colaianni & Provident 2010)
- Physical, occupational, social and temporal environmental factors that may have precipitated or are contributing to their condition and restricting their function (Doble & Santha 2008)
- Occupational tasks or activities that elicit pain→ ask the patient to simulate some physical movements performed in their everyday occupations that elicit pain
- The experience of the condition to the patient as well as the impact of the condition on their functioning (Cooper 2011)
- The underlying factors such as personal, bodily and environmental factors that are supporting or limiting their performance (Fisher 2014)
- Strengths and problems related to their occupational performance must be identified by the patient (Grice 2015)

- Perform an ergonomic analysis of the patients job if appropriate (Calvo-Cerrada et al. 2012)
- Standardised assessments including the Finkelstein test and Visual Analogue Scale (VAS) should be administered to assess the patient's level of pain
- Client- centred and occupation based standardised assessments including the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and Canadian Occupational Performance Measure (COPM) must also be administered to gain an understanding of the patients activity limitations and occupational performance (de Klerk et al. 2016) Thoroughly explain the purpose of these tests to the patient before they are administered.
- Once these assessments are complete, the therapist must set and prioritise short and long-term goals collaboratively with the patient that they would like to achieve in therapy. These goals should be reflective of the patients' occupational roles, needs and values. These goals must also focus more on illness experience and recovery of function rather than reduction of the disease process (Cooper 2011)

Intervention

- Throughout the intervention process, the therapist should encourage the patients family and support systems to actively participate and contribute to the treatment sessions in order to promote patient participation (Law 2002). This also gives the patient a sense of belonging during the treatment process (Doble & Santha 2008)

1. *Education on de Quervain's disease*

- The therapist must facilitate the development of an in-depth understanding of the condition (Goel & Abzug 2015). A handout including a description of de Quervain's disease with pictures of the anatomy; general and patient specific occupational causes of the condition; and symptoms that are expected of the condition must be explained and given to the patient (Appendix B)
- Explore the impact of the condition (general, potential and specific to the patient) to their everyday functioning and occupational performance
- Explain the occupational therapist's role in managing this condition by using an occupation-based treatment approach. The therapist should facilitate the patients understanding of what this treatment involves as well as how it will benefit them
- Throughout the education process, adult learning principles must be implemented and applied appropriately to create a sense of collaboration, shared power and partnership between the patient and therapist (de Klerk et al. 2016). Adult educator, Malcolm Knowles and Brazilian educator, Paulo Freire describe key principles that should be used with adult learners. These principles include:
    - To be objective and be aware of one's own values, issues, prejudices and frame of reference so that one does not impose their own beliefs, cultural roles and expectations on the patient (Hope & Timmel 1999)
    - To encourage radical transformation and create opportunity to empower individuals to become committed to changing their lifestyles by drawing on contributions they can make in improving their condition (Hope & Timmel 1999)
    - To actively involve individuals in therapy by encouraging them to set clear goals and objectives and explain how therapy will help them to attain their goals (Knowles 2011)

- To facilitate dialogue between the therapist, the individual and their family members/ friends to discuss problems and solutions (Hope & Timmel 1999)
- Acknowledging and drawing on the patient's prior learning and past experiences by encouraging them to discuss what they already know about de Quervain's disease, as well as to identify changes/ remedies they have used to reduce their symptoms (Knowles 2011)
- To ensure that education is relevant to the patient by allowing them to plan and set goals and priorities that are in keeping with their interests, roles and responsibilities for what they would like to achieve in therapy (Knowles 2011; Hope & Timmel 1999)
- To treat the patient with dignity by respecting their beliefs and opinions, by acknowledging their wealth of life experiences, and to avoid humiliating them during treatment (Hope & Timmel 1999)
- To facilitate problem solving by encouraging the patient to identify issues they are experiencing in their everyday occupations, present it in a challenging way, and facilitate a discussion on solutions to their problems (Hope & Timmel 1999)
- To allow the patient to reflect on their solutions or changes they can make to their lifestyles and encourage them to identify new practical skills or solutions that may enhance their recovery (Knowles 2011; Hope & Timmel 1999)

2. *Biomechanical principles*

- Perform preparatory methods→ soft tissue massage over first dorsal compartment to relax tendons and decrease pain (Goel & Abzug 2015; Amini 2004)
- Use therapeutic exercise→ Gentle active range of motion exercises of the wrist and thumb joints to patients tolerance to improve gliding of the APL and EPB tendons (Goel & Abzug 2015)

3. *Purposeful activity and active engagement in valued occupations with task modifications and education of joint protection and energy conservation principles*

- Ask the patient to choose meaningful activities they would like to engage in during the treatment session→ encourage the patient to choose a balance of activities that reflect personal management, work and leisure occupations (Doble & Santha 2008)

- Perform an activity analysis of the chosen tasks or occupations to ensure appropriate task modifications and adaptions are made to the activity and the environment (de Klerk et al. 2016)
- Encourage the patient to perform a chosen activity and in doing so explore strategies to improve their performance (Preissner 2010)
- Explore and educate the patient on task modification and activity adaptations specific to their context in order to improve independence in their everyday occupations (Calvo-Cerrada et al. 2012; de Klerk et al. 2016)
    - Facilitate the patient to explore ways in which their occupational environments, tools and activities can be adapted to limit pain and discomfort. The therapist should provide guidance and input when needed. (Calvo-Cerrada et al. 2012)
    - Activity modifications should be aimed at encouraging neutral wrist positioning and restricted thumb movements during activities. Patients that perform tasks that require lifting or carrying objects will be encouraged to limit this as much as possible (Goel & Abzug 2015). These new skills can then be generalised to all activities performed in their everyday activities to overcome functional impairments (Jack & Estes 2010; Fisher 2014)
    - Encourage the patient to bring photos or videos of them performing tasks within their occupational contexts as well as their own tools and materials they use in their daily occupations to the following session to enhance task modification. This will ensure that the treatment is more culturally appropriate and context specific (Che Daud et al. 2016)
    - Perform a vocational assessment if appropriate and suggest possible reasonable accommodations for their work tasks (Calvo-Cerrada et al. 2012)
- Educate the patient on the use of joint protection and energy conservation principles specific to de Quervain's disease that are to be integrated into their daily activities (Pendleton & Schultz -Krohn 2012). A handout of these principles with pictures must be given (Appendix D). The same adult learning principles discussed above should be used when educating the patient on these principles
- An educational- behavioural approach must be used when teaching these principles to the patient. This approach is aimed at educating patients on joint protection and

energy conservation principles, as well as demonstrating and providing opportunity for the patient to practice these skills within the treatment setting. This will enhance adherence and compliance of the patient to use and apply these skills in their everyday activities (Hammond & Freeman 2004)

- Provide the patient with self- management information and advice on these principles. Allow them to practice these skills in a stimulated setting (Preissner 2010). Written handouts of these principles must be given to the patient and translated to their own language if necessary

4. *Splinting*

- Principles adopted from the biopsychosocial model must be used when splinting to individualise treatment and increase patient compliance to splint wear: (McKee & Rivard 2011). These include:
  - Patient education: Encourage the patient to explain how they think the splint will address their symptoms. The therapist will also test their understanding of the *what, why, when and how* of splint wear and expand on this if necessary
  - Use a client- centred approach: Ask the patient whether they believe a splint would help their condition. If they agree to use one, ask for their choice in what colour and type of splinting material they would prefer to use (if available)
  - Minimise harm and optimise comfort, compliance and cosmesis of the splint: Round the edges, smooth corners and provide padding to pressure points
  - Optimise usability, body structure and function and enable activity participation: Inform the patient that the splint should be worn when resting and sleeping as well as when performing daily activities, however, remove it during activities that can't be performed successfully with the splint (this is advised for the first three weeks to allow for tissue healing during the acute phase of the condition)
- Fabricate a forearm- based thumb spica splint for the patient:
  - Materials needed:
    - 3.2mm thermoplastic
    - Thumb spica splinting pattern
    - Splinting bath
    - Adhesive hook and non- adhesive loop velcro

- Heat gun
- Splinting scissors
- Pen

- Procedure:
  - Heat up the splinting bath to 60°C
  - Trace the thumb spica pattern onto the thermoplastic material
  - Melt the thermoplastic material in the splinting bath
  - Once properly melted, remove the material from the splinting bath and cut out the pattern. Reheat the material in the splinting bath if necessary
  - Position the patient's hand with the forearm and wrist in neutral position with the ulnar border rested on the table, and the thumb in palmar abduction
  - Mould the splinting material onto the radial aspect of the hand and forearm, immobilising the thumb carpo- metacarpal and metacarpophalangeal joints with the interphalangeal joint free to mobilise
  - Once moulded, remove the splint from the patient's hand and neaten the edges
  - Apply the splint to the patient's hand and add velcro straps around the forearm, wrist and thumb proximal phalanx
- Educate the patient on the application, removal and care for the splint. A handout of this must also be given (Appendix C)

5. Home programme (Case-Smith 2003)

- Provide the patient with a comprehensive home programme including all the handouts for de Quervain's disease, joint protection principles as well as the wearing regime and care for splint. A written handout of the patient's goals, task modifications and activity adaptions that were discussed during the session should also be included in the home programme

Three-week follow up appointment

- Revise the short and long-term occupational goals that were set by the patient and therapist in the first therapy session. Allow time for the patient to reflect on these goals and provide input or changes if requested

- Reassess the patient using the Finkelstein test, VAS, DASH and COPM. Discuss any changes in pain levels, activity limitations and occupational performance and encourage the patient to explore what has contributed to this
- Re-educate the patients on their condition; revise and clarify task modification (using equipment and materials from the patient's context); and revise joint protection and energy conservation principles for de Quervain's disease using the principles described above
- Apply biomechanical principles→ preparatory methods (soft tissue massage) and therapeutic exercise (gentle active range of motion over the wrist and thumb joints as discussed previously. Include muscle strengthening principles and functional activity if the patients pain has subsided to improve performance in occupations (Goel & Abzug 2015)
- Evaluate, monitor, modify and adjust the splint if needed
- Re-educate the patient on splint care and the new wearing regime if their pain has subsided. The patient should only wear the splint while resting and sleeping and discontinue splint wear when performing daily activities
- Revise the home programme with the patient

Six-week follow up appointment

- Revise the occupational goals that were set in the first therapy session and discuss whether some of these goals have been achieved
- Reassess the patient using the Finkelstein test, VAS, DASH and COPM. Discuss any changes in pain levels, activity limitations and occupational performance and encourage the patient to explore what has contributed to this
- Reapply biomechanical principles→ preparatory methods (soft tissue massage) and therapeutic exercise (gentle active range of motion over the wrist and thumb joints as discussed previously. Include muscle strengthening principles and functional activity if the patients pain has subsided to improve performance in occupations (Goel & Abzug 2015)
- If the patient's pain has resolved:
    - Advise the patient to slowly discontinue wearing the splint

- Develop a new home programme- revise the causes of the condition, task modifications, energy conservation and joint protection principles for de Quervain's disease
- Discharge the patient from occupational therapy and provide contact details for the department should their symptoms return and require another consultation

- If there has been minimal or no resolution of the patient's pain:
  - Re-educate the patient on their condition, explore new task modifications (using equipment and materials from the patient's context), and revise joint protection and energy conservation principles
  - Advise the patient to continue wearing the splint
  - Refer the patient back to the hands clinic to consult with the doctors regarding alternative treatment options and advise the patient to provide feedback to the occupational therapy department

4.3 Demographics

The Chi- squared test was used to compare and analyse the differences in demographic variable frequencies between the OBI and traditional group.

4.3.1 Personal demographics

The frequency distributions and statistical significance values for the OBI and traditional group's personal demographics are displayed in Table 4.1. The gender of participants in both groups was comparable (p=0.488) with the majority of the sample being female. The languages spoken and understood by the participants varied, with most of participants speaking English or an additional language to English. No significant different was found between the two groups (p=0.413).

The age of participants between the two groups varied significantly (p=0.007) with the majority of participants in the OBI group being older, falling between 50- 70 years of age, while the participants in the traditional group were younger, ranging between 30-50 years of age.

Table 4.1: Personal demographics of participants (n=54)

		Total Sample n=54	Occupation Based Intervention Group n=27	Traditional Group n=27	Chi Square df=1	p
		n (%)				
Age Groups	**20-29 years**	7 (12.96)	4 (14.81)	3 (11.11)	7.42	0.007**
	30-39 years	12 (22.22)	3 (11.11)	9 (33.33)		
	40-49 years	9 (16.66)	2 (7.41)	7 (25.93)		
	50-59 years	14 (25.92)	9 (33.33)	5 (18.51)		
	60-69 years	9 (16.66)	7 (25.93)	2 (7.40)		
	70-79 years	3 (5.55)	2 (7.41)	1 (3.70)		
Gender	**Male**	10 (18.51)	6 (22.22)	4 (14.81)	0.00	0.488
	Female	44 (18.48)	21 (77.78)	23 (85.19)		
Language	**English**	19 (35.18)	12 (44.44)	7 (25.92)	0.67	0.413
	Afrikaans	4 (7.40)	0	4 (14.81)		
	Zulu	6 (11.11)	1 (3.70)	5 (18.51)		
	English and other	20 (37.03)	14 (51.85)	6 (22.22)		
	Other	5 (9.25)	0	5 (18.51)		

Significance $p \leq 0.05$* $p \leq 0.01$**

4.3.2 Educational and occupational demographics

The level of education was also comparable between the two groups as there was no significant difference between them (p=0.736). Approximately 70% of participants in both groups received high school education (Grade 8 - matric).

When analysing the occupational demographics, nearly half of the participants in each group were employed. The types of employment were classified into manual laborer/ domestic worker, clerical/administrative work, housewife/mother and pensioner. Precisely 27.78% of all participants fell within the ‘other’ category for types of employment. Furthermore, none of the participants in the traditional group reported

being pensioners, however 25.93% of participants in the OBI group received a pension. The two treatment groups were comparable for employment status (p=0.489) and type of occupation (p=0.097) as there was no significant difference between the two groups (Table 4.2).

Table 4.2: Educational and occupational demographics of participants (n=54)

		Total Sample n= 54	Occupation Based Intervention Group n=27	Traditional Group n=27	Chi Square df= 1	p
		n (%)				
Highest Level of Education	**< Grade 7**	5 (9.26)	3 (11.11)	2 (7.41)	1.11	0.736
	Grade 8-11	20 (37.04)	12 (44.44)	8 (29.63)		
	Matric	18 (33.33)	7 (25.93)	11 (40.74)		
	Diploma	5 (9.26)	3 (11.11)	2 (7.41)		
	Degree	6 (11.11)	2 (7.41)	4 (14.81)		
Employment Status	**Unemployed**	26 (48.15)	14 (51.85)	12 (44.44)	0.00	0.489
	Employed	28 (51.85)	13 (48.15)	15 (55.56)		
Occupation	**Manual laborer/ Domestic Worker**	6 (11.11)	4 (14.81)	2 (7.41)	2.76	0.097
	Clerical/ Administrative	11 (20.37)	3 (11.11)	8 (29.63)		
	Housewife/ Mother	15 (27.78)	6 (22.22)	9 (33.33)		
	Pensioner	7 (12.96)	7 (25.93)	(0)		
	Other	15 (27.78)	7 (25.93)	8 (29.63)		

Significance $p \leq 0.05$* $p \leq 0.01$**

4.3.3 Medical Demographics

Figure 4. 1 shows a comparison of the time difference between the first onset of condition and the first occupational therapy session among the two treatment groups. Most of the participants in each group consulted an occupational therapist within the

first six months after their first onset. No significant difference was identified (p=0.750) and therefore the two groups were comparable for this variable.

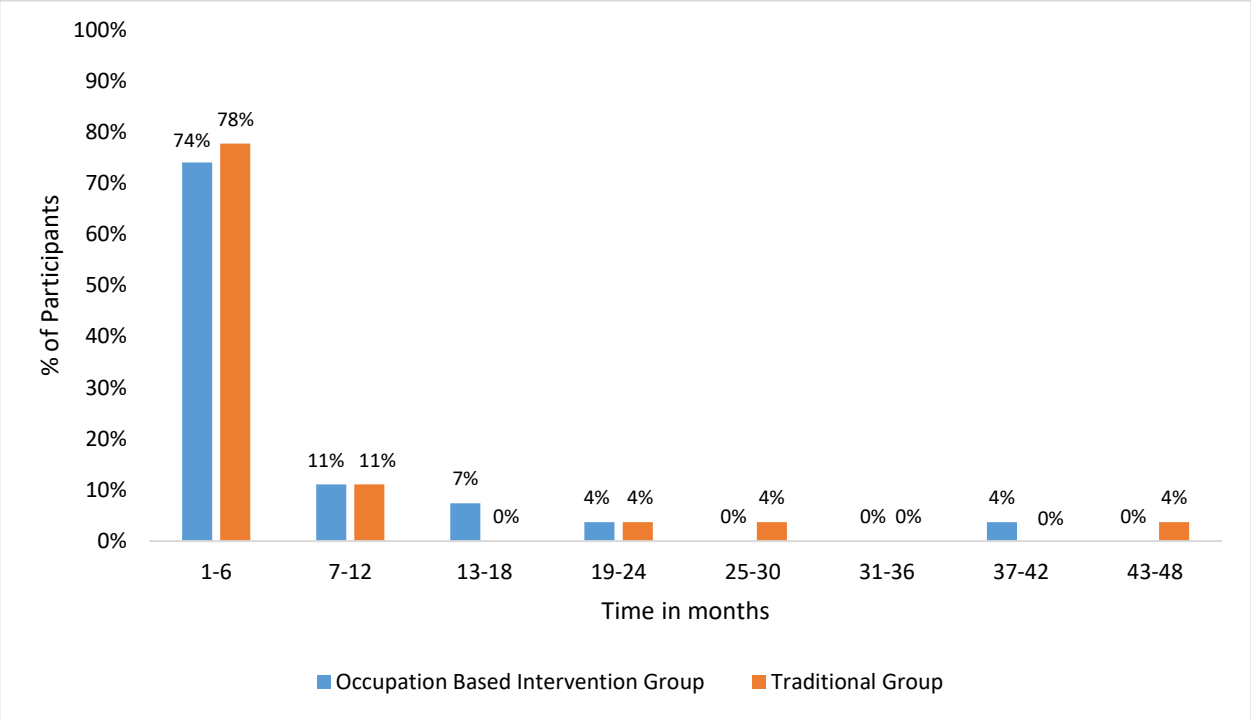

Figure 4.1: Time between first onset of condition and first occupational therapy session (n=54)

Table 4.3 demonstrates the frequency distributions and statistically significant values for the medical demographics between the two treatment groups. A large majority of participants in the OBI group (70.37%) and traditional group (77.78%) reported this to be the first onset of their condition, and therefore the two groups were comparable for this variable (p= 0.535).

