The Role of New Zealand Osteopaths in the Care of People Who Experience Migraine: A Qualitative Exploration

Kaspara Chaise

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Osteopathy, Unitec Institute of Technology, Auckland, New Zealand 2017
Declaration

Name of candidate: Madeleine-Kaspara Chaise

This Thesis/Dissertation/Research Project entitled ‘The Role of New Zealand Osteopaths in the Care of People Who Experience Migraine: A Qualitative Exploration’ is submitted in partial fulfilment of the requirements of the Unitec degree of Master of Osteopathy.

Candidate’s declaration

I confirm that:

• This Thesis/Dissertation/Research Project represents my own work;
• Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.
  Research Ethics Committee Approval Number: 2015-1011

Candidate Signature: ……………………………………………….. Date: 21/06/2017

Student number: 1396574
Abstract

Background: Migraine is a common, disabling, neurovascular disorder. The aetiology and pathophysiology of the condition are complex, and still carry many unknown factors. Despite the pharmaceutical agents developed to help people who experience migraine (PwEM), these present drawbacks and many patients have difficulty finding relief. While most osteopaths claim that they can treat PwEM, evidence for this is scarce. While the results from the few studies that do exist are promising, much more research is required to determine the mechanism of action of osteopathy and its level of effectiveness for migraine. Research investigating the role osteopaths play in treating these patients is a first step to advance the profession and improve the care PwEM receive.

Objective: To develop a descriptive model of the phenomenon experienced by osteopaths who treat PwEM, and thus unveil the role that these practitioners play in the care of these patients.

Methods: To carry out this study, five New Zealand osteopaths were interviewed to gather their views on their role in caring for PwEM. The five in-depth, face-to-face interviews lasted between 53 and 60 minutes each. Analysis of the data from the interviews was done using descriptive phenomenological methods, following Colaizzi’s seven steps of analysis (Colaizzi, 1978).

Results: A descriptive model showing the essential meaning of care for PwEM as an osteopath in New Zealand was successfully developed. Two overarching themes, ‘The Migraine Challenge’ and ‘The Role of the Osteopath in the Care of PwEM’ were found. The multiple themes and subthemes composing these results showed the multifaceted role osteopaths take on to help these patients. Specific areas for further research in this field were identified.

Conclusion: Osteopaths have the potential to help PwEM. This study shows a first insight into the role osteopaths play in caring for PwEM, and highlights specific aspects of treatment which were recurrent across all five interviews. These provide a guide for future research, as more specific studies must be undertaken to advance the profession and determine the value of osteopathy in the care for migraine.

Keywords: Migraine, osteopathic treatment, osteopathic profession, qualitative research, descriptive phenomenology.
Acknowledgements

This thesis would not have been possible without the guidance and support of my supervisors, Dr Elizabeth Niven and Dr Dianne Roy. Thank you.
# Table of Contents

Declaration...........................................................................................................................................ii

Abstract.................................................................................................................................................. iii

Acknowledgements .................................................................................................................................iv

Table of Contents ...................................................................................................................................v

Introduction to the Thesis .......................................................................................................................1

Chapter I: Background ...........................................................................................................................3

  Chapter Introduction ...............................................................................................................................4
  Migraine, an Introduction ......................................................................................................................4
    Defining migraine .................................................................................................................................4
    The epidemiology of migraine ...........................................................................................................6
  Migraine and disability ............................................................................................................................8
  The economic burden of migraine .........................................................................................................11

The Pathophysiology of Migraine ........................................................................................................12

  Introduction to a complex subject ........................................................................................................12
  The anatomy of migraine ......................................................................................................................12
  The relationship between migraine and cervical structures ..............................................................14
  Migraine and the sensitive Brain .........................................................................................................15
  The cortical spreading depression .......................................................................................................17
  The vascular component of migraine .................................................................................................18
  Hormonal relationships .......................................................................................................................20

Conclusion of Chapter I .........................................................................................................................21

Chapter II: Literature Review - Current Treatment & Management .................................................23