Table 4.3: Medical demographics of participants (n=54)

		Total Sample n= 54	Occupation Based Intervention Group n=27	Traditional Group n=27	Chi Square df=1	p
		n (%)				
First Onset/ Recurring	First onset	40 (74.07)	19 (70.37)	21 (77.78)	0.39	0.535
	Recurring	14 (25.93)	8 (29.63)	6 (22.22)		
Co-morbidities	None	24 (44.44)	9 (33.33)	15 (55.56)	3.63	0.057
	Rheumatic conditions	3 (5.56)	1 (3.70)	2 (7.41)		
	Hypertension	4 (7.41)	3 (11.11)	1 (3.70)		
	Diabetes	1 (1.85)	0	1 (3.70)		
	Multiple	14 (25.93)	8 (29.63)	6 (22.22)		
	Other	6 (11.11)	4 (14.81)	2 (7.41)		
	Unspecified	2 (3.70)	2 (7.41)	0		
Use of analgesia for pain relief	No	20 (37.04)	12 (44.44)	8 (29.63)	0.00	0.264
	Yes	34 (62.96)	15 (55.56)	19 (70.37)		
Corticosteroid Injections (CSI)	No	32 (59.26)	19 (70.37)	13 (48.15)	2.76	0.097
	Yes	22 (40.74)	8 (29.63)	14 (51.85)		
Number of CSIs received	None	32 (59.26)	19 (70.37)	13 (48.15)	2.76	0.097
	1	19 (35.19)	7 (25.93)	12 (44.44)		
	2	2 (3.70)	1 (3.70)	1 (3.70)		
	6	1 (1.85)	0	1 (3.70)		
Hand Dominance	Right	50 (92.59)	27 (100)	23 (85.19)	4.32	0.038*
	Left	4 (7.41)	0	4 (14.81)		
Hand Affected	Right	30 (55.56)	18 (66.67)	12 (44.44)	2.70	0.100
	Left	19 (35.19)	6 (22.22)	13 (48.15)		
	Bilateral	5 (9.26)	3 (11.11)	2 (7.41)		
Pregnancy Status	Not pregnant	54 (100)	27 (100)	27 (100)	0.00	1.000
	Pregnant	0	0	0		
Postpartum	No	46 (85.19)	25 (92.59)	21 (77.78)	2.35	0.126
	Yes	8 (14.81)	2 (7.41)	6 (22.22)		
Lactating	No	47 (87.04)	26 (96.30)	21 (77.78)	4.10	0.043*
	Yes	7 (12.96)	1 (3.70)	6 (22.22)		

Significance $p \leq 0.05$* $p \leq 0.01$**

When considering co-morbidities, more than half the participants in the traditional group (55.56%) did not have any co-morbid conditions. Similarly, a relatively large percentage of participants in the OBI group (33.33%) did not have co-morbidities. Other co-morbid conditions such as rheumatic diseases, hypertension and diabetes were only reported by between 4% and 11% of participants in the groups. A number of participants in the OBI group (29.63%), and traditional group (22.22%) had been diagnosed with multiple co-morbidities. The two groups were therefore comparable for this variable (p=0.057).

More than half the participants in each group, including 55.56% in the OBI group and 70.37% in the traditional group reported using analgesia to manage their pain. Therefore, no significant difference was shown between the two groups (p=0.264).

A higher percentage of participants in the traditional group (51.85%) received CSIs when compared to the OBI group (29.63%). When analysing the number of CSIs received by participants, 44.44% in the traditional group and 25.93% in the OBI received one injection. In both groups however, 3.70% of participants received two injections, and only 3.70% in the traditional group had received six CSIs. The administration of and number of CSIs received by participants were comparable between the two groups, with a p- value of 0.097 for both variables.

All participants in the OBI group were right hand dominant. Only 85.19% of participants in the traditional group were right handed, and therefore a significant difference (p=0.038) was indicated for this variable when comparing the two groups. There was however no significant difference (p=0.100) when comparing the affected hand among participants in the two groups. A relatively large percentage of participants in both groups, including 66.67% in the OBI group and 44.44% in the traditional group were affected by their right hand. Furthermore, a smaller percentage of participants in the OBI group (11.11%) and the traditional group (7.41%) developed this condition bilaterally.

None of the participants in the entire sample were pregnant. In the OBI group however, 7.41% of participants were postpartum and 3.70% were lactating. In the traditional group, 22.22% of participants were both postpartum and lactating. No significant

difference was found for pregnancy status (p=1.000) or the postpartum variable (p=0.126) between the two groups. There was however a significant difference for the lactating variable (p=0.043).

4.3.4 Precipitating activities for pain

Figure 4.2 demonstrates the precipitating factors experienced by participants in the OBI and traditional group that increase their levels of pain. A large number of participants in both groups reported that housework was the main precipitator for pain. In the OBI group, a fair number of participants also reported that cooking/baking, washing and picking up children were a significant contributor to their pain.

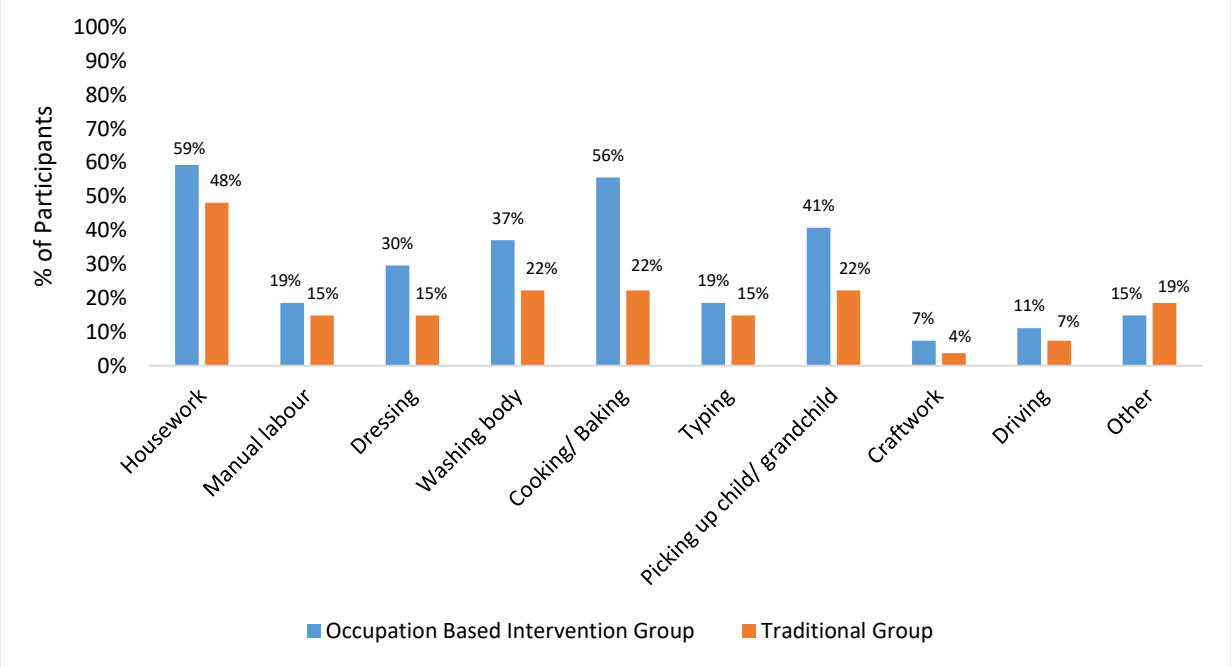

Figure 4.2: Precipitating factors for pain (n=54)

Other precipitating factors experienced by a few participants in each group include performing manual labour, dressing, typing, craftwork and driving. In general, a higher percentage of participants in the OBI group experienced more precipitating factors when compared to the traditional group. Consequently, a significant difference (p= 0.035) was calculated between the two groups for this variable.

4.3.5 Alleviating strategies for managing pain

Figure 4.3 shows a comparison of the different types of alleviating strategies participants in each group use for managing their pain. A large percentage of participants in the OBI group (44.44%) as well as the traditional group (33.33%) used multimodal strategies for managing their pain. The majority of participants in the traditional group (40.74%) report that analgesia alone relieved their pain, compared to a lesser 7.40% in the OBI group. A small percentage of participants in the traditional group reported that CSIs and other modalities such as strapping, bandaging or applying cold packs to the hand relieved the pain.

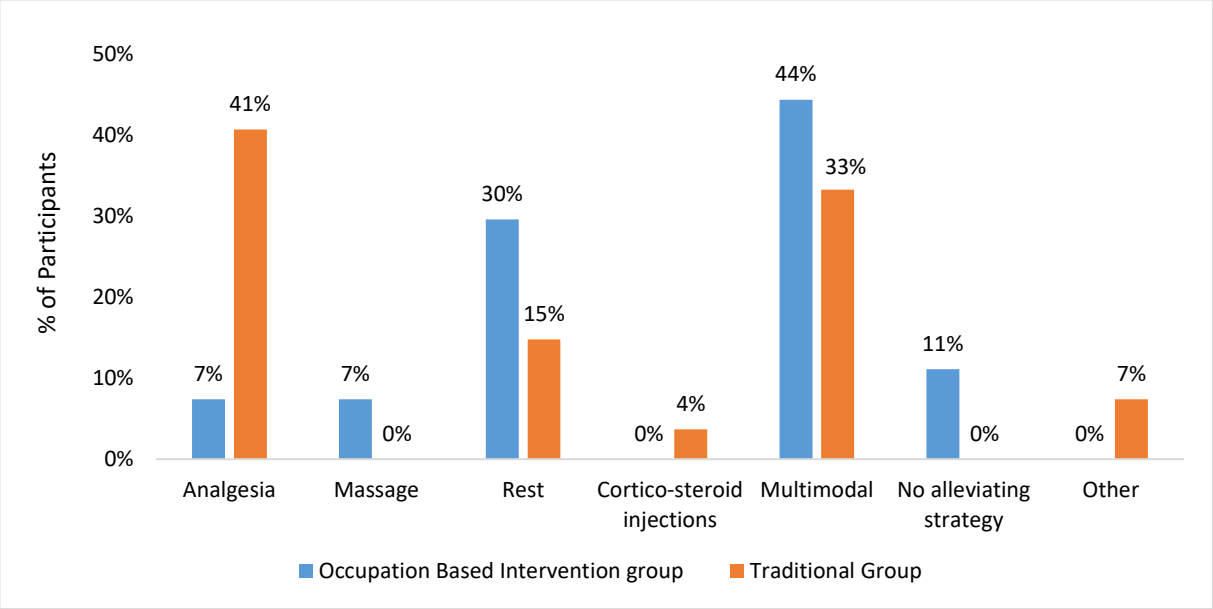

Figure 4.3: Alleviating strategies for managing pain (n=54)

Furthermore, a few participants in the OBI group used massage alone to relieve pain and 11.11% reported no alleviating strategy for managing their pain. Lastly, a fair number of participants in both groups, including 29.63% in the OBI group and 14.81% in the traditional group reported that resting their hand provided pain relief. Although there was some variation in alleviating strategies for managing pain between the two groups, they were still comparable as no significant difference was shown between them (p= 0.414).

4.4 Results of the Finkelstein test

4.4.1 Comparison between the occupation based intervention and traditional group

Figure 4.4 demonstrates the change in positive test scores for the Finkelstein test over the three assessment sessions. All participants in each treatment group presented with a positive test score on the initial assessment. On the second assessment, 88.89% of participants in the OBI group and a higher 96.30% of participants in the traditional group tested positive.

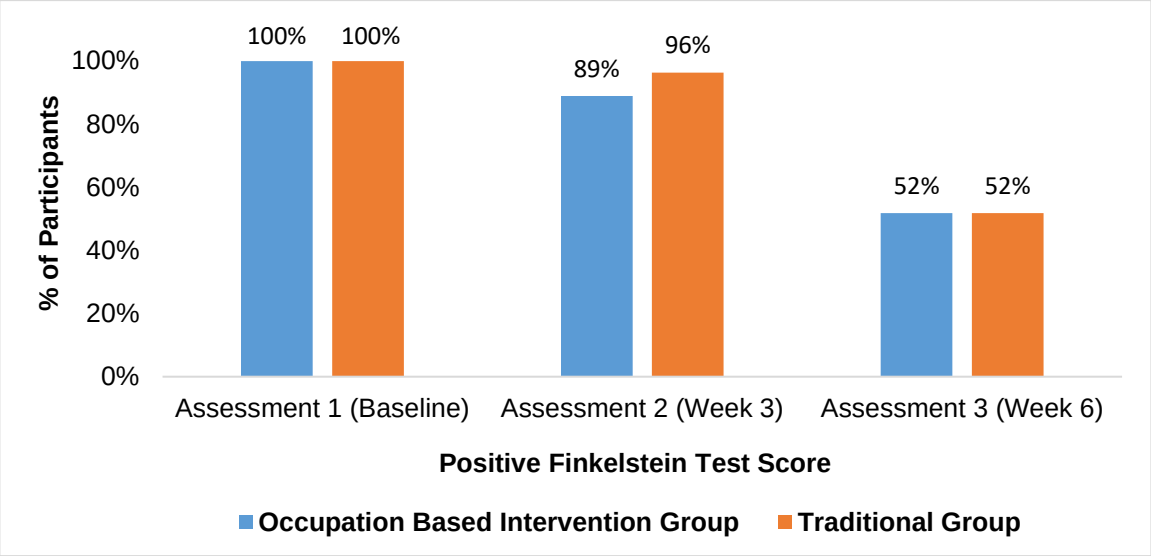

Figure 4.4: Comparison of positive Finkelstein test scores for the OBI and traditional group over three assessment sessions (n=54)

Moreover, 51.85% of participants in each group scored a positive result on the final assessment. Therefore, there was a slight decline in positive test scores between the first and second assessment, and a more noticeable decline between the second and third assessment for both treatment groups. There was also a greater decline in positive test scores between the first two assessments for the OBI group when compared to the traditional group, and vice versa between the second and third assessment.

4.5 Results of the Visual Analogue Scale (VAS)

4.5.1 Scores within the occupation based intervention and traditional group

The single sample t- test was used to analyse and compare the change in VAS scores that occurred within the two treatment groups over three assessment sessions.

4.5.1.1 Scores within the occupation based intervention group

There were highly significant differences in scores between the first and second (p=0.000) as well as the second and third (p=0.000) VAS assessments for the OBI group. This is shown by the decrease in average scores between the three assessments (Table 4.4). There was also a large effect size between the first two assessments (Cohen's d= 1.49) and the last two assessments (Cohen's d= 1.07). In addition, a higher percentage of pain reduction was indicated between the second and third assessment (56%) when compared to the first two assessments (37%) for the OBI group.

Table 4.4: VAS scores for the occupation based intervention group between three assessments (n=27)

	Mean	Standard Deviation	Total % Pain reduction Mean	p- value	Effect size Cohen's d
VAS Assessment 1 (Baseline)	82.04	14.90	Between Ax 1 & 2 37%	Between Ax 1 & 2 0.000**	Between Ax 1 & 2 1.49**
VAS Assessment 2 (Week 3)	51.89	27.01			
VAS Assessment 3 (Week 6)	24.41	24.21	Between Ax 2 & 3 56%	Between Ax 2 & 3 0.000**	Between Ax 2 & 3 1.07**

Significance p ≤ 0.05* p ≤ 0.01** Small effect size 0.2, Medium effect size 0.5*, Large effect size 0.8**

4.5.1.2 Scores within the traditional group

Similar to the OBI group, there was a great decline in the average values between the three VAS assessments. As a result, significant differences were identified between the first two (p= 0.001) as well as the second two assessments (p=0.021) (Table 4.5).

Table 4.5: VAS scores for the traditional group between three assessments (n=27)

	Mean	Standard Deviation	Total % Pain reduction Mean	p- value	Effect size Cohen's d
VAS Assessment 1 (Baseline)	70.89	22.11	Between Ax 1 & 2 29%	Between Ax 1 & 2 0.001**	Between Ax 1 & 2 0.92**
VAS Assessment 2 (Week 3)	48.74	25.69			
VAS Assessment 3 (Week 6)	29.78	32.87	Between Ax 2 & 3 40%	Between Ax 2 & 3 0.021*	Between Ax 2 & 3 0.64*

Significance p ≤ 0.05* p ≤ 0.01** Small effect size 0.2, Medium effect size 0.5*, Large effect size 0.8**

There was also a large effect size between the first and second assessment (Cohen's d= 0.92) and a medium effect size between the second and third assessment (Cohen's d=0.64). There was a higher percentage of pain reduction between assessments two and three (40%), when compared to assessments one and two (29%).

4.5.2 Comparison of scores between the occupation based intervention and traditional group

The Students t- test for independent samples was used to compare the scores of the three VAS assessments between the OBI and traditional group.

A significant difference was shown between the OBI and traditional groups for the first VAS assessment (p=0.034), indicating that the OBI group had greater pain on the initial assessment. Although both groups displayed an overall improvement in VAS scores for the second and third assessments, none of these changes were significant.

Figure 4.5 displays the change in mean values for the OBI and traditional group for the three VAS assessments. Both groups show a decrease in average scores between the three assessments. Furthermore, the mean values for the first two assessments were higher in the OBI group than the traditional group. In the third assessment however, the traditional group displayed a higher mean value.

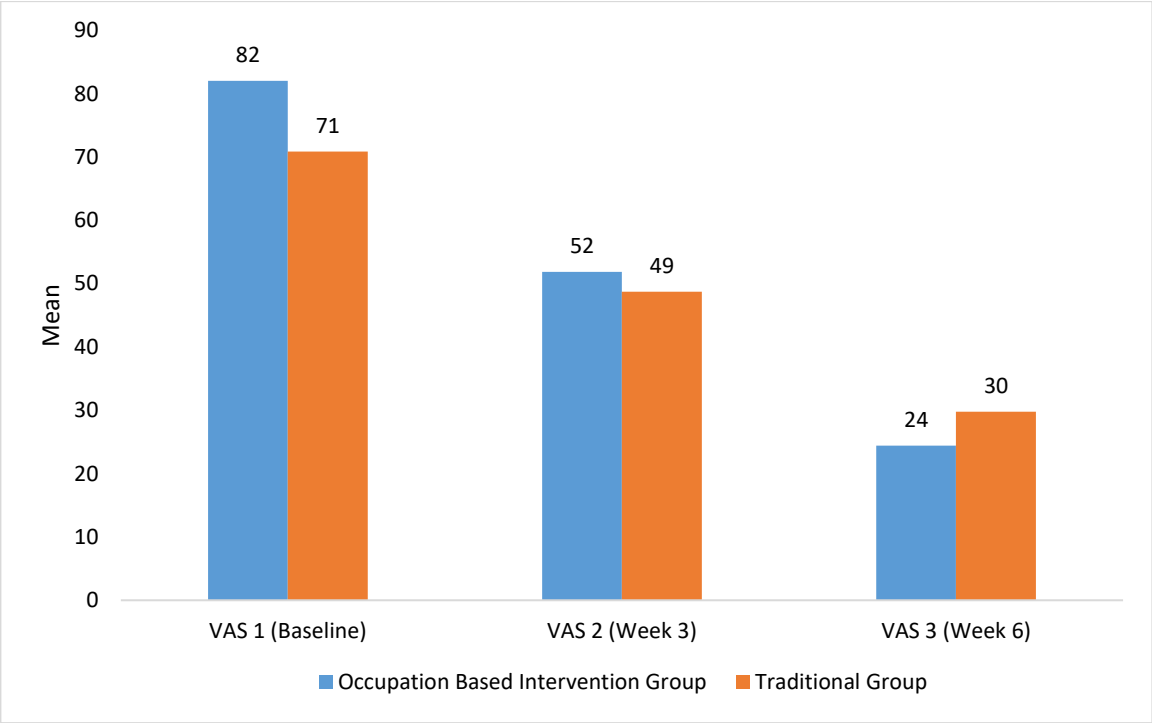

Figure 4.5: Comparison of mean VAS scores for the occupation based intervention and traditional group (n=54)

When analysing the change in VAS scores between the first and second (p=0.246) and second and third (p=0.298) assessment, no statistical significance was shown between the two groups (Table 4.6).

Table 4.6: Comparison of the change in VAS scores between the assessments for the occupation based intervention and traditional group (n=54)

	Occupation Based Intervention Group		Traditional Group		p	Effect size Cohen's d
	Change in VAS score Mean (SD)	% Pain Reduc. (Mean)	Change in VAS score Mean (SD)	% Pain Reduc. (Mean)		
Assessment 1 (Baseline) & 2 (Week 3)	30.15 (24.53)	37%	22.15 (25.61)	29%	0.246	0.32
Assessment 2 (Week 3) & 3 (Week 6)	27.48 (22.00)	56%	18.96 (35.85)	40%	0.298	0.38

Significance p ≤ 0.05* p ≤ 0.01**

Small effect size 0.2, Medium effect size 0.5*, Large effect size 0.8**

In addition, a small effect size was indicated between the first two assessments (Cohen's d= 0.32) as well as the second two assessments (Cohen's d= 0.38). It can be concluded that the pain reduction was similar in the OBI and traditional groups over the intervention period.

4.6 Results of the Disabilities of the Arm, Shoulder and Hand questionnaire

4.6.1 Scores within the occupation based intervention and traditional groups

The Wilcoxon signed- rank test was used to analyse and compare the change in DASH ordinal scores that occurred within the two treatment groups over three assessment sessions. The DASH questionnaire is divided into three sections including the main DASH section, as well as the work and sports/art component. The scores for each component are calculated separately. The work and sports/art sections are optional and therefore were not completed by all participants. Table 4.7 shows the response rate of the components within the DASH questionnaire for each treatment group.

Table 4.7: Response rate of the components within the DASH questionnaire (n=54)

	Occupation Based Intervention Group (n=27)		Traditional Group (n=27)	
	No. of participants	**Response Rate (%)**	**No. of participants**	**Response Rate (%)**
DASH (main component)	27	100%	27	100%
Work component	13	48%	14	52%
Sports/ art component	4	15%	0	0%

4.6.1.1 Scores within the occupation based intervention group

As shown in Table 4.8 there were highly significant differences in scores between the first and second (p=0.000) as well as the second and final (p=0.000) DASH assessment for the OBI group. Similarly, there were significant changes in scores between assessment one and two (p=0.002) and assessment two and three (p=0.008) for the work component. The sports/art section however showed no statistical significance as the p-values were calculated at 0.109 and 0.180 between the first and last two assessments respectively. One of the participants only completed the sports/art section the final assessment as he had started playing a sport after the second assessment. In addition, large effect sizes were calculated between all assessments for all components of the test.

Table 4.8: DASH scores of the occupation based intervention group for three assessments (n=27)

	N	Median	Quartiles		p- value	Effect sizes Cohens r
			Lower Quartile	Upper Quartile		
DASH Assessment 1 (Baseline)	27	64.30	55.80	79.30	Between Ax 1 & 2 0.000** Between Ax 2 & 3 0.000**	Between Ax 1 & 2 0.87** Between Ax 2 & 3 0.83**
DASH Assessment 2 (Week 3)		45.50	21.70	63.30		
DASH Assessment 3 (Week 6)		23.30	5.80	39.20		
DASH Assessment 1 (Work Component) (Baseline)	13	75.00	50.00	75.00	Between Ax 1 & 2 0.002** Between Ax 2 & 3 0.008**	Between Ax 1 & 2 0.84** Between Ax 2 & 3 0.77**
DASH Assessment 2 (Work Component) (Week 3)		25.00	25.00	50.00		
DASH Assessment 3 (Work Component) (Week 6)		25.00	6.30	37.50		
DASH Assessment 1 (Sport/ Art Component) (Baseline)	3	56.30	18.80	100.00	Between Ax 1 & 2 0.109 Between Ax 2 & 3 0.180	Between Ax 1 & 2 0.92** Between Ax 2 & 3 0.73**
DASH Assessment 2 (Sport/ Art Component) (Week 3)		25.00	0.00	81.25		
DASH Assessment 3 (Sport/ Art Component) (Week 6)	4	0.00	0.00	6.25		

Significance p ≤ 0.05* p ≤ 0.01** Cohen's r Small effect size 0.1 Medium effect size 0.3*, Large effect size 0.5**

4.6.1.2 Comparison of scores within the traditional group

As shown in Table 4.9 there were highly significant statistical differences between the first and second (p=0.001) as well as the second and third (p=0.000) DASH assessments. For the work component, there was also a significant difference between the second and third assessments (p=0.003), however no significant changes were noted between the first two assessments (p=0.635). No values are displayed for the

sports/art component as none of the participants in this group recorded scores in this section. Moreover, a large effect size was indicated between all assessments for the main DASH component as well as between the second and third assessment for the work component. A small effect size was however shown between the first and second assessment for the work component (Cohen's d= 0.09).

Table 4.9: DASH scores for the traditional group for three assessments (n=27)

	N	Median	Quartiles		p- value	Effect size Cohen's r
			Lower Quartile	Upper Quartile		
DASH Assessment 1 (Baseline)	27	62.10	44.20	72.30	Between Ax 1 & 2 0.001**	Between Ax 1 & 2 0.62**
DASH Assessment 2 (Week 3)		50.80	35.70	62.90	Between Ax 2 & 3 0.000**	Between Ax 2 & 3 0.93**
DASH Assessment 3 (Week 6)		25.00	6.90	53.30		
DASH Assessment 1 (Work Component) (Baseline)	14	75.00	62.50	75.00	Between Ax 1 & 2 0.635	Between Ax 1 & 2 0.09
DASH Assessment 2 (Work Component) (Week 3)		75.00	56.30	81.30	Between Ax 2 & 3 0.003**	Between Ax 2 & 3 0.78**
DASH Assessment 3 (Work Component) (Week 6)		25.00	18.80	56.30		
DASH Assessment 1 (Sport/ Art Component) (Baseline)	0	-	-	-	-	-
DASH Assessment 2 (Sport/ Art Component) (Week 3)		-	-	-		-
DASH Assessment 3 (Sport/ Art Component) (Week 6)		-	-	-		-

Significance p ≤ 0.05* p ≤ 0.01** Cohen's r Small effect size 0.1 Medium effect size 0.3*, Large effect size 0.5**

4.6.2 Comparison of scores between the occupation based intervention and traditional groups

The Mann- Whitney U test was used compare the differences in scores of the three assessments between the OBI and traditional group. The sports/art component could not be analysed as no scores were recorded for the traditional group.

There was no significant difference between the two groups for the first (p=0.172) and third (p=0.730) DASH assessment including both work components (Assessment 1: p=0.808; Assessment 2: p= 0.320). On the second assessment, there was no significant difference for the main DASH assessment (p=0.775) between the two groups, however a significant difference was indicated for the work component (p=0.010). The median value for the OBI group was 25.00, compared to a higher 75.00 for the traditional group indicating a significantly better ability to perform in work tasks for the OBI group at this stage (Figure 4.6).

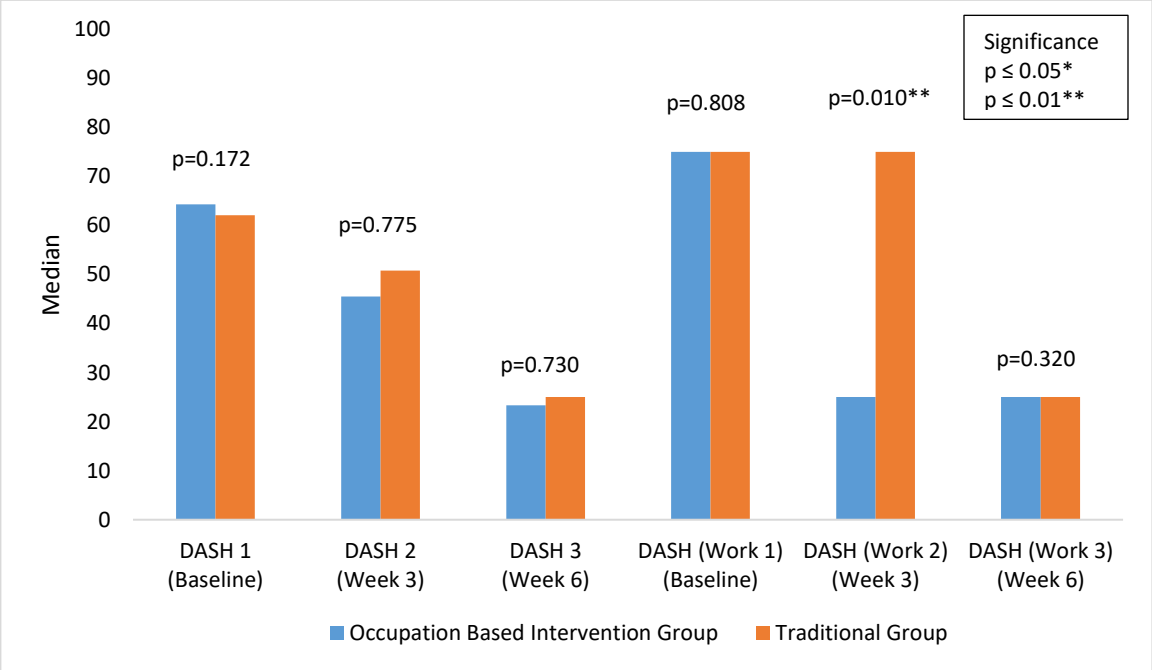

Figure 4.6: Comparison of DASH median scores and significant differences for occupation based intervention and traditional groups between three assessment sessions (n=54)

When analysing the change in DASH scores between the assessments for the two groups, a statistical significance was indicated between the first and second assessments for both the main DASH component (p=0.005) as well as the work component (p=0.010). No statistical significance was shown between the groups for the third assessments for both the main and work components indicating both groups had similar upper limb function and work performance ability at the end of the intervention. (Table 4.10).

Table 4.10: Comparison of the change in DASH scores between the assessments for the occupation based intervention and traditional group (n=54)

	Occupation Based Intervention Group		**Traditional Group**		**p (DASH main)**	**p (DASH work)**
	Change in DASH score Median (Lower and Upper Quartile)	**Change in DASH (work) score Median (Lower and Upper Quartile)**	**Change in DASH score Median (Lower and Upper Quartile)**	**Change in DASH (work) score Median (Lower and Upper Quartile)**		
Assessment 1 (Baseline) & 2 (Week 3)	23.30 (9.80-30.80)	25.00 (15.65-34.35)	10.40 (1.60-19.70)	6.20 (-6.30-12.50)	0.005**	0.010**
Assessment 2 (Week 3) & 3 (Week 6)	16.60 (7.50-32.80)	25.00 (18.70-25.00)	12.50 (0.00-35.00)	31.25 (18.80-56.30)	0.392	0.081

Significance p ≤ 0.05* p ≤ 0.01**

4.7 Results of the Canadian Occupational Performance Measure

4.7.1 Scores within the occupation based intervention and traditional group

The non-parametric Wilcoxon signed- rank test was used to analyse the difference in COPM scores within each group over three assessment sessions. There are two sets of scores within the COPM, including the level of performance and the level of satisfaction.

4.7.1.1 Scores within the occupation based intervention group

Highly significant differences were indicated for the OBI group between the first and second and second and third assessments for both performance and satisfaction (p=0.000). This is seen by the great change in median values between each assessment. A large effect size was also calculated between all assessments for satisfaction and performance (Table 4.11).

Table 4.11: COPM scores for the occupation based intervention group between three assessments (n=27)

	Scores	Difference in scores	p- value	Effect size Cohen's r
	Median (Lower and Upper Quartile)			
Assessment 1 (Baseline) (Performance)	4.40 (3.60-5.30)	Between Ax 1 & 2 1.60 (8.00- 2.50) Between Ax 2 & 3 1.60 (1.00-2.40)	Between Ax 1 & 2 0.000** Between Ax 2 & 3 0.000**	Between Ax 1 & 2 0.82** Between Ax 2 & 3 0.83**
Assessment 2 (Week 3) (Performance)	5.80 (4.60 -8.00)			
Assessment 3 (Week 6) (Performance)	7.80 (6.20-9.50)			
Assessment 1 (Baseline) (Satisfaction)	3.00 (1.80- 4.50)	Between Ax 1 & 2 2.00 (1.00-3.30) Between Ax 2 & 3 1.70 (1.00-3.60)	Between Ax 1 & 2 0.000** Between Ax 2 & 3 0.000**	Between Ax 1 & 2 0.84** Between Ax 2 & 3 0.83**
Assessment 2 (Week 3) (Satisfaction)	5.60 (3.40-7.60)			
Assessment 3 (Week 6) (Satisfaction)	7.80 (5.60-9.50)			

Significance p ≤ 0.05* p ≤ 0.01**

Cohen's r Small effect size 0.1, Medium effect size 0.3*, Large effect size 0.5**

4.7.1.2 Scores within the traditional group

As shown in Table 4.12 a significant change was indicated for performance scores between the three assessments. There was also a significant difference in satisfaction

scores between the second and third assessment (p=0.000), however no significant change was shown between the first and second satisfaction scores (p= 0.775).

Table 4.12: COPM scores for the traditional group for three assessments (n=27)

	Scores	Difference in scores	p- value	Effect size Cohen's r
	Median (Lower and Upper Quartile)			
Assessment 1 (Baseline) (Performance)	3.60 (2.20-4.60)	Between Ax 1 & 2 0.80 (0.00-1.20) Between Ax 2 & 3 2.20 (0.60-3.20)	Between Ax 1 & 2 0.002** Between Ax 2 & 3 0.001**	Between Ax 1 & 2 0.60** Between Ax 2 & 3 0.64*
Assessment 2 (Week 3) (Performance)	4.20 (3.20-6.00)			
Assessment 3 (Week 6) (Performance)	8.00 (5.00-9.40)			
Assessment 1 (Baseline) (Satisfaction)	2.40 (1.00-4.40)	Between Ax 1 & 2 0.20 (0.00-2.00) Between Ax 2 & 3 2.40 (0.00-5.60)	Between Ax 1 & 2 0.775 Between Ax 2 & 3 0.000**	Between Ax 1 & 2 0.06 Between Ax 2 & 3 0.81**
Assessment 2 (Week 3) (Satisfaction)	4.00 (1.20-6.00)			
Assessment 3 (Week 6) (Satisfaction)	8.40 (4.00-10.00)			

Significance p ≤ 0.05* p ≤ 0.01** Cohen's r Small effect size 0.1 Medium effect size 0.3*, Large effect size 0.5**

4.7.2 Comparison of scores between the occupation based intervention and traditional groups

The differences in COPM scores of the three assessments between the OBI and traditional group was conducted using the Mann- Whitney U test.

There were no statistically significant differences in performance and satisfaction scores between the two groups for the first (performance: p=0.097; satisfaction: p=0.634) and third assessment (performance: p=0.568; satisfaction: p=0.986). There was however a significant difference in performance (p= 0.014) and satisfaction (p=0.041) scores between the groups for the second assessment (Figure 4.7).