  Chapter Introduction ...............................................................................................................................24
  The Diagnosis of Migraine ...................................................................................................................24
  Pharmaceutical Management ...............................................................................................................26
    Acute treatments .................................................................................................................................26
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylactic treatments</td>
<td>28</td>
</tr>
<tr>
<td>The limitations of pharmaceutical management</td>
<td>29</td>
</tr>
<tr>
<td>Non-Pharmaceutical Management</td>
<td>31</td>
</tr>
<tr>
<td>Nutrition</td>
<td>31</td>
</tr>
<tr>
<td>Behavioural therapies</td>
<td>33</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>34</td>
</tr>
<tr>
<td>Naturopathy</td>
<td>35</td>
</tr>
<tr>
<td>Manual therapies</td>
<td>36</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>37</td>
</tr>
<tr>
<td>Massage therapy</td>
<td>38</td>
</tr>
<tr>
<td>Chiropractic</td>
<td>39</td>
</tr>
<tr>
<td>Osteopathy</td>
<td>40</td>
</tr>
<tr>
<td>What is osteopathy?</td>
<td>40</td>
</tr>
<tr>
<td>Osteopathy and the New Zealand healthcare system</td>
<td>42</td>
</tr>
<tr>
<td>Osteopathy and migraine: A very limited amount of published studies</td>
<td>43</td>
</tr>
<tr>
<td>A note on evidence based practice</td>
<td>48</td>
</tr>
<tr>
<td>The wider osteopathic literature</td>
<td>50</td>
</tr>
<tr>
<td>A Multidisciplinary Approach</td>
<td>52</td>
</tr>
<tr>
<td>Conclusion of Chapter II</td>
<td>56</td>
</tr>
</tbody>
</table>

**Chapter III: Methodology** ................................................................. 59

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter Introduction</td>
<td>60</td>
</tr>
<tr>
<td>A Qualitative Approach</td>
<td>60</td>
</tr>
<tr>
<td>Descriptive Phenomenology</td>
<td>62</td>
</tr>
<tr>
<td>Ensuring Trustworthiness</td>
<td>64</td>
</tr>
<tr>
<td>What is trustworthiness?</td>
<td>65</td>
</tr>
<tr>
<td>Participant validation</td>
<td>66</td>
</tr>
<tr>
<td>Peer reviewing</td>
<td>66</td>
</tr>
</tbody>
</table>

~ vi ~
A dense description of the results ................................................................. 67
Reflexion journal ....................................................................................... 67
Creation of an audit trail ........................................................................... 68

Chapter IV: Method .................................................................................. 69

Chapter Introduction ................................................................................. 70
Ethical Considerations .............................................................................. 70
Participant Selection ................................................................................ 71
Participant Recruitment .......................................................................... 73
Data Collection .......................................................................................... 74
Carrying Out Phenomenological Methods of Analysis ......................... 75
Bracketing ............................................................................................... 76
Analysing .................................................................................................. 76
Immersion .................................................................................................. 77
Extraction of significant statements ....................................................... 78
Formulating meanings ............................................................................. 78
Categorising into themes ......................................................................... 80
Describing the preliminary results ......................................................... 81
Returning to participants ......................................................................... 82
Making changes per the participants' feedback ....................................... 82
Describing ............................................................................................... 82

Chapter V: Results ................................................................................... 84

Chapter Introduction ................................................................................ 85
A guide to reading this chapter ............................................................... 89
Overarching Theme: The Migraine Challenge ........................................ 90
Migraine: A complex condition ............................................................... 90
The unknown nature of migraine ........................................................... 90
Migraine as a diagnostic challenge for osteopaths ................................. 91
Migraine as a misused term by PwEM and the public..............................................92
Rarity of PwEM in the osteopathy clinic .................................................................93
Managing migraine: A frustratingly difficult endeavour .....................................93
Migraine as a multifactorial condition.................................................................94
Unpredictability of migraine attacks and periods of worsening ......................95
Unmet needs in the traditional medicine framework ..........................................95

Overarching Theme: The Role of the Osteopath in the Care of PwEM ...............97
A multidisciplinary approach .............................................................................97
Osteopathy as only one part of a multidisciplinary solution for PwEM ..........97
Patterns of referral from osteopaths to other health professionals .................98
Osteopaths being osteopaths: Osteopathic principles to tackle the problem ....101
Uniqueness of every PwEM and individualised treatment ................................101
Use of a wide range of osteopathic approaches and techniques ....................102
Treating the whole body .....................................................................................103
Osteopaths treat around the underlying pathophysiological cause ...............103

The osteopath in action: Specific treatment tactics ...........................................104
The neck as a target for treatment .....................................................................105
Fluid motion ..........................................................................................................105
Breathing ...............................................................................................................106
Autonomic balance ...............................................................................................107