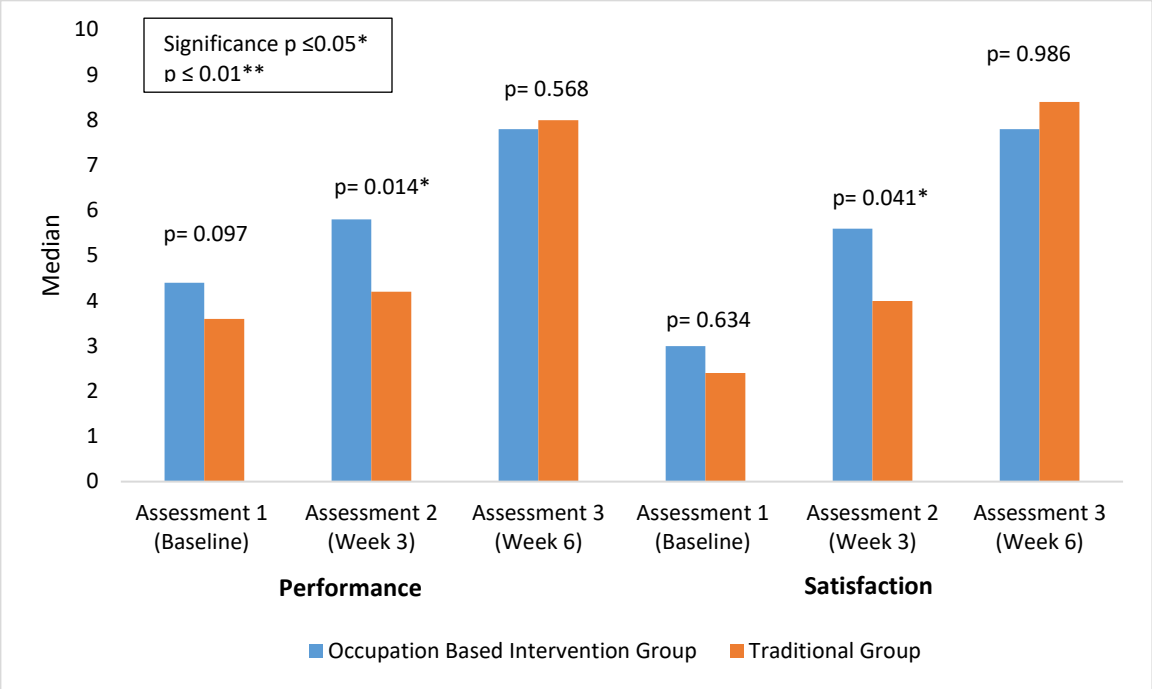

Figure 4.7: Comparison of COPM median scores for the occupation based intervention and traditional group between three assessment sessions (n=54)

Table 4.13 shows the change in COPM scores for all assessments between the two treatment groups. Significant differences were indicated for the change in performance (p=0.012) and satisfaction (p= 0.005) scores between the first two assessments indicating that participants in the OBI group had significantly higher levels of satisfaction and performance at three weeks. A large effect size was calculated for the change in performance (Cohen's d= 0.74) and satisfaction (Cohen's d= 0.78) for the first and second assessment. No significant change was however shown for performance (p=0.604) and satisfaction (p=0.672) scores between the second and third assessment indicating that both groups had similar scores at this stage.

Table 4.13: Comparison of change in COPM scores for the occupation based intervention and traditional group (n=54)

	Occupation Based Intervention Group	Traditional Group	P	Effect size Cohen's r
	Change in COPM scores Median (Lower and Upper Quartile)			
Assessment 1 (Baseline) & 2 (Week 3) (Performance)	1.60 (0.80-2.50)	0.80 (0.00-1.20)	0.012*	0.74**
Assessment 2 (Week 3) & 3 (Week 6) (Performance)	1.60 (1.00-2.40)	2.20 (0.60-3.20)	0.604	-0.04
Assessment 1 (Baseline) & 2 (Week 3) (Satisfaction)	2.00 (1.00-3.30)	0.20 (0.00-2.00)	0.005**	0.78**
Assessment 2 (Week 3) & 3 (Week 6) (Satisfaction)	1.70 (1.00-3.60)	2.40 (0.00-5.60)	0.672	-0.05

Significance p ≤ 0.05* p ≤ 0.01** Cohen's r Small effect size 0.1 Medium effect size 0.3*, Large effect size 0.5**

4.8 Summary of Results

At the start of the study, the OBI and traditional groups were comparable in terms of their personal and medical demographics. A significant difference for age (p=0.007), hand dominance (p=0.038), lactation (p=0.043) as well as the precipitating factors (0.035) was found.

The development of a six week OBI programme for de Quervain's disease included OBI treatment principles that were extracted from literature and were used to modify the traditional programme. The implementation of this programme including the benefits and challenges will be discussed in the next chapter.

When analysing the results of the Finkelstein test, both groups presented with a decrease in positive test results between the three assessments. Significant

differences could not be calculated for this test as the results indicate a positive or negative score.

For the VAS, DASH and COPM, significant differences in scores were generally shown between the three assessments when analysing scores within each group.

An analysis of the VAS assessment between the two groups indicated a significant difference for the first assessment. No significant changes were found between the two groups for the second and third VAS assessments or for the change in scores between the three assessments. Therefore, pain was reduced significantly in both groups over the intervention period with no differences between the groups at three and six weeks. Thus, the null hypothesis that there will be no difference in symptoms between the OBI and traditional group was accepted.

For the DASH questionnaire, statistically significant changes were indicated between the two groups over the intervention period with both groups improving significantly at week three and six. For the work component the OBI group had a significant improvement in their scores at the second assessment which also differed significantly from the traditional group ($p=0.010$), indicating that the OBI group had a significantly better work performance at week three. A between group analysis could not be done for the sports/ art section as none of the participants in the traditional group scored on this component. Thus, the null hypothesis that there will be no difference in activity participation between the OBI and traditional group was accepted. The null hypothesis was rejected for activity participation in the work sphere at assessment two, three weeks into the intervention.

Finally, for the COPM assessment, the between group analysis displayed no significant differences for the first and third assessments. Significant differences in scores were shown for the change in performance and satisfaction between the first two assessments for both groups, but not for the second and third assessment. This indicates that a significant change for these outcomes occurred in the first three weeks of intervention. When the two groups were compared, the OBI group indicated significantly better performance and satisfaction with their occupations than the traditional group at three weeks. Thus, the null hypothesis that there will be no

difference in performance and satisfaction in everyday activities between the OBI and traditional group was accepted. The null hypothesis was rejected for performance and satisfaction in everyday activities at assessment two, three weeks into the intervention

The demographic and outcome measure results will be interpreted and discussed further in the next chapter.

CHAPTER 5: DISCUSSION

This chapter provides a discussion of the results of the study. Firstly, an interpretation of the demographic characteristics of patients that participated in the study is provided. The results of the study are then discussed as they relate to the study objectives. Speaking to the first objective of the study, the development of an OBI programme for de Quervain's disease is discussed. A comparison of the two treatment programmes according to symptom change, participation in activities, and performance and satisfaction in everyday activities for patients with de Quervain's disease (Objective two to four) is then discussed with reference to the literature. This chapter concludes with the researcher's personal reflections on the implementation of the OBI programme and the contribution that the study has made to her becoming an occupation based practitioner.

The strengths and limitations of the study are also described.

5.1 Demographic characteristics of participants in the study

This research study included a total of 54 participants who were all 18 years or older; presented with a positive Finkelstein test on first consultation with occupational therapy; and diagnosed with de Quervain's disease by a medical practitioner at Helen Joseph Hospital. None of the patients recruited into the study had been diagnosed with a psychiatric condition or cognitive impairment, as this may have affected the results of the outcome measures.

The demographics of participants in this study closely fits the expected profile of patients diagnosed with de Quervain's disease according to literature. It has been found that most of the participants in this study (81.48%) are female which is consistent with research indicating that this condition is much more prevalent in women (Kachooei et al. 2015; Ilyas et al. 2007). The majority of participants in the traditional group were between the ages of 30-50 which is the age group with the highest occurrence rate according to literature (Wolf et al. 2009). Most of the participants in the OBI group

however were older, ranging between 50-70 years of age, explaining why a larger percentage of participants in the OBI group reported being pensioners (25.93%), compared to the traditional group where none of the participants received a pension. Despite equal allocation of participants in order of referral between the two treatment groups, the significant differences in ages is surprising. It is unclear whether this may have affected the results as there is limited research describing an association between age and pain.

Most participants in the study were literate and reported English as being one of their spoken languages. This most likely produced more accurate findings with regards to the outcome measures. There was however some difficulty with regards to the use of an interpreter for those patients who struggled to understand English, which will be discussed later in this chapter.

When analysing the educational and occupational demographics, it is shown that a large majority of participants did not complete formal schooling or receive tertiary education. It is suggested that their low level of education may be the reason for approximately 50% of all participants being unemployed, and of those who are employed, most perform unskilled work tasks that require repetitive movements of the upper limb. Participants who are unemployed reported spending most of their day performing household tasks such as washing, ironing, gardening, cleaning, and cooking. In addition, the most common types of occupations performed by participants who are employed include domestic work, manual labour, baking or chef work, nursing, caretaking as well as clerical work (typists). These results are in good agreement with other studies which have shown that occupations involving manual force or repetitive movements of the hand and wrist, such as these described above are the most predominant risk factors for this condition (Calvo-Cerrada et al. 2012; Che Daud et al. 2016). Furthermore, these findings suggest a need for more health promotion and injury prevention strategies, which is an important aspect that is under-addressed in hand rehabilitation (Lucado et al. 2016).

In terms of the medical demographics of participants, it is assumed that most participants recruited into the study were in the acute phase of their condition as a large

representation of the sample (75.93%) consulted occupational therapy within the first six months of the first onset of their condition. Furthermore, a significant number of participants did not experience any co-morbid conditions or differential diagnoses, indicating that their symptoms are most likely attributed to de Quervain's disease. Although there were no significant differences between the groups in terms of co-morbidities, the traditional group presented with a lower percentage of participants with co- morbid conditions (55.56%) compared to the traditional group (66.67%). This is expected as participants in the OBI group were older which is in agreement with literature showing an increase in the development of co-morbid conditions with age (Fabbri et al. 2015). A fairly large number of participants reported receiving CSIs (40.74%) and using analgesia (62.96%) to manage their symptoms. Unfortunately, this may have affected the results on the outcome measures as participants' change in symptoms and occupational performance may have been influenced by the use of these treatment modalities as suggested in literature (Goel & Abzug 2015; Ilyas 2009; Neiduski 2016; Oh et al. 2017).

Interestingly, as de Quervain's disease is typically known as a RSI where symptoms are exacerbated by overuse of the hand, it is expected that this condition would generally affect one's dominant hand (Ilyas et al. 2007). In this sample however, it is surprising that a fairly large percentage of participants (31,48%) reported experiencing symptoms in their non-dominant hand. This may however be a result of most of the precipitating activities for pain reported by the participants such as manual labour (e.g. picking up bricks), housework activities (e.g. washing clothes), picking up children, typing, etc. involve the use of both hands. Although there were significant differences between the groups in terms of hand dominance, there is no literature describing the association between hand dominance and the presentation of de Quervain's disease. Furthermore, although pregnancy and hormonal changes during the postpartum period are considered to be risk factors for developing de Quervain's disease, it was unexpected that none of the participants in the entire sample reported being pregnant, and only a small percentage of participants were postpartum (14.81%) or lactating (12.96%). For participants that were lactating, it is unknown whether this variable was a risk factor for developing de Quervain's disease as all these participants are new

mothers and also reported picking up their child as one of the precipitating factors for their pain. Therefore, it is also unknown whether the significant differences between the groups for lactation affected the results.

A large variation in the types of precipitating factors for pain was noted between the participants. Most of these factors however are household or occupational activities that require repetitive movements of the hand and wrist. This is consistent with findings in literature as the most common risk factor for developing this condition include work or household activities that involve overexertion of the upper limb (Ilyas et al. 2007; Che Daud et al. 2016). In addition, many of the participants perform the task of picking up a child or grandchild and reported this to be a major precipitating factor for their pain. This is also in agreement with other studies which have shown this to be a major risk factor for de Quervain's disease (Goel & Abzug 2015).

A large representation of the sample indicated that a combination of strategies provided some relief for managing pain. The most common strategies used by participants include analgesia and resting the hand. Interestingly, only one participant reported that the use of CSIs relieved their pain, and similarly only one participant stated that NSAIDs together with other treatment modalities alleviated their pain. This finding is quite unexpected and perhaps suggests that these treatment modalities as perceived by patients may not be particularly effective for the management of de Quervain's disease.

Lastly, although there were some demographic variations between the OBI and traditional groups, these groups were mostly comparable at the start of the study.

5.2 Development of an occupation based intervention programme for de Quervain's disease

The first objective of the study was to develop an occupation based programme to be used with the experimental group in the study. In recent years there has been a growing interest regarding the need for more holistic occupation based approaches in the field of occupational therapy, and particularly within hand rehabilitation practices (Jack & Estes 2010). This was the motivating factor for the development of an OBI programme

in hand rehabilitation, and for the implementation of this research study. This section will reflect on the process of developing an OBI programme for de Quervain's disease.

A barrier to OBI reported in the literature is that therapists have limited understanding of an OBI approach and how to implement it (de Klerk et al. 2016; Colaianni & Provident 2010; Grice 2015). Reviewing and examining the literature regarding OBI was therefore the first and most vital step before the programme structures and processes could be the developed. This enabled the researcher to truly understand the core theories, principles, frameworks and constructs on which this intervention is based. The researcher was then able to incorporate these theories and constructs into designing an intervention strategy and specifying OBI programme elements for de Quervain's disease. Discussions with the researcher's supervisors regarding the implementation of this approach further assisted in the development of the OBI programme and overcoming this barrier.

Occupation based intervention is a client- centred treatment approach which is aimed at connecting an individual's life to therapy (Amini 2004; Finlay 2004). After explaining and applying this holistic approach, patients were able to understand the underlying philosophy and therapeutic value of the OBI programme and identify what was expected of them in terms of setting their own goals and becoming actively involved in treatment sessions. The administration of occupation based assessments such as the COPM also enhanced patients' understanding of OBI and helped them to gain further insight into what their needs and priorities were in terms of treatment goals.

The actual development of an OBI programme for de Quervain's disease was a challenging and time consuming process, which has also been identified as being problematic by other therapists within the hand rehabilitation literature (Colaianni & Provident 2010; de Klerk et al. 2016; Grice 2015). Review and opinions regarding the programme by other professionals were however valuable and enhanced the quality of the OBI programme. After an intense review of the literature, finalisation of the programme elements and practice of this programme with patients before data collection commenced, the OBI process and use of principles in the programme was easy to follow and apply.

The three main phases of the OBI process were included in the OBI programme. The main elements of the OBI assessment that were extracted from the literature included a narrative based interview with the patient to understand their occupational profile; observation of patients performing their everyday activities; as well as the administration of client- centred and occupation based standardised assessments (Fisher 2014; Grice 2015). As described in literature, this holistic evaluation enabled the researcher to gain a comprehensive understanding of the patients' occupational profile and allowed patients to easily identify and set personalised goals for treatment (Cooper 2011; Grice 2015; Fisher 2014; Durocher et al. 2014). The essential elements of the intervention phase based on literature involved educating patients on de Quervain's disease, the use of biomechanical principles, actively engaging patients in their everyday occupations using task modifications; joint protection and energy conservation principles, and splinting (Goel & Abzug 2015; Amini 2004; Calvo-Cerrada et al. 2012; de Klerk et al. 2016). These principles were also given in handouts and individualised home programmes were created for each patient. The benefits and challenges of these strategies are discussed in the researcher reflection of OBI section. Re-evaluation of the patient's occupational performance was included at the second and third follow up sessions by performing the same assessments as in the first consultation. As mentioned in the literature, this was an essential element of the programme as it enabled patients and the researcher to reflect and assess whether the patient had reached any of their treatment goals and to reinforce or adjust intervention strategies (Fisher 2014).

Although the OBI programme for de Quervain's disease was easy to follow, some of the programme elements came with challenges. Firstly, the researcher did not have access to a trained interpreter for the few patients whose first language was not English, and therefore had to make use a staff or family member that could understand and speak the patients' language. As reported in literature, the use of an interpreter also made it difficult for the researcher to gain a comprehensive understanding of the patents' occupational profile (van Stormbroek & Buchanan 2019). This resulted in further time constraint issues as these assessments and home programmes took a lot longer than what was expected. Another challenge was that the researcher was unable

to perform an ergonomic assessment and provide intervention of patient's occupations within their own environment. As the importance of assessing and treating individuals within their environment is highlighted in literature, this challenge may have impacted on the researcher's conceptualisation of patients performance within their context as well as the provision of context specific OBI interventions (Law et al. 1996; Hemmingsson & Jonsson 2005; Law 2002). The researcher tried to overcome these challenges by encouraging patients to bring their own tools and materials from their environment and simulating their everyday tasks during treatment sessions. A discussion and handout of task modifications as well as joint protection and energy conservation principles also encouraged patients to generalise these skills to their everyday occupations. A final challenge regarding the actual programme elements was that patients were not always able to choose what type and colour of splinting material they would prefer. This was due to poor availability of different splinting material in the department. This is consistent with literature which explains that limitations in resources is one of the challenges that therapists face in providing OBI in hand rehabilitation (van Stormbroek et al. 2018; de Klerk et al. 2016).

All the outcome measures used during this study were relevant to test the change in outcomes of this programme in a clinical setting. The Finkelstein test and VAS were helpful in determining whether patients' symptoms had changed over the course of the assessments. Not only were the DASH questionnaire and COPM standardised assessments useful for statistical purposes, these assessments were appropriate and supported theory on OBI. The COPM also enabled the researcher to assess whether patients' goals were achieved during therapy. The researcher was therefore able to deliver more holistic and client- centred treatments and this made treatment sessions more meaningful to patients. The only limitation of using this assessment as an outcome measure in this study is that this assessment made the traditional groups intervention more occupation based than is usually is, which resulted in an untrue reflection of the outcomes of this method. The DASH questionnaire was also an effective outcome measure for this research study as it is sensitive to short term changes (Case-Smith 2003), and could assess whether patients functional restrictions had improved over the six week treatment period. As described in literature, the

combination of these two outcome measures provided a conceptualisation of an individual's activity limitations and occupational performance (Case-Smith 2003). One of the limitations regarding the administration of these outcome measures, however, was that the different language versions of the DASH and COPM were not used in this study. This may have resulted in some limitations regarding how the patient rated measures were administered and analysed. This however was not a major limitation as most of the patients were able to understand English.

5.3 The change in outcomes in patients with de Quervain's disease who receive the traditional immobilisation protocol

The second objective of the study was to determine the change in outcomes for the traditional immobilisation protocol in patients with de Quervain's disease. These outcomes were measured in relation to change in symptoms, participation in activities, and performance and satisfaction in everyday activities. These results were obtained and interpreted using four outcome measure including the Finkelstein test, VAS, DASH and COPM.

Results from the Finkelstein test show a reduction in positive test scores between the three assessments. This indicates that in general, participants symptoms specifically in terms of radial-sided wrist pain when the hand is moved into ulnar deviation was reduced over the course of therapy. Similarly, results obtained from the VAS assessment demonstrate a great decline in mean values, which indicates a decrease in pain levels between the assessments. A greater percentage of pain reduction was noted between the second and third assessments (40%) as opposed to the first two assessments (29%). This suggests that patients experience greater pain relief only after three weeks of wearing the splint once the inflammation had subsided. These results are broadly consistent with other studies which have shown that splinting assists in pain relief during the acute phases of the condition (Ilyas 2009; Goel & Abzug 2015).

Data obtained from the DASH questionnaire and COPM assessment, both indicate a general increase in median values between the three assessments, particularly between the second and third assessment. This shows that participants mostly

experienced improvement in activity participation, and increased levels of performance and satisfaction in everyday activities after their thumb was immobilised for a period of six weeks. An important implication of these findings is that the improvement in activity participation as well as performance and satisfaction in everyday activities may be largely attributed to the reduction in pain symptoms. There was however no significant difference between the first and second DASH (work) as well as COPM satisfaction scores. The most likely explanation of this is that patients may have experienced some functional restrictions and irritation of wearing the splint initially within the first three weeks. This is related to findings in literature which describe functional restrictions as being one of the major limitations to splinting (Coldham 2006; Cavaleri et al. 2016).

5.4 The change in outcomes in patients with de Quervain's disease who receive occupation based intervention

The third objective of the study was to determine the change in outcomes of the OBI protocol for patients with de Quervain's disease. These outcomes were also measured in relation to change in symptoms, participation in activities, and performance and satisfaction in everyday activities, and were interpreted using the four outcome measures mentioned above.

A decline in positive test scores was shown on the Finkelstein test between the three assessments for the OBI group. Scores obtained from the VAS assessment also demonstrate a decline in pain levels between the assessments. This indicates that OBI designed specifically for patients with de Quervain's disease may be an effective method in reducing radial sided wrist pain. A higher percentage of pain reduction was also shown between the second and third assessments (56%) as opposed to the first two assessments (37%), which indicates a greater reduction in symptoms after the second consultation with occupational therapy. This may be linked to discussions in literature which explains that that re-evaluation of occupational performance; revision of treatment goals and practice of skills to overcome functional restrictions, as well as re-education of the patient's condition and reinforcement of treatment principles plays an essential part in the OBI process (Hammond & Freeman 2004; Fisher 2014). This

may also be attributed to the greater reduction in symptoms after the second occupational therapy session and re-evaluation of occupational performance.

Results from the DASH questionnaire and COPM assessments show a great increase in median values, and highly significant differences in scores between the three assessments. This shows that OBI is an effective approach for improving activity participation and increasing levels of performance and satisfaction in everyday activities. This supports theory in literature which leads us to believe that OBI is an effective tool in helping patients achieve satisfaction and competence in performing their everyday activities (Che Daud et al. 2016; Hemmingsson & Jonsson 2005; Law 2002). Occupation based intervention has also shown to facilitate function in activities, improve patient motivation and produce improved outcomes in therapy (Grice 2015; Jack & Estes 2010; Colaianni & Provident 2010).

5.5 Comparison of the change in outcomes for the two different treatment approaches

The last objective of the study was to compare the change in outcomes for symptoms, participation in activities, and performance and satisfaction in everyday activities for the traditional immobilisation protocol and the OBI programme designed specifically for de Quervain's disease.

All participants in each group present with a positive Finkelstein test on referral to occupational therapy. Interestingly the same number of participants present with a positive test score on the final assessment (51.85%), indicating that both treatment approaches are equally effective in reducing pain symptoms for this condition. There is however a greater decline in positive test scores between the first two assessments for the OBI group in comparison to the traditional group. This may indicate that the OBI programme is more effective in reducing pain levels within the very acute stages of the condition. This also suggests that the experience of pain is more complex in nature and through implementation of an OBI programme where patients feel empowered, in control, and able to make their own decisions, the experience of pain may be more positive. When comparing results from the VAS assessment, participants in both

groups also show a general decline in pain levels between the three assessments. Although not statistically significant, the OBI group presented with a slightly higher percentage of pain reduction between the first two (37%) and last two (56%) assessments when compared to the traditional immobilisation protocol with 29% between the first two and 40% pain reduction between the last two assessments. This may be related to the higher satisfaction scores of the OBI group, particularly on the second assessment.

Results from the DASH questionnaire show that both treatment approaches are effective in improving participants functional performance and reducing activity limitations between the three assessments. On the second assessment however, participants in the OBI group display greater improvement in functional performance and activity limitations with regards to their work component. Moreover, the OBI group have a greater change in overall DASH scores between the first and second assessment. The most likely explanation of this is that the OBI programme for de Quervain's disease focuses more on reducing limitations in one's everyday activities by implementing task modifications and adaptations to the home and work environment (Jack & Estes 2010; Fisher 2014; Goel & Abzug 2015; Calvo-Cerrada et al. 2012).

As discussed in the literature full time splinting may take some time for patients to get used to, and may result in functional restrictions particularly after initial application of the splint (Coldham 2006; Cavaleri et al. 2016). This may explain why participants in the traditional immobilisation group reported more activity restrictions within their work tasks, and a smaller change in overall DASH scores after the first three weeks of wearing the splint compared to the OBI group.

Data obtained from the COPM assessment also indicate that both treatments are effective in improving the patient's subjective perception of occupational performance and satisfaction in their everyday activities. Similar to the DASH questionnaire, participants in the OBI group reported higher levels of performance and satisfaction on the second assessment, as well as a greater change in performance and satisfaction scores between the first two assessments compared to the traditional group. This may

suggest that the OBI programme produces better outcomes within the first three weeks after the initial treatment session compared to the traditional immobilisation protocol.

The results of the study indicate that for both treatment methods the outcomes after six weeks of intervention are the same, but the journey to achieve these outcomes were significantly more satisfying for the OBI group as intervention was geared to their specific needs during this period. The requirements related to performance particularly at work was addressed and they could continue with these activities during the intervention allowing them to retain their ability to continue with occupations.

5.6 Reflections on the development and implementation of an occupation based intervention programme for de Quervain's disease

This section discusses the development and implementation of the OBI programme for de Quervain's disease, including the researchers perceived benefits and challenges, as well as the contributions this process has made in helping her become an occupation based practitioner.

5.6.1 Reflections on the development and outcomes of an occupation based intervention programme for de Quervain's disease

In many hand rehabilitation facilities both internationally and locally, such as the occupational therapy department at Helen Joseph Hospital, rehabilitation services have been directed by a predominating biomedical model (Burley et al. 2018; de Klerk et al. 2016). After reviewing the literature, the researcher became aware of the problems related to this potentially restricted view and recognised the need for hand rehabilitation services to be guided by a more occupation based perspective (Burley et al. 2018). This motivated the researcher to develop a study that involved designing an OBI programme for a common hand condition and compare it to a tradition approach that focuses mainly on the biomechanical aspects of the condition.

The development of an OBI programme specifically for patients with de Quervain's disease was a challenging yet rewarding process and helped the researcher gain a true and personal understanding of the many benefits and challenges of implementing this treatment approach in the field of hand rehabilitation. Throughout this process, the

researcher realised that the implementation of this programme is not a step by step process, but rather a set of principles that are used as a guide when treating patients with de Quervain's disease. This highlights the importance of reviewing the literature and understanding the underlying philosophy and principles on which this treatment approach is constructed before developing and implementing an OBI programme.

The results of this study indicate that the OBI programme produces improved outcomes for patients. In general, patients made statistically significant improvements in their performance and satisfaction in everyday activities and their pain levels decreased significantly over the six-week treatment period. This supports literature which explains that favourable outcomes for therapy are achieved when patients are engaging in activities or occupations that are meaningful to them (Jack & Estes 2010; Law 2002). Although the outcomes for the two treatment groups did not differ significantly at the end of the six-week treatment period, there was a greater improvement in performance and satisfaction levels three weeks into the intervention. This is echoed in OBI literature, which communicates a strong sense that when patients' therapy is aimed at engaging them in occupations that they choose and is directed towards achieving their own personal goals, they appear to be more motivated and experience a greater sense of pleasure, fulfillment and accomplishment during therapy (Fisher 2014; Doble & Santha 2008). In addition, many of the patients who received this OBI approach reported that they appreciated being heard by a medical professional and felt more valued when they were able to choose what they wanted to achieve in therapy. As a result, patients appeared more motivated during treatment sessions, which contributed to a satisfying therapy experience.

When reflecting on the results of this study, the fact that both the traditional and OBI intervention programmes produce favourable outcomes, can lead us to conclude that both interventions are effective. It does however also compel us to consider whether patients who receive neither traditional or OBI interventions may achieve similar outcomes to those reported in this study, given that de Quervain's disease has been described as a 'self- limiting condition' (Kachooei et al. 2015; Ilyas 2009). However, given that surgical intervention is an eventual reality for people living with this condition, better documentation of this term in relation to de Quervain's disease is needed.

5.6.2 Reflections on the benefits of occupation based assessment and goal setting

During the OBI assessment phase, the researcher developed a greater appreciation for the use of narrative medicine, which helped her gain a true understanding of the patient's occupational profile. The use of narratives altered the way the researcher viewed patients and enhanced her conceptualisation of an 'occupational being'. Understanding a person as an occupational being goes beyond their physical attributes, but rather fosters a more holistic view of the patients' lives. As described in literature the researcher acknowledged that individuals' circumstances are all different resulting in a unique set of capabilities and needs (Durocher et al. 2014). By listening to patients' stories, it was clear that their problems were a result of the dynamic interaction between multiple factors, including the physical, psychological, occupational and environmental aspects that are influencing their lives. This supports theory relating to the PEO model and ICF framework on which OBI is constructed (Law et al. 1996; Hemmingsson & Jonsson 2005). This is also consistent with literature which explains that by gaining a sense of all factors that influence a patient's life including their personal, spiritual, occupational, physical and social contexts, the researcher was able to effectively address all the underlying factors that are affecting the patient's life and condition during the intervention process (Fisher 2014). Through these narratives, the researcher also developed a greater sense of trust and connection with patients and gained a deeper understanding of their problems. Similar to what is described in an article regarding the use of narratives in hand rehabilitation, patients were able to self-reflect on their situation, which assisted in them gaining further insight on the complexity of their illness and helped in setting realistic and appropriate goals for therapy (Cooper 2011). This interactive story telling created a positive patient- therapist relationship where patients appeared to feel more confident and comfortable during therapy sessions and were able to express more personal issues such as family and relationship dynamics that affect their condition. This enhanced the researchers understanding as described in literature that individuals' illness experiences and lives are indeed unique and that setting generic objectives or goals for therapy may not be

sufficient in addressing all the underlying factors that affect ones condition (Mattingly 1991; Finlay 2004).

Before reviewing the literature and designing this OBI programme, the researcher was unaware of the use and benefits of administering occupation based standardised assessments for patients with hand injuries. By reflecting on this study, the researcher acknowledges that the COPM is one of the most beneficial elements included in this programme. The COPM assessment and scoring manual was easy to understand, follow and administer with patients. This assessment as described by Law, et al, 2014 also provided evidence- based evaluations of patients' occupational performance in all areas of their life. Information gathered from the COPM further enhanced the researchers' conceptualisation of the patient's occupational profile. Throughout this study, it became clear that this assessment truly relates to all concepts described in OBI theory and supports the philosophy behind occupational therapy.

Another key element of this programme was observing patients perform their everyday activities. Although the patients' perception of their performance was valuable, observing them perform an activity provided a more objective view and accurate understanding of the quality of their occupational performance. This relates to OBI literature which emphasises the importance of observing ones performance during occupation based assessments (Grice 2015; Law 2002). A major limitation to this however was that the researcher was unable to observe patients perform these activities in their own environment. This made it difficult to truly understand how contextual factors may be limiting the patients' function, which in turn affected the ability to modify tasks and adapt activities within their own environment during the intervention phase. The researcher was also unable to perform work visits for patients whose condition affected their functioning at work, which limited the analysis and interpretation of vocational assessments. According to the literature, this challenge appears to affect many hand therapists, which is a direct result of logistic issues, busy schedules, high workloads and time constraints (de Klerk et al. 2016; Rogers 2007; Colaianni & Provident 2010; Grice 2015) An article regarding OBI in a medical- based setting proposes some strategies to overcome these barriers (Rogers 2007). A strategy used by the researcher when implementing this OBI programme was to simulate patients'

everyday activities in the occupational therapy treatment area. This was done by creating a more homelike or work environment in the treatment room as well as making use of all facilities in the hospital such as the kitchen, bathroom, laundry room, basins and computer room (Rogers 2007). In addition, patients were encouraged to bring their own tools and materials from their environment such as kitchen utensils, hairbrushes, handbags and other personal management items, as well as tools used at work to the treatment session. Compensatory and adaptive techniques could therefore be applied using these tools and materials. In addition, mothers and care givers were encouraged to bring their children to treatment session so they could practice techniques of picking up and holding their child in order to reduce strain placed on their wrists and hands. The researcher also encouraged other family members to attend and participate in therapy sessions. Although only a few patients were able to bring family members, these patients, as described in literature appeared to feel more comfortable and motivated during their treatment sessions (Doble & Santha 2008)

5.6.3 Reflections on the benefits of occupation based intervention

Throughout the intervention phase, the researcher recognised the benefit of applying educational-behavioral approaches described by Hammond and Freeman, 2004. This was done by educating patients on joint protection and energy conservation principles, as well as practicing these principles with task modifications which were aimed at encouraging a neutral wrist position and restricted thumb movements (Goel & Abzug 2015; Hammond & Freeman 2004). Handouts that were given to patients regarding these principles were also free of medical jargon and were thought to be a key factor in strengthening the patient's knowledge and compliance to the programme. As described in literature, this allowed patients to integrate and generalise these skills and address issues particularly in their work environment (Goel & Abzug 2015; Calvo-Cerrada et al. 2012; Fisher 2014). The advantage of this was also shown in the results of the study where participants in the OBI group displayed significantly higher work performance scores during the second treatment session, three weeks into the intervention. Therefore, this education-behavioural approach which included education on ergonomic measures and practice of skills on how to adapt and modify tasks in the work environment assisted in meeting patients' current needs and maintaining

functional independence in everyday tasks before resolution of all their symptoms (Hammond & Freeman 2004; Goel & Abzug 2015; Calvo-Cerrada et al. 2012).

5.6.4 Reflections on the challenges of occupation based intervention

When designing the OBI programme, one of the challenges the researcher faced was how to incorporate splinting into the intervention phase. Initially, this was difficult to conceptualise as the researchers understanding of orthotic application was primarily based on biomechanical principles. After reviewing an article on a biopsychosocial approach to orthotic intervention, the main principle outlined was to ensure that a client-centred approach is followed during orthotic intervention (McKee & Rivard 2011). During the intervention phase, the researcher therefore provided an in-depth explanation regarding the purpose of the splint and allowed patients to decide whether they would benefit from the splint or not. Patients were also informed that the splint may limit their function in everyday activities and were encouraged to only wear the splint when resting and during activities in which the splint did not interfere with their functioning (McKee & Rivard 2011). In addition, patients were also encouraged to provide their own opinions at each treatment session regarding the design and cosmesis of the splint to ensure comfort and improve compliance to splint wear. Another challenge with regards to splinting in the OBI programme was that in a government hospital such as Helen Joseph, resources are scarce. This makes it difficult for the occupational therapy department to procure different types of splinting material. As a result, patients had limited options as to what splinting material they would prefer and what felt the most suitable and comfortable for them.

Other challenges the researcher experienced through implementation of this OBI programme were similar to the ones described in literature (Colaianni & Provident 2010; de Klerk et al. 2016; Burley et al. 2018). Time limitation was the most crucial issue during the implementation of this OBI programme. Working in a public hospital with high patient loads and limited staff made it difficult for the researcher to dedicate her time to providing personalised and long treatment sessions. Although the researcher is aware of the many benefits of occupation based standardised assessments such as the COPM, this assessment is very time consuming, which

impacted on the time spent with other patients referred to occupational therapy. Another challenge as proposed in literature was that although the use of an interpreter for patients who struggled to understand English was to ensure that information regarding the OBI programme was portrayed correctly, the researcher still believes that some of the therapeutic content was compromised (van Stormbroek & Buchanan 2019).

5.6.5 Reflections on becoming an occupation based practitioner

Despite these challenges, the researcher still acknowledges that OBI is an effective treatment approach as it produces favourable outcomes for patients. The development and implementation of this programme enabled her to think more creatively about overcoming barriers and challenges that individuals face in their everyday lives. By reviewing the literature and developing an OBI programme, the researcher was able to shift her focus from pure tissue healing to understanding and achieving patients' personal goals during therapy. This has also helped in filtering and maintaining an occupational perspective when treating other patients with hand conditions.

Although the researchers' practice has shifted towards a more occupation based approach, there is still room for growth and scope for developing her skills as an occupation based practitioner. There are elements of the OBI programme that need to be revised and through reflection of this OBI programme within a South African context, the researcher identified that further research and use regarding the different language versions of patient rated assessments such as the DASH and COPM and translation of other assessments into various languages as being one of the most crucial elements that should be considered more carefully in this programme. Educating patients on their conditions and principles to follow also needs to cater to the different learning styles and education histories of diverse patient groups. In addition, this programme should include communication with referring doctors regarding the benefits of the OBI programme, as one of the challenges highlighted in the provision of OBI is the referring doctors' orders to follow the traditional programme for de Quervain's disease. It is thought that regular revision of OBI literature will go a long way in facilitating further growth and conceptualisation of this intervention approach.