Beyond the treatment table ..............................................................................107

The osteopath as a health educator ...................................................................107
The osteopath’s role in providing mental health support .................................109
The management plan ........................................................................................110

Chapter VI: Discussion & Conclusion ................................................................112

Chapter Introduction .............................................................................................113
Discussion ...............................................................................................................113

~ viii ~
Appendix K: Example of a collated significant statement .......................... 160
Appendix L: View of the document containing the 960 significant statements and their formulated meanings ................................................................................................................................. 161
Appendix M: Example of one significant statement giving rise to two formulated meanings ...................................................................................................................................................... 162
Appendix N: Example of two consecutive significant statements giving rise to one formulated meaning ...................................................................................................................................................... 163
Appendix O: Extract from a journal entry written about sorting formulated meanings into initial themes ...................................................................................................................................................... 164
Appendix P: Extract of initial themes with the numerical references of each corresponding formulated meaning ...................................................................................................................................................... 165
Appendix Q: Example of one formulated meaning (904) categorised under two themes (6 and 43) ...................................................................................................................................................... 166
Appendix R1: Example of a mind-map drawn for the development of themes .......... 167
Appendix R2: Example of a mind-map drawn for the development of themes .......... 168
Appendix S: Color-coded formulated meanings sorted in themes .......................... 169
Appendix T: Initial results as returned to participants ........................................... 170
Introduction to the Thesis

Migraine is the subject of much research in the medical field. It is recognised as a condition which carries a heavy burden on health worldwide, as it is the seventh highest specific cause of disability worldwide (Steiner, Stovner, & Birbeck, 2013). Throughout this thesis, the word ‘migraine’ is employed in a singular form, to denote the condition which causes recurrent migraine attacks. People who experience migraine (PwEM) not only experience the disability that comes with attacks, but also the day-to-day impact this condition causes. The economic burden of migraine is heavy on both individuals and society due to its high prevalence.

Extensive efforts to develop pharmaceutical agents that can help these patients have and continue to be made, but no single treatment solution has been developed yet. Many PwEM either do not find relief in these medications, want to avoid them, or cannot use them. The diagnosis of migraine also poses its own set of problems, as many studies have pointed out the under-diagnosis of this condition, delaying access to appropriate care. Because of these shortcomings, many PwEM do not see their needs being met by traditional medicine, and turn to other approaches. Most complementary and alternative treatments offered to these patients lack high-quality evidence for their effectiveness, and have presently unknown mechanisms of actions.

Osteopathy is a type of manual therapy used to treat musculoskeletal problems, but aims to support general health in a wide variety of patients. Osteopaths offer treatment to PwEM, even though the condition is currently understood as having a primarily neurovascular origin. The effectiveness of osteopathy has not yet been firmly established, although the few studies that have been done suggest positive outcomes, encouraging further research in this area.

Osteopathy studies in the field of migraine have focused on the effectiveness of osteopathic treatment. They have taken place without benefiting from prior investigations of how osteopaths treat these patients, and do not provide specific descriptions of the osteopathic interventions used in them. As such, the nature of osteopathic treatment for PwEM is an important subject which has remained mostly unexplored.

Michal (2009) is the sole study that sought to investigate the nature of osteopathic treatment for PwEM, through in-depth interviews with members of the profession in Austria. Michal (2009) enquired about the manual techniques the osteopaths used for migraine, and provided a first insight into an unexplored subject. In consideration of the current state of the literature, it was found that the emphasis placed by Michal (2009) on manual techniques kept the
broader picture of osteopathic management undetermined. An investigation of all that osteopaths do for the care of patients who experience migraine would provide a greater understanding of osteopathic treatment for PwEM and allow potential improvements to be made within the profession. Additionally, understanding how these patients are treated is essential to designing effectiveness trials that truly reflect osteopathic practice. Therefore, the research question this study sought to answer asked what the role of osteopaths in the treatment of people who experience migraine may be. The aim of this thesis was to show the role of osteopaths in the management of migraine, their views, approaches and treatment strategies. No other study of this kind has been undertaken in the field of osteopathy, so this study set out to provide a broad view of an unexplored subject, and aimed at providing directions for future research.

This thesis is made up of six chapters. Because of the large scope of the subject of migraine, the literature review is divided into two parts. The first is Chapter One: ‘Background’, in which information on the wider impact of the condition and its possible underlying mechanisms are presented. Chapter Two: ‘Current Treatment and Management’ offers the second part of the literature review and discusses both pharmaceutical and non-pharmaceutical approaches to the treatment of PwEM, including osteopathy. Chapter Three: ‘Methodology’ and Chapter Four: ‘Method’, describe and discuss the steps used in carrying out this study and their philosophical underpinnings. Chapter Five: ‘Results’, provides the results of this study and describes the themes that emerged through the analysis process. Finally, Chapter Six: ‘Discussion & Conclusion’, offers a discussion of the results and their implication in osteopathic clinical practice and research.
Chapter I: Background
Chapter Introduction

In this first chapter, an exploration of the main features of migraine is presented. This helps establish the nature of the condition, before considering its impact on individuals, and the ways in which health professionals, including osteopaths, address it. The chapter is divided into two main parts. The first is entitled ‘Migraine, an Introduction’, and provides an overview of the clinical manifestations of the condition. It is followed by a discussion on the individual and social health impact it causes. The epidemiology of migraine and its economic impact are also considered.

The second part of the chapter, entitled ‘The pathophysiology of Migraine’, provides an overview of the basic pathophysiological mechanisms thought to be responsible for the condition. Migraine is a complex, multifactorial disorder. Because of this, consideration of its neuroanatomical, neurophysiological, neurovascular, genetic and hormonal aspects must be described. An in-depth review of the current state of knowledge of migraine is beyond the scope of this thesis; nonetheless, the overview offered here conveys the context in which the discussions presented in this thesis take place.

Migraine, an Introduction

Defining migraine

Migraine is a complex neurovascular pain disorder. It is difficult to define its nature beyond this broad description. Pietrobon and Moskowitz (2013) describe migraine as ‘a collection of perplexing neurological conditions’ (p. 1). This statement refers to the myriad of ways in which the condition can manifest itself and the difficulties the scientific community continues to encounter in learning its underlying mechanisms. Headaches, a symptom of migraine present in most cases, are responsible for the popular conception that migraine is a type of headache. Migraine is indeed classified as a primary headache disorder (Olesen & Marie-Germaine, 2004), but should be understood as migraine being a cause of headaches, rather than migraine being defined by this symptom. Unlike tension-type or cervicogenic headaches, headaches in the context of migraine are only one of the many possible symptoms of a usually more disabiling condition. While some PwEM experience only transient neurological symptoms others may feel abdominal pain and nausea, but no headaches (Olesen, 2013). These are a few of the many possible migraine presentations described in the
International Classification of Headache Disorders (ICHD) developed by the International Headache Society. The Beta version of the third edition is the latest available form of the document, and is the basis for the discussion presented in this chapter. In the International Headache Society’s classification, diagnostic criteria for no less than 17 migraine subtypes are described (Olesen, 2013). A few of these subtypes include childhood periodic syndromes, which involve cyclical vomiting, abdominal migraine, and paroxysmal vertigo of childhood. Retinal migraine, hemiplegic familial migraine, and migraine complications such as chronic headaches, status migrainosus, migraine infarction, and migraine-triggered seizures (Olesen, 2013) are examples of atypical migraine. All these subtypes, however, are less prevalent and mostly unknown to the public compared to the two main types of migraine: migraine without aura (also known as ‘common migraine’) and migraine with aura (or ‘classic migraine’). These two disorders, as two variations of the same condition, are what are referred to throughout this thesis when employing the word ‘migraine’, and are the focus of this review.

Migraine without aura involves recurrent attacks (or ‘episodes’) of a moderate to severe headache, typically unilateral and of pulsating quality, although variations to this pattern can occur (Olesen, 2013). The headache lasts several hours to a few days, and is accompanied by other symptoms, of which photophobia, phonophobia, nausea, vomiting (Mueller, 2007; Olesen, 2013) and neck pain (Calhoun et al., 2010) are the most common. Another defining characteristic is the debilitating effect of the pain, which is aggravated by activity. This typically renders PwEM unable to function in their day-to-day life during an attack, until the symptoms resolve. PwEM may also experience symptoms in the hours or days preceding an attack which are referred to as premonitory symptoms. These usually involve increased yawning and fatigue, pallor, a heightened sensitivity to sound or light, difficulty concentrating, or blurry vision (Olesen, 2013). Migraine attacks are generally associated with triggers. These vary from person to person, but typically involve certain foods. Common examples include alcohol, coffee, chocolate, sugar, cheese, wheat, citrus fruits, or nightshade vegetables. Sensory stimuli, such as loud noises, flashing lights, strong smells; or intrinsic changes, commonly stress, hormonal changes, or lack of sleep can also act as triggers for migraine attacks (Bunner, Agarwal, Gonzales, Valente, & Barnard, 2014; Charles, 2013).