Above all else, this study has enhanced the researchers' value of OBI in hand rehabilitation and has created a feeling of uniqueness in her profession. It has helped develop a specific set of skills and confidence in using occupation based standardised assessments and has motivated her to advocate for the implementation of this approach to other practitioners.

5.7 Strengths and limitations of the study

This was the first study to develop an OBI programme specific to patients with de Quervain's disease and compare this approach to a traditional treatment method. This adds to a growing body of international evidence which has found that the integration of OBI into hand rehabilitation practices produces more favourable outcomes than traditional approaches (Che Daud et al. 2016; Rostami et al. 2017). This study also contributes to the development of local evidence on the use of occupation based practice in the field of hand rehabilitation (de Klerk et al. 2015; de Klerk et al. 2016). As highlighted in the reflections section, the development of this programme also contributed to a better understanding of the researcher's knowledge regarding OBI and added to the body of knowledge in literature regarding the application of this treatment method within hand rehabilitation.

One of the main limitations of this study is that it was not completed over an extended period of time. As a result, conclusions can only be drawn based on the acute stages of this disease, and analysis does not enable us to determine whether these programmes are effective in the long term, and whether they influence the re-occurrence of the condition.

Another limitation of this study is that not all participants were able to return for their follow up sessions after a three week period. This study was based on participants that were generally of a lower economic status, resulting in financial constraints and transport issues. Some of the participants were therefore only able to attend therapy after the three week period, when they were able to access transport.

This study was completed at a government hospital in South Africa with high patient loads and shortage of staff. As a result, the researcher was involved in the

implementation of the OBI programme and data collection, which may have influenced the delivery and outcome of assessments. Due to this shortage of staff and time constraints, the two groups also had different therapists providing the assessments and intervention. This may have been a form of observer bias which perhaps could have affected the way information was collected or presented to patients. The use of convenient sampling was also a limitation as this resulted in sampling bias as the sample was not representative of the entire population. Allocation of participants in order of referral into each group was also difficult as one of the therapists involved in the study was often busy in meetings or treating other patients and were unable to see patients when initially referred. This resulted in inconsistent splitting of participants in each group. In addition, Helen Joseph Hospital does not offer home visits due to the high patient load and time constraints of therapist. As a result, the researcher implementing the OBI programme was unable to assess patients performing their everyday tasks within their physical and social environment. This may have affected the assessment and understanding of the participants' occupational performance within their context.

There were also limitations regarding the analysis of the VAS and DASH questionnaire. A significant difference was shown on the first assessment for the VAS assessment between the two groups. This indicates that the two groups were not comparable at the beginning of the assessment, which may have affected the results. In addition, the number of participants that completed the work component on the DASH questionnaire differed within each treatment group, and therefore the analysis between the groups may have been slightly inaccurate. The results for the sports/arts component were also inconclusive as none of the participants in the traditional group completed this section, and one of the participants in the OBI group only scored on this component on the final assessment.

Another limitation, although not major in this study was that language barriers with a small number of participants, as well as the use of untrained translators may have impacted on the administering of patient rated measures such as the DASH and COPM. The different language versions of the DASH and COPM were also not used in this study and therefore these results should be viewed with slight caution.

A limitation in the analysis of the research was that the researcher was unable to determine the impact regarding the significant differences in ages of patients between the two groups, as well as the chronicity of the disease on the outcomes of the study.

A final limitation of this study is that a large representation of participants reported receiving corticosteroid injections and were using analgesia to relieve their pain. This may have interfered with results on the outcome measures as these treatment modalities may have contributed to the change in their symptoms. A factor analysis may have been useful in determining the effect of these treatment modalities on the outcomes of the study, however this goes beyond the objectives of the study.

5.8 Summary

The objectives of this study were achieved and discussed through careful interpretation of the results. The findings of this study support theory in literature regarding the efficacy of OBI in producing favourable outcomes for patients.

With regards to the demographics, the profile of patients recruited into this study were similar to what is described in literature, and the two treatment groups were mostly comparable at the beginning of the study.

The first objective, which involved the designing an OBI programme specifically for patients with de Quervain's disease was challenging and time consuming, however after extensive review of the literature, extraction of OBI principles and development of OBI programme elements, the application of this programme was easy.

Through the interpretation of results, both the traditional and OBI treatment programmes yielded positive outcomes for patients at the end of the six week programme. The OBI group however produced more favourable outcomes in terms of pain reduction, participation in their work component, as well as performance and satisfaction scores in everyday activities at the second assessment. This gives us a sense that the OBI therapeutic experience is more satisfying for patients as it facilitates holism and focuses on reducing functional restrictions in one's everyday occupations.

Finally, after reflecting on the development and implementation of this OBI treatment approach, the researched gained an appreciation of the many benefits this programme

has to offer. This programme also comes with challenges and requires further review to enhance the essential programme elements. Recommendations on how to develop this study and improve the OBI programme will be discussed in the next chapter.

CHAPTER 6: CONCLUSION

This chapter provides a summary of the central developments and key findings of the study as they relate to the study objectives. Implications of these findings and recommendations for education, clinical practice and scope for future research are also discussed.

6.1 Conclusion

There is a general consensus that occupational therapists working in the field of hand rehabilitation have lost an occupational perspective in their practices. Research regarding the development and efficacy of OBI within this particular field is therefore needed. This study compared the outcomes of an OBI programme developed specifically for de Quervain's disease to a traditional immobilisation protocol. The many benefits, challenges and complexities of designing and implementing OBI within hand rehabilitation practices in South Africa were also highlighted in this study.

Unfamiliarity with the underlying philosophy, core values, theories and principles on which OBI is based, is a common problem among therapists and poses challenges when designing and implementing occupation based hand rehabilitation programmes. Reviewing the literature and familiarising oneself with the body of knowledge reflecting OBI is a key step in overcoming these challenges and should be encouraged when integrating this approach into hand rehabilitation practices.

The ICF and PEO models as well as other literature sources indicate that the impact of disease is influenced by many factors in an individual's life including their physical, psychosocial, vocational, and environmental contexts (Hemmingsson & Jonsson 2005; Law et al. 1996; Che Daud et al. 2016). Occupation based intervention is concerned with addressing these factors as well as providing holistic and client- centred strategies and engaging individuals in meaningful occupations (Amini 2004; Preissner 2010; Fitzpatrick & Presnell 2004). When designing an OBI programme, particularly within a South African context, therapists also need to consider the socio-economic, occupational, contextual, cultural, educational and language diversity within the

countries' population. A comprehensive assessments of an individuals' occupational profile through narrative based interviews, observation of occupational performance and the administration of occupation based standardised assessments is a vital step in understanding the uniqueness of an individuals' life and creates a conceptualisation of an individual as an 'occupational being'. Using client-centred approaches, particularly when encouraging patients to set their own goals for therapy is also beneficial in catering for individual needs during therapy. Another key aspect to consider when designing and implementing an OBI programme in a culturally diverse population is to become mindful of the educational and language differences within our context. Patient education, handouts, home programmes and orthotic prescriptions should be sensitive and relevant to individuals' capabilities and unique physical, psychosocial and environmental contexts.

For this research study, an OBI programme was developed specifically for patients with de Quervain's disease. This programme was then tested on patients at Helen Joseph Hospital and the outcomes were compared to a traditional biomechanical approach that is currently been used by occupational therapists at this hospital.

From the current study, it is possible to conclude that both the traditional and the OBI programme designed specifically for de Quervain's disease are valid intervention options. There are significant improvements in outcomes for both of these methods and no clinically significant differences were found between the two groups after a six week intervention period. The journey to achieve these outcomes however is more favourable and satisfying for individuals included in the OBI programme. It is found that symptoms related to de Quervain's disease subside a lot earlier on during the OBI intervention programme when compared to the traditional approach. The OBI programme also encourages better participation at work and produces higher levels of satisfaction and performance in occupations half way through the prescribed intervention period in comparison the traditional approach.

One of the main implications of this finding suggests that OBI contributes to a more satisfying therapeutic experience for individuals affected by de Quervain's disease than traditional approaches. Therefore, by acknowledging individuals 'as a whole' and

encouraging active engagement in valued occupations that are geared to meet individual needs, patients feel more satisfied with their performance in everyday activities. Furthermore, by modifying and adapting one's everyday activities, individuals are able to maintain their identity within their life roles and retain their ability to continue with activities, thereby improving performance and satisfaction in everyday occupations.

Despite the findings in this study as well as other evidence- based research favouring OBI, therapists still struggle to deliver this approach in hand rehabilitation practices. The lack of skill and familiarity with OBI among therapists, as well as high patient loads, shortage of staff and limited time to implement these OBI programmes are the main underlying issues regarding the provision of this approach.

Discussions in literature regarding the benefits and challenges of OBI in hand rehabilitation both internationally and locally are thereby re-iterated by this research study.

In conclusion, the findings of this study suggest that the use of an OBI approach is of direct practical relevance as it enhances outcomes for therapy. It also emphasises that OBI is a holistic and client- centred practice which focuses on participation in activities and occupational performance, and promotes occupational well-being, which supports the underlying philosophy of the occupational therapy profession. Therefore, there is a strong need to broaden hand therapists' understanding of OBI and to address the challenges and barriers regarding the implementation of this approach, so that occupational therapists can demonstrate this unique practice and remain true to their professional foundation.

6.2 Recommendations

This section presents the recommendations for education, clinical practice and research.

6.2.1 Education

- Continuing professional development (CPD) workshops regarding the provision of OBI in hand rehabilitation practices should be made more available in South Africa. These should be aimed at increasing awareness of this type of intervention and bridging the gap between the use of biomechanical and occupation based approaches.
- Teaching of OBI for hand injuries as well as training on the use of occupation based standardised assessments such as the DASH questionnaire and COPM should be included in the occupational therapy undergraduate curriculum. This will strengthen the use of these occupation based assessments. This also suggests the need for research that establishes whether both of these measures are valid and reliable for the South African context. In addition, OBI programmes as well as the models and frameworks on which this treatment approach is constructed should also be emphasised and contained within the curriculum.
- Regular meetings and discussions with research supervisors is recommended to all postgraduate students to enhance and develop their research skills.

6.2.2 Clinical practice

- The primary issues regarding poor provision of OBI in hand rehabilitation practices come down to therapists' unfamiliarity and lack of skill with implementing OBI, as well as time constraints. This suggests a need for journal clubs and other CPD activities regarding the development and implementation of OBI to be held on a regular basis. A shortage of therapists, particularly in government hospitals in South Africa result in high patient loads and ultimately limited time to provide occupation-based approaches. Occupational therapy managers should therefore advocate for more occupational therapy posts to be made available in their departments. By addressing this issue, occupational therapists may also have more time to perform

home or work visits for their patients. Therapists will also be able to observe individuals participate in occupations within their own environment, which is one of the key elements of OBI. Performing home visits will also ensure that OBI is more accessible to patients and will address the transport and compliancy issues that many patients face in accessing rehabilitation. Should these time constraints not be addressed, a suggestion from Rodgers, 2007 is to provide OBI groups by including patients with similar problems and interests into these programmes.

- This research will change the way novice therapists are trained by the researcher at Helen Joseph Hospital and induced into the hands department. Community service therapists will be guided to provide more occupation based practices when treating patients with hand injuries. In addition, training of occupation based standardised assessments including the DASH questionnaire and COPM will be provided and these assessments will be readily available in the treatment setting. These assessments will also be used to record outcomes of therapy on a daily basis.
- The researcher is a member of the district's hands task team and attends meetings on a regular basis. The outcomes of this research and OBI programme for de Quervain's disease will be presented to other hand rehabilitation practitioners at these meetings to advocate for the use of this approach. Electronic copies of this programme will also be made available to other members of the hands task team and distributed to the various hospitals in the district. In addition, the findings of this study will be disseminated through publication in a journal article to add to the existing body of knowledge regarding the need for OBI in hand rehabilitation practices.
- In South Africa, being a culturally diverse nation with many language and educational differences within our population, it is recommended that all OBI protocols developed including the handouts and home programmes speak to the learning styles, language, and educational history of patients. This suggests the need for professional organisations such as OTASA and SASHT to provide opportunities for therapists to develop competencies in language and cultural skills.

This will enable therapists to be more equipped to deliver OBI that is sensitive and accessible to diverse patient groups.

6.2.3 Research

- There is a distinct need for further research that evaluates the change in outcomes of these treatment approaches over an extended period. This may provide more information regarding the long- term effects of the programmes and will help determine the change in outcomes of these programmes over time.
- Further research is also needed comparing the change in outcomes of these intervention programmes, by excluding patients who received CSIs, NSAIDs and other treatment modalities. This will establish the true change in outcomes of these programmes for patients with de Quervain's disease.
- Future research should consider the chronicity of de Quervain's disease. Studies need to be conducted to test the differences in presentation and outcomes of treatment methods for patients in the acute and chronic stages of the disease. If these outcomes are found to be significantly different, further research should focus on the outcomes for patients in the acute or chronic stages of the condition.
- Research that evaluates the impact of CPD courses that are aimed at encouraging therapists to develop their OBI knowledge and skills is also needed
- Occupational therapy educators and post graduate students should encourage other therapists to develop and use an OBI approach with other hand conditions, as well as to conduct further evidence-based research to improve the credibility of OBI and ensure best practice in occupational therapy.

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APPENDIX A: Helen Joseph Hospital standard treatment programme for de Quervain's disease

Day of referral

- The patient diagnosed with De Quervain's Disease is referred to occupational therapy from the outpatient hands clinics
- *For research purposes, the information sheet explaining the research will be given to the patient. The patient will be requested to sign a letter of informed consent (should he/she accept the invitation to participate). The demographics form will be filled out and the assessments using the four outcome measures (Finkelstein test, VAS, DASH, COPM) will be completed with the patient. These four assessments will also be completed at the three and six-week follow up appointments.*

Treatment programme:

- Verbally explore the understanding of de Quervain's disease with the patient and provide a brief explanation of the condition:
  - Explanation: De Quervain's Disease is commonly caused by repetitive movements or overuse of the thumb and wrist. It results in narrowing of the space through which two tendons of the thumb run. This restricts movement of the tendons causing pain, swelling and decreased movement of the thumb. Some activities that often result in the development of this condition include typing, performing house work, construction work and picking up children.
- Verbally inform the patient regarding the thumb spica splint including its purpose and the wearing regime:
  - Purpose of the splint: To immobilise and restrict flexion of the thumb carpometacarpal (CMC) and metacarpophalangeal (MCP) joints and reduce friction of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons to alleviate pain
  - Wearing regime: The splint should be worn throughout the day and at night, only removing it when bathing or showering
- Fabricate the forearm-based thumb spica splint for the patient:

- Equipment and materials needed:
  - 3.2mm perforated thermoplastic
  - Thumb spica splinting pattern (see below)
  - Splinting bath
  - Adhesive hook and non- adhesive loop velcro
  - Heat gun
  - Splinting scissors
  - Pen
- Procedure:
  - Heat up the splinting bath to 60°C
  - Trace the thumb spica pattern onto the thermoplastic material
  - Melt the thermoplastic material in the splinting bath
  - Once properly melted, remove the material from the splinting bath and cut out the pattern. Reheat the material in the splinting bath if necessary
  - Position the patient's hand with the forearm and wrist in neutral position with the ulnar border rested on the table, and the thumb in palmar abduction
  - Mould the splinting material onto the radial aspect of the hand and forearm, immobilising the thumb CMC and MCP joints with the interphalangeal (IP) joint free to mobilise
  - Once moulded, remove the splint from the patient's hand and neaten the edges (flare and smooth the edges using a heat gun)
  - Place the splint back on the patient's hand and apply velcro straps around the forearm, wrist and thumb proximal phalanx
- Once the splint has been fabricated, verbally educate the patient on the application, removal and care for the splint

Three-week follow up appointment

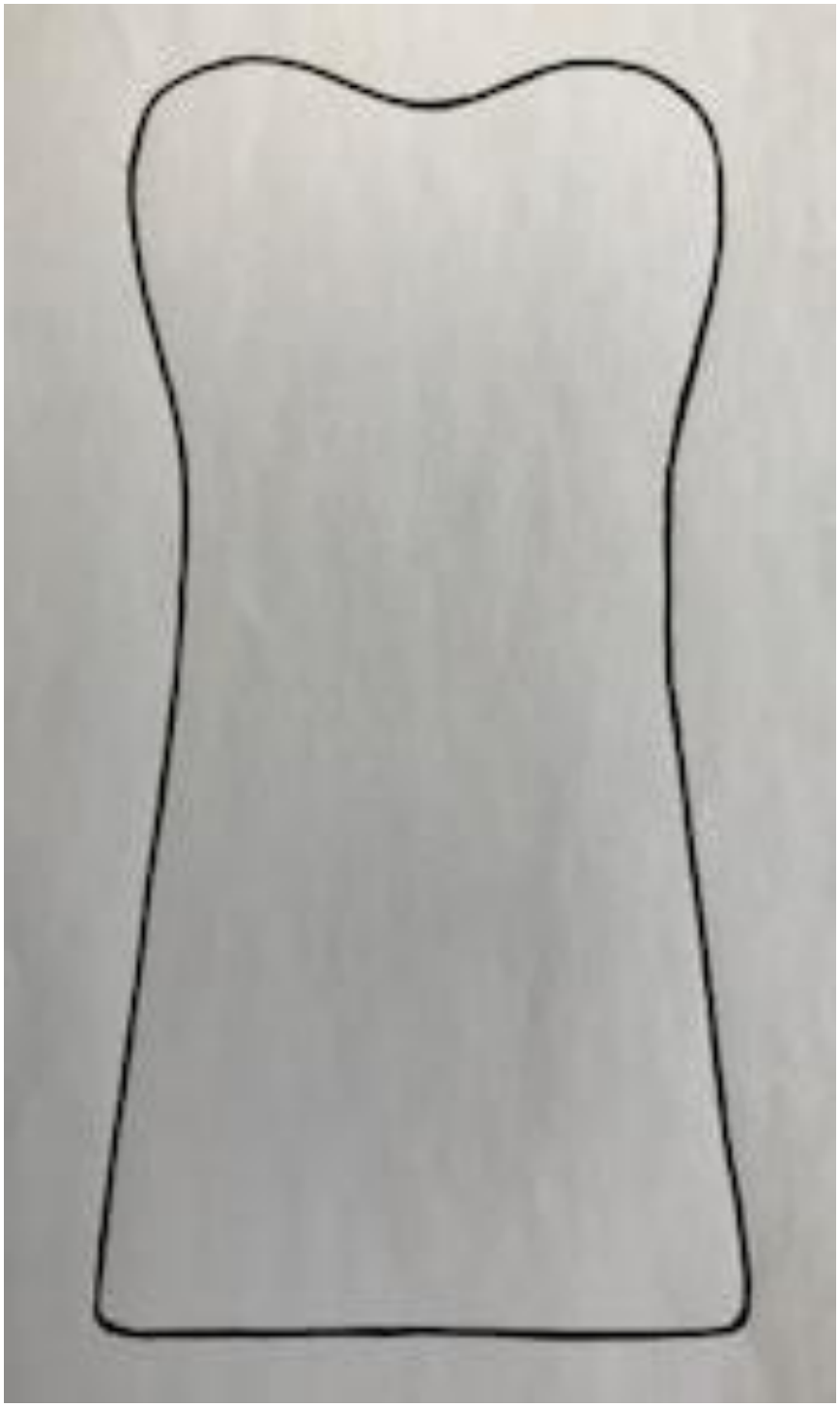
- The patient will be reassessed using the four outcome measures
- Monitor, modify and adjust the splint if necessary
- Verbally re-educate the patient on the purpose, application, removal and care for the splint, as well as the wearing regime

- The patient must continue full time wear of the splint

Six-week follow up appointment

- The patient will be reassessed using the four outcome measures
- If the patient's symptoms have resolved, they must be advised to discontinue wearing the splint
- If there has been some improvement but there are still some residual symptoms, the patient will be advised to wear the splint for three hours during the day and at night for the following three weeks
- If there is no resolution of symptoms and the pain persists, the patient will be referred to the hands clinic to consult with the doctors for further management
- The patient must also be advised to phone and arrange a further appointment with the occupational therapist should the pain return after discharge

Thumb Spica Splint Pattern



APPENDIX B: Information on de Quervain's disease handout

What is it?

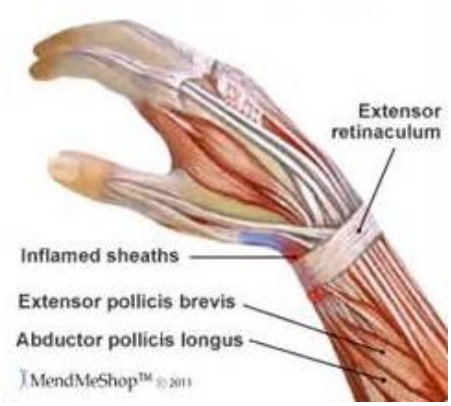
- De Quervain's Disease is a relatively common condition which is thought to be caused by repetitive movements or overuse of the thumb and wrist. E.g.: typing, performing house work, construction work, picking up your child, etc.
- It results in narrowing of the space through which the two tendons of the thumb run
- This restricts movement of these tendons causing pain, swelling and decreased movement of the thumb

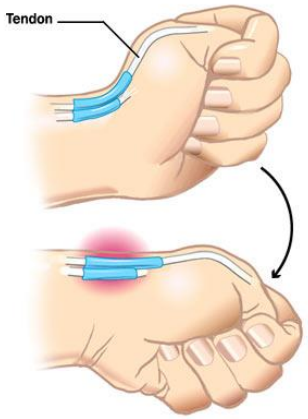
Causes

- Overuse of the hand and wrist
- Repetitive movements of the wrist
- Hormonal changes (pregnancy and lactation)
- Inflammatory (swelling) conditions
- Trauma

Symptoms

- Pain over the thumb and forearm
- Swelling over the wrist and base of the thumb





APPENDIX C: Purpose and instructions for proper care and wearing regime of your splint handout

Purpose of the thumb spica splint

To restrict movement and friction of the thumb joints and tendons. This enables the painful tendons to rest and heal. This aids in reducing pain enabling you to use the hand freely again.



Wearing Schedule

Wear your splint according to the following instructions given by your Occupational Therapist:

Cleaning your splint

Clean your splint with dishwashing liquid/mild soap and luke warm water

A brush works well to scrub the splint and the straps

Rinse the splint and dry thoroughly before reapplying

Precautions

Do not expose your splint to any heat: fire, warm water, stove or direct sunlight as the splint will lose its shape

Do not work on heavy machinery while wearing the splint

Avoid adding other material or attempt to make adjustments to your splint, rather contact the Occupational Therapist

Problems to watch for

Contact the Occupational Therapist if your splint causes any of the following:

- Excessive swelling, stiffness and numbness
- Severe pain, pins-and-needles or a burning sensation
- Pressure areas-redness or a blister
- Red or irritated skin areas

Your splint was custom made for you and is an important part of your treatment

If you have any further questions as to its proper application, fit or wearing schedule, please contact: The Occupational Therapy Department at HJH on 011 489 0292

Compiled By: Jaqui Meier

Senior OT HJH

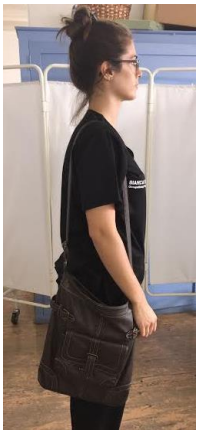
APPENDIX D: Joint protection and energy conservation principles for de Quervain's disease handout

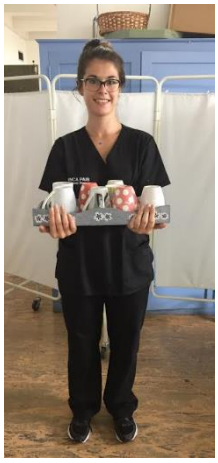
Why is this important?

- To decrease the stress on the tendons affected by De Quervain's Disease
- To decrease pain and ultimately improve hand function

Joint protection and energy conservation principles:

- Respect pain as a sign to rest
- Balance rest and activity
  - Alternate tasks and take rest breaks every 20 minutes when performing activities such as typing, housework, manual labour, etc.
- Use the strongest joints and muscles available for the task
  - Carry bags/ parcels in a backpack or on your shoulder rather than in your hand
  - Carry a tray/ pick up your child using your forearms and palms with the majority of your strength coming from your shoulders, upper arms and legs
  - Carry load close to the body
- Avoid staying in one position for long periods
  - Avoid holding objects for more than 2-3 minutes at a time
  - Take rest breaks
- Reduce the force placed on your hand
  - A large force or heavy object (e.g. a heavy box, your child, etc.) can increase friction on your thumb tendons and lead to pain
  - Ask for help when lifting heavy objects
  - Use a trolley for transporting your shopping items
  - Find new ways of doing things e.g. wringing clothes around a tap
- Avoid positions that increase pain around the thumb
- Use both hands to lift objects
- Avoid activities that can't be stopped if necessary





- Use assistive devices to increase size of grasp and thereby decrease the stress on the thumb joints
    - Use a built-up handle on hair brushes, utensils, etc.
    - Use a jar opener to open bottles
    - Use a book rest or rest a book against something when reading
    - Using a tap turner to open a tight tap

- Pick up your child using forearms with a scooping motion

Compiled by: Jaqui Meier

Senior OT HJH

011 489 0292

APPENDIX E: Information letter for participants

Study Title: Comparing occupation based intervention with traditional therapy for patients with de Quervain's disease

Dear Patient,

I, Ms. Jaqueline Meier, am currently completing my Masters' degree in Occupational Therapy at the University of the Witwatersrand. I am conducting research on the comparison of two treatment methods used to manage de Quervain's disease at Helen Joseph Hospital. The first treatment method is a traditional protocol which involves resting the thumb in a splint to reduce pain. The second treatment method uses an occupational based approach where you will also be advised on what changes you could make to your environment and the way you perform your activities which is based on your own personal goals. Splinting will also be used in this programme. I would like to study which of the two treatment methods produces the best outcomes.

I am inviting you to take part in this research study.
Should you accept this invitation, you will be allocated to one of the two treatment groups mentioned above. An initial evaluation will be done on the day of referral which will include a diagnostic test, a pain assessment, an assessment of your activity limitations as well as a self- evaluation of your performance and satisfaction in everyday activities. These assessments in total will take approximately 45 minutes to complete and will be administered again at the follow up sessions. Two follow up sessions will be required at three and six weeks after the initial assessment.

There are no risks of being involved in this study. Should you wish to access the results of the study once it has been completed, this will be made available to you on your request.

Participation in this research study is voluntary and refusal or discontinuation of participation at any time will involve no penalty or loss of benefits to which you are entitled.
All personal information will be kept confidential by means of codes where your personal details cannot be linked to your particular results.
Organisations such as the Research Ethics Committee may inspect or copy your research records for quality assurance and data analysis.

For further information on this study, you are welcome to contact myself,
Jaqueline Meier (011 489 0292) or my supervisors Kirsty Van Stormbroek (011 717 3701) and Denise Franzsen (011 717 3711).
Should you have any complaints or queries regarding the ethics of this study please contact the Chairman of the Human Research Ethics Committee at the University of the Witwatersrand, Professor P. E. Cleaton-Jones, on 011 717 1234 or email anisa.keshav@wits.ac.za.

I thank you for your consideration to contribute to this research.
If you are willing to participate in this study, please sign the consent form attached to this letter.

Kind Regards,

_____

Ms. Jaqueline Meier
Senior Occupational Therapist at Helen Joseph Hospital
BSC (OT) WITS University

APPENDIX F: Letter of informed consent

I, _____ (Patient), agree to participate in this study, **comparing the occupation based intervention with traditional therapy for patients with de Quervain's disease.**

I fully understand what my involvement in this research entails and that I may withdraw from the study at any time without any consequence.

Signature: _____

Date: _____

Witness

Signature: _____

Name in print: _____

Date: _____

APPENDIX G: Demographic questionnaire including personal and medical history

1. Demographics Form: Confidential (To be kept separate)

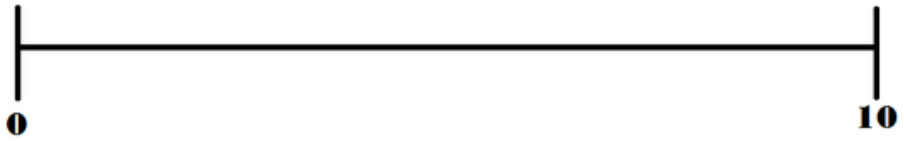
Code:			
Patients name:		Contact number:	
File Number:		Date of birth:	
Date of referral to OT:		Therapist:	

2. Demographics Form

Code:_____

Personal Information					
Age:			Gender:	M	F
Language:					
Highest level of education:					
Employment status:			Occupation:		
Description of work environment and work tasks:					
Medical Information:					
Diagnosis:					
Onset of condition:					
Other medical conditions:					
Medication:					
Have you had corticosteroid injections:	Y	N	If yes, how many to date?		
Hand dominance:			Affected hand:		
Pregnant (If applicable):	Y	N	Lactating (If applicable:	Y	N
Everyday activities that precipitate the pain:					
What relieves the pain:					

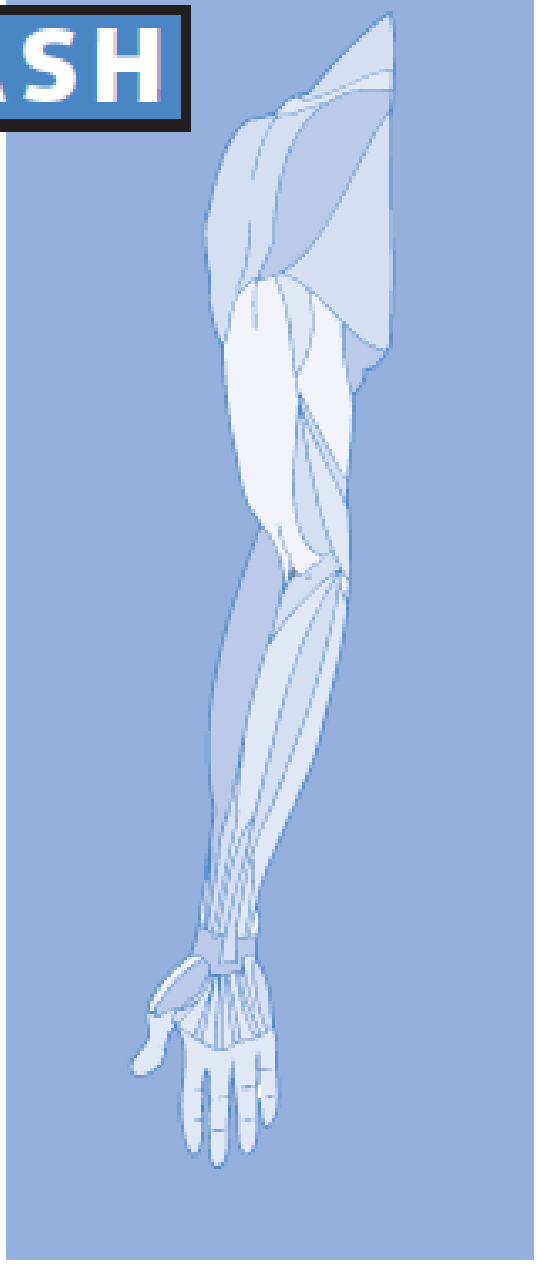
APPENDIX H: Visual Analogue Scale



APPENDIX I: Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire

DISABILITIES OF THE ARM, SHOULDER AND HAND

THE **DASH**



INSTRUCTIONS

This questionnaire asks about your symptoms as well as your ability to perform certain activities.

Please answer *every* question, based on your condition in the last week, by circling the appropriate number.

If you did not have the opportunity to perform an activity in the past week, please make your *best* estimate on which response would be the most accurate.

It doesn't matter which hand or arm you use to perform the activity; please answer based on your ability regardless of how you perform the task.

Disabilities of the Arm, Shoulder and Hand

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	1	2	3	4	5
2. Write.	1	2	3	4	5
3. Turn a key.	1	2	3	4	5
4. Prepare a meal.	1	2	3	4	5
5. Push open a heavy door.	1	2	3	4	5
6. Place an object on a shelf above your head.	1	2	3	4	5
7. Do heavy household chores (e.g., wash walls, wash floors).	1	2	3	4	5
8. Garden or do yard work.	1	2	3	4	5
9. Make a bed.	1	2	3	4	5
10. Carry a shopping bag or briefcase.	1	2	3	4	5
11. Carry a heavy object (over 10 lbs).	1	2	3	4	5
12. Change a lightbulb overhead.	1	2	3	4	5
13. Wash or blow dry your hair.	1	2	3	4	5
14. Wash your back.	1	2	3	4	5
15. Put on a pullover sweater.	1	2	3	4	5
16. Use a knife to cut food.	1	2	3	4	5
17. Recreational activities which require little effort (e.g., cardplaying, knitting, etc.).	1	2	3	4	5
18. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	1	2	3	4	5
19. Recreational activities in which you move your arm freely (e.g., playing frisbee, badminton, etc.).	1	2	3	4	5
20. Manage transportation needs (getting from one place to another).	1	2	3	4	5
21. Sexual activities.	1	2	3	4	5

Disabilities of the Arm, Shoulder and Hand

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
22. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups? (circle number)	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
23. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem? (circle number)	1	2	3	4	5

Please rate the severity of the following symptoms in the last week. (circle number)

	NONE	MILD	MODERATE	SEVERE	EXTREME
24. Arm, shoulder or hand pain.	1	2	3	4	5
25. Arm, shoulder or hand pain when you performed any specific activity.	1	2	3	4	5
26. Tingling (pins and needles) in your arm, shoulder or hand.	1	2	3	4	5
27. Weakness in your arm, shoulder or hand.	1	2	3	4	5
28. Stiffness in your arm, shoulder or hand.	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
29. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? (circle number)	1	2	3	4	5

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
30. I feel less capable, less confident or less useful because of my arm, shoulder or hand problem. (circle number)	1	2	3	4	5

DASH DISABILITY/SYMPTOM SCORE = $\left(\frac{\text{sum of } n \text{ responses}}{n} - 1\right) \times 25$, where n is equal to the number of completed responses.

A DASH score may not be calculated if there are greater than 3 missing items.

Disabilities of the Arm, Shoulder and Hand

WORK MODULE (OPTIONAL)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including home-making if that is your main work role).

Please indicate what your job/work is: _____

☐ I do not work. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for your work?	1	2	3	4	5
2. doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
3. doing your work as well as you would like?	1	2	3	4	5
4. spending your usual amount of time doing your work?	1	2	3	4	5

SPORTS/PERFORMING ARTS MODULE (OPTIONAL)

The following questions relate to the impact of your arm, shoulder or hand problem on playing your musical instrument or sport or both. If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: _____

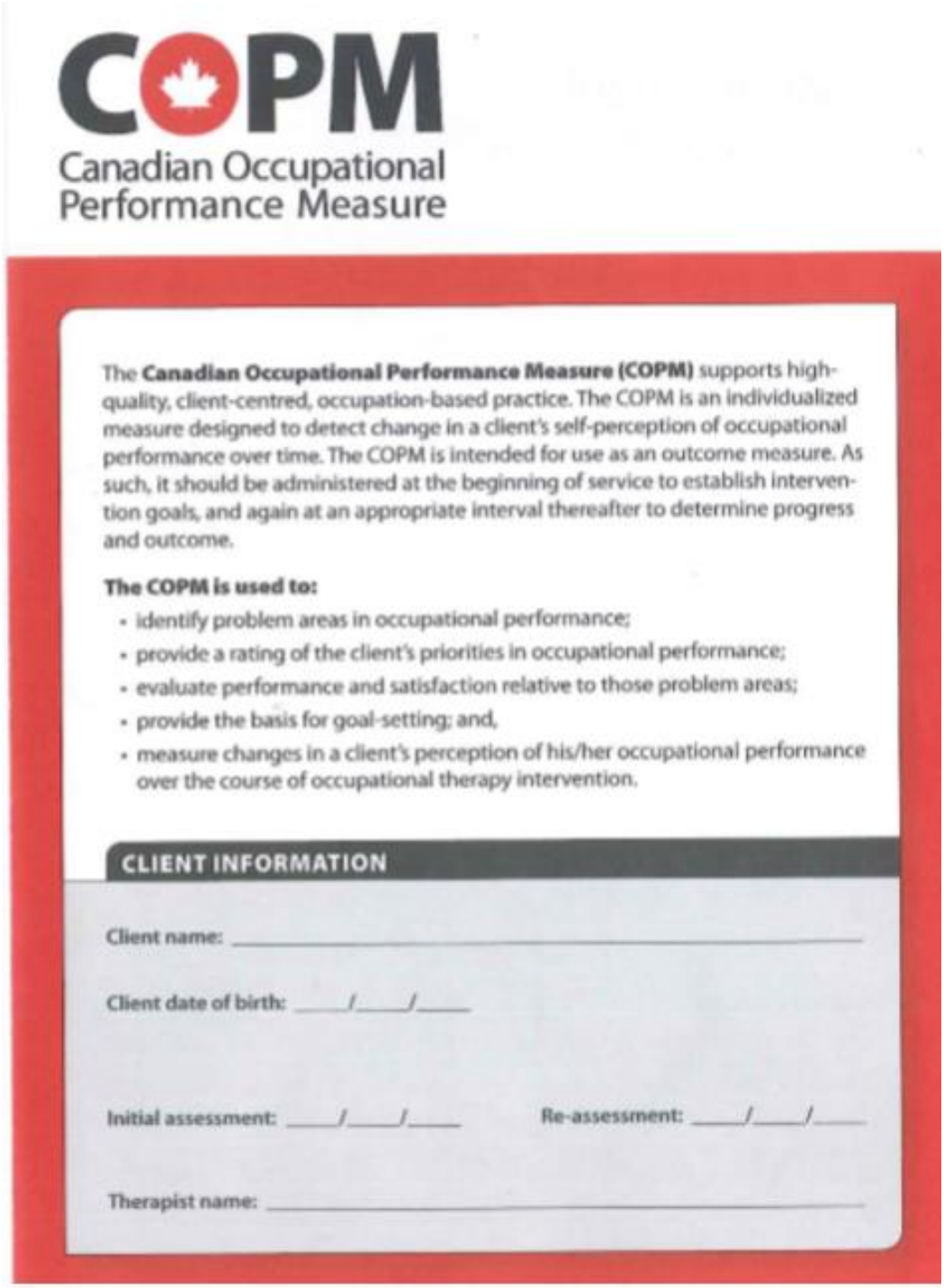
☐ I do not play a sport or an instrument. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for playing your instrument or sport?	1	2	3	4	5
2. playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	4	5
3. playing your musical instrument or sport as well as you would like?	1	2	3	4	5
4. spending your usual amount of time practising or playing your instrument or sport?	1	2	3	4	5

SCORING THE OPTIONAL MODULES: Add up assigned values for each response; divide by 4 (number of items); subtract 1; multiply by 25.
An optional module score may not be calculated if there are any missing items.

APPENDIX J: Canadian Occupational Performance Measure (COPM) assessment form



COPM

Canadian Occupational Performance Measure

The **Canadian Occupational Performance Measure (COPM)** supports high-quality, client-centred, occupation-based practice. The COPM is an individualized measure designed to detect change in a client's self-perception of occupational performance over time. The COPM is intended for use as an outcome measure. As such, it should be administered at the beginning of service to establish intervention goals, and again at an appropriate interval thereafter to determine progress and outcome.

The COPM is used to:

- identify problem areas in occupational performance;
- provide a rating of the client's priorities in occupational performance;
- evaluate performance and satisfaction relative to those problem areas;
- provide the basis for goal-setting; and,
- measure changes in a client's perception of his/her occupational performance over the course of occupational therapy intervention.

CLIENT INFORMATION

Client name: _____

Client date of birth: ____/____/____

Initial assessment: ____/____/____ Re-assessment: ____/____/____

Therapist name: _____

COPM

Canadian Occupational Performance Measure

The COPM is completed in 5 steps:

1. Identify occupational performance problems.
   The definition of a problem is:
   An occupation that a person WANTS TO DO, NEEDS TO DO or IS EXPECTED TO DO, BUT CAN'T DO, DOESN'T DO or ISN'T SATISFIED WITH THE WAY THEY DO.
2. Once specific *occupational performance* problems have been identified, the client is asked to rate each one in terms of its IMPORTANCE in his or her life. Importance is rated on a ten-point scale.
   1= not important at all **10 = extremely important**
3. Ask the client to choose up to five problems that seem most pressing or important, using the ratings just done.
4. Rate: PERFORMANCE (How would you rate the way you do this activity now?) and SATISFACTION (How satisfied are you with the way you do this activity now?)
5. Establish date for re-assessment.

SELF CARE

Self care includes occupations aimed at getting ready for the day and getting around. In the COPM, we measure three aspects of self-care: personal care, functional mobility, and community management.

	IMPORTANCE
Personal care	
Functional mobility	
Community management	

PRODUCTIVITY

Productivity includes occupations aimed at earning a living, maintaining home and family, providing service to others and/or developing one's capabilities. The COPM measures three types of productive activity: paid or unpaid work, household management, and school/play.

IMPORTANCE

Paid or unpaid work

Household management

School and/or play

LEISURE

Leisure includes the occupations performed by an individual when freed from the obligation to be productive. The COPM includes quiet recreation, active recreation, and socialization.

IMPORTANCE

Quiet recreation

Active recreation

Socialization

SCORING

PERFORMANCE (How would you rate the way you do this activity now?)

1 = not able to do it at all ⟷ **10 = able to do it extremely well**

SATISFACTION (How satisfied are you with the way you do this activity now?)

1 = not satisfied at all ⟷ **10 = extremely satisfied**

TIME 1: ____/____/____ **TIME 2:** ____/____/____

OP Problems	Impt	Performance T_1	Satisfaction T_1	Performance T_2	Satisfaction T_2
1.					
2.					
3.					
4.					
5.					
		Total Performance T_1	Total Satisfaction T_1	Total Performance T_2	Total Satisfaction T_2
TOTAL SCORES					
		Average Performance T_1	Average Satisfaction T_1	Average Performance T_2	Average Satisfaction T_2
AVERAGE SCORES (Total score / number of problems)					
				Change in Performance	Change in Satisfaction
CHANGE SCORES (T2 – T1)					

NOTES AND OBSERVATIONS

Initial Assessment

Re-assessment

Published by CAOT Publications ACE. To reorder visit: www.caot.ca/publication

APPENDIX K: Letter to research committee and CEO of Helen Joseph Hospital and permission to conduct the research

WITS UNIVERSITY

Department of Occupational Therapy

7 York Road, Parktown, 2193 South Africa • Telegrams 'Witsmed' • Tel: +27-11-717-3701 • Fax: +27-11-717-3709
e-mail: Leilane.Bogoshi@wits.ac.za

PERMISSION LETTER: CEO

CEO
Helen Joseph Hospital

Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervain's disease

Dear Dr Billa

I, Ms. Jaqueline Meier, am currently completing my Masters' degree in Occupational Therapy at the University of the Witwatersrand. It is required that I conduct a research study and compile a thesis report to complete my studies. The aim of my research is to develop an outcome based intervention programme for de Quervain's disease and compare the effectiveness of this treatment approach with a traditional protocol for patients with this condition. The traditional protocol involves immobilisation of the thumb in a splint whereas occupational based intervention involves activity and environmental adaptations, the use of occupational activities during treatment, as well as splinting.

All patients diagnosed with de Quervain's disease who are referred to occupational therapy at Helen Joseph Hospital will be randomly assigned to one of the two treatment groups. An initial assessment will be conducted on the day of the referral and will be administered again after 3 and 6 weeks of therapy. These assessments include a diagnostic test, a pain assessment, an assessment of activity limitations as well as a self- evaluation of performance and satisfaction in daily activities. Assistance from other OT staff will be required for the administration of these assessments.

All prospective participants referred will be given an information letter explaining their confidentiality within the study and that their participation is voluntary and refusal or discontinuation of participation at any time will hold no penalty or loss of benefit to which they are entitled. All participants will also be able to access the results of the study once completed, should they request this. There are also no risks to patients for being involved in this study.

If patients accept the invitation to participate in the study, they will be required sign a document informing their consent.

I am asking for permission to conduct this research study at Helen Joseph Hospital. Please sign the permission form attached to approve this request.

For further information regarding this study please contact myself, Jaqueline Meier (071 440 0089), or my supervisors, Kirsty Van Stormbroek (011 717 3701) and Denise Franzsen (011 717 3711).

Should you have any complaints or queries regarding the ethics of this study please contact the Human Research Ethics Committee (Medical) at the University of the Witwatersrand, Professor P. Cleaton-Jones, Tel: 011 717 2301 or email peter.cleaton-jones1@wits.ac.za

Contact details for the administrative offices: Ms. Z Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng, Tel: 011 717 2700/2656/1234/1252, or email: zanele.ndlovu@wits.ac.za; Rhulani.mkansi@wits.ac.za; Lebo.moeng@wits.ac.za

Kind Regards,

Ms Jaqueline Meier

Senior Occupational Therapist at HJH

BSc (OT) WITS University

18/07/16

Date

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Gauteng Department of Health
Helen Joseph Hospital
Enquiries: Dr. M.R. Billa
Chief Executive Officer
Tel :(011) 489-0306/1087
Fax :(011) 726-5425
E mail: Raymond.Billa@gauteng.gov.za
Date: 23 September 2016

Dr.M.R.Billa
Chief Executive Officer
Helen Joseph Hospital

Dear Dr.Billa

STUDY: Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervain's disease

RESEARCHERS: Jaqui Meler

The above was discussed at the Research Committee Meeting. We recommend that permission be granted for Helen Joseph Hospital to be used as a site for the above research. However, since this is a research project involving voluntary participation. We cannot guarantee participation of individuals/patients.
Upon completion of the study, a copy thereof should be submitted to Helen Joseph Hospital.

Thank you

DR. Murimisi Mukansi
CHAIRPERSON
DATE: 23/09/2016

Approved

DR. M.R. BILLA
CHIEF EXECUTIVE OFFICER
DATE: 26-09-2016

PROVINCIAL GOVERNMENT GAUTENG
26 SEP 2016
PROVINCIAL GOVERNMENT GAUTENG

GAUTENG PROVINCE

Helen Joseph Hospital
Enquiries: Dr. M.K. Bila
Chief Executive Officer
Tel: (011) 489-0306/1087
Fax: (011)726-5425
Email:Raymond.Bila@gauteng.gov.za

PERMISSION TO CONDUCT RESEARCH AT HELEN JOSEPH HOSPITAL

PRINCIPAL RESEARCHER

FULL NAME Joyce Meier

DESIGNATION Senior Production Level Occupational Therapist

CONTACT NUMBER 071 44 6026 / 011 4890292

E-MAIL ADDRESS joymeier@gmail.com

DEPARTMENT Occupational Therapist

HEAD/S OF DEPARTMENT/S Tanweer Alli

TITLE OF RESEARCH Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervains disease

OBJECTIVES OF RESEARCH

(occupation based intervention)

1) To develop an OBI protocol for de Quervains disease (DQD)
2) To determine the changes in pain, reduction in symptoms, participation in activities and satisfaction in occupational performance in patients with DQD who receive OBI
3) To determine the changes in pain, reductions in symptoms, participation in activities and satisfaction in occupational performance in patients with DQD who receive CBI
4) To compare the outcomes for pain, reduction in symptoms, participation in activities and satisfaction in occupational performance for the two different treatment approaches.

STUDY SITE/S Helen Joseph Hospital, Occupational Therapy Department

BRIEF OUTLINE OF METHODOLOGY • Quantitative, longitudinal, randomised intervention design
• Sample size 56 patients (28 in each treatment group)
• Outcome: ① Finkelstein test ② Visual Analogue Scale ③ Disability of the Arm, Shoulder & Hand questionnaire & Canadian Occupational Performance measure
• Patients will be given information letter explaining purpose of research & will sign letter of informed consent if they wish to participate. Participants will be randomly assigned to either of the two treatment groups (see follow flow diagram for specific treatment process).
• Descriptive statistics/graphs will be used to compare treatment outcomes.

EXPECTED START DATE November 2016 EXPECTED DURATION 6 months

ETHICS CLEARANCE	YES	NO	(PENDING)
CONFLICTS OF INTEREST	YES	(NO)	DETAILS:
COSTS TO HOSPITAL AND/OR OTHERS	YES	(NO)	

SOURCE OF FUNDING

SIGNATURE OF RESEARCHER & DATE Meier 15/07/2016

PERMISSION GRANTED	(YES)	NO	GAUTENG PROVINCIAL GOVERNMENT HELEN JOSEPH HOSPITAL PRIVATE BAG X57 26-09-2016
SIGNATURE (CLINICAL MANAGER /CEO)	MD Mkhatshi NAME IN PRINT & DESIGNATION		OFFICIAL STAMP & DATE

APPENDIX L: Letter to occupational therapy HOD of Helen Joseph Hospital and permission to conduct the research

WITS UNIVERSITY

Department of Occupational Therapy

7 York Road, Parktown, 2193 South Africa • Telegrams 'Witsmed' • Tel: +27-11-717-3701 • Fax: +27-11-717-3709

e-mail: Leilane.Bogoshi@wits.ac.za

PERMISSION LETTER: HOD OT

Head of Department
Occupational Therapy Department
Helen Joseph Hospital

Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervain's disease

Dear Ms Alli

I, Ms. Jaqueline Meier, am currently completing my Masters' degree in Occupational Therapy at the University of the Witwatersrand. It is required that I conduct a research study and compile a thesis report to complete my studies. The aim of my research is to develop an outcome based intervention programme for de Quervain's disease and compare the effectiveness of this treatment approach with a traditional protocol for patients with this condition. The traditional protocol involves immobilisation of the thumb in a splint whereas occupational based intervention involves activity and environmental adaptations, the use of occupational activities during treatment, as well as splinting.

All patients diagnosed with de Quervain's disease who are referred to occupational therapy at Helen Joseph Hospital will be randomly assigned to one of the two treatment groups. An initial assessment will be conducted on the day of the referral and will be administered again after 3 and 6 weeks of therapy. These assessments include a diagnostic test, a pain assessment, an assessment of activity limitations as well as a self- evaluation of performance and satisfaction in daily activities. Assistance from other OT staff will be required for the administration of these assessments.

All prospective participants referred will be given an information letter explaining their confidentiality within the study and that their participation is voluntary and refusal or discontinuation of participation at any time will hold no penalty or loss of benefit to which they are entitled. All participants will also be able to access the results of the study once completed, should they request this. There are also no risks to patients for being involved in this study.

If patients accept the invitation to participate in the study, they will be required sign a document informing their consent.

I am asking for permission to conduct this research study at Helen Joseph Hospital. Please sign the permission form attached to approve this request.

For further information regarding this study please contact myself, Jaqueline Meier (071 440 0089), or my supervisors, Kirsty Van Stormbroek (011 717 3701) and Denise Franzsen (011 717 3711).

Should you have any complaints or queries regarding the ethics of this study please contact the Human Research Ethics Committee (Medical) at the University of the Witwatersrand, Professor P. Cleaton-Jones, Tel: 011 717 2301 or email peter.cleaton-jones1@wits.ac.za

Contact details for the administrative offices: Ms. Z Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng, Tel: 011 717 2700/2656/1234/1252, or email: zanele.ndlovu@wits.ac.za; Rhulani.mkansi@wits.ac.za; Lebo.moeng@wits.ac.za

Kind Regards,

JMeier

Ms Jaqueline Meier

Senior Occupational Therapist at HJH

BSc (OT) WITS University

18/7/16

Date

PERMISSION TO DO RESEARCH

I, Tanner Allie give Ms. Jaqueline Meier permission to conduct this research: **Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervain's disease** at Helen Joseph Hospital.

Signature: _____ Date: 19/7/16

APPENDIX M: Ethical clearance certificate

R14/49 Miss Jaqueline Meier

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160847

NAME: (Principal Investigator)	Miss Jaqueline Meier
DEPARTMENT:	Occupational Therapy Helen Joseph Hospital
PROJECT TITLE:	Comparing the Effectiveness of Occupation Based Intervention with Traditional Therapy for Patients with De Quervain's Disease
DATE CONSIDERED:	26/08/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Kirsty van Stormbroek and Denise Franzsen
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	14/10/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in August and will therefore be due in the month of August each year.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX N: Plagiarism form

Faculty of Health Sciences, Postgraduate Office
Phillip V Tobias Building, 2nd Floor
Cnr York & Princess of Wales Terrace, Parktown 2193
Tel: (011) 717 2745 | Fax: (011) 717 2119
Email: Mathoto.senamela@wits.ac.za

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Jaqueline Maier (Student number: 304267) am a student registered for the degree of MSc OT in the academic year 2019.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: JMaier Date: 18/02/2019

APPENDIX O: Turn- it- in report

Comparing the effectiveness of occupation based intervention with traditional therapy for patients with de Quervain's disease- Jaqueline Meier Dissertation

ORIGINALITY REPORT

8%	4%	6%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Huisstede, B. M. A., J. Henk Coert, J. Friden, and P. Hoogvliet. "Consensus on a Multidisciplinary Treatment Guideline for De Quervain Disease: Results From the European HANDGUIDE Study", Physical Therapy, 2014. Publication	1%
2	Fiona Coldham. "The Use of Splinting in the Non-Surgical Treatment of De Quervain's Disease: A Review of the Literature", The British Journal of Hand Therapy, 2016 Publication	<1%
3	repository.up.ac.za Internet Source	<1%
4	link.springer.com Internet Source	<1%
5	scholar.ufs.ac.za:8080 Internet Source	<1%
6	www.associazioneumanamente.org Internet Source	<1%
7	J. Sato, Y. Ishii, H. Noguchi. "Clinical and ultrasound features in patients with intersection syndrome or de Quervain's disease", Journal of Hand Surgery (European Volume), 2015 Publication	<1%
8	Submitted to Monash University Student Paper	<1%
	Submitted to University of Witwatersrand	