Migraine with aura typically presents in the same way as a migraine without aura, but is also associated with aura symptoms (Olesen, 2013). An aura is a combination of one or several transient, fully reversible, neurological symptoms (Burstein, Noseda, & Borsook, 2015; Cutrer & Smith, 2013; Olesen, 2013). Due to their similarity to stroke or transient ischemic
attack symptoms, these can cause much distress to patients, especially when undiagnosed (Mueller, 2007). Aura symptoms usually occur up to one hour before the headache appears and dissipate soon after. In most cases, aura symptoms are experienced as unilateral visual disturbances, such as hemianopia, scintillating scotoma or blurred vision (Burstein et al., 2015; Olesen, 2013). The second most common types of aura symptoms are sensory, and involve pin and needles or numbness spreading over an area of the face, tongue, or upper extremity. Speech impairments are less frequent but may also occur (Dalkara, Nozari & Moskowitz, 2010; Olesen, 2013). Hemiplegic migraine, involving auras causing motor weakness, and migraine with brainstem aura, which cause vertigo, tinnitus, dysarthria, and ataxia, are some other specific subtypes of migraine with aura. Another rare subtype of migraine with aura can manifest as neurological symptoms in the absence of a headache, known as a silent migraine, or acephalgic migraine (Olesen, 2013). Migraine with aura affects approximately one third of people who experience migraine (PwEM) (Mueller, 2007). Olesen (2013) adds that people who experience migraine with aura often experience migraine without aura as well. Such overlap of migraine types can be found across all other variations of the condition, and PwEM often present a mixed and complex clinical picture.

Co-morbidities such as depression, anxiety (Dhillon, Singh, & Lyall, 2011; Peres et al., 2004) and fibromyalgia (Peres et al., 2004; Peres, Young, Kaup, Zukerman, & Silberstein, 2001) commonly exist in PwEM. The risk of cardiovascular disorders, particularly ischemic stroke, is also increased in people who experience migraine with aura (Bigal et al., 2010; Diener, Küper, & Kurth, 2008). Evidence for links between migraine and coronary heart disease, patent foramen ovale, epilepsy, asthma, vertigo, and gastrointestinal disturbances have also been found (Diener et al., 2008), adding difficulty to the management of migraine.

The epidemiology of migraine

Migraine is a widespread condition, being one of the most common causes of headaches worldwide along with tension-type headaches and combinations of the two (The World Health Organization, 2011). In the last 30 years, many migraine prevalence studies have been undertaken, using the diagnostic criteria proposed by the ICHD, the first version of which was published in 1989. This has enabled researchers to conduct surveys to identify PwEM as defined by one set of criteria. In the United States, a major study was that of The American Migraine Study II (Lipton, Stewart, Diamond, Diamond, & Reed, 2001), which recreated an earlier population study undertaken in 1989. Consistent one-year prevalence percentages of
18.2% among women and 6.5% among men were confirmed, suggesting a stable population of PwEM. A slightly higher prevalence was found in the Caucasian population and the lower income class. It must be kept in mind, however, that these numbers apply to the United States specifically.

The first survey to investigate migraine prevalence across multiple countries surveyed 5554 people across France, the United States, the United Kingdom, Italy and Germany (MacGregor, Brandes, & Eikermann, 2003). A general population prevalence between 5% and 12% was found, with a similar proportion of men to women as that found by the American Migraine Study II. The international study took place in the context of a multiple part enquiry, one of which aimed to compare satisfaction rates for Zolmitriptan, which was found to be superior to other medications. Although this study appears to have been well designed, and only its prevalence results are of interest to this discussion, the fact that it was sponsored by AstraZeneca (the pharmaceutical company distributing Zolmitriptan) must be kept in mind when interpreting its findings.

In 2013, a literature review examining 19 international studies involving 272,731 people found wide-ranging one-year prevalence estimates for migraine. The results were as low as 2.65% in a Tanzanian study, and as high as 21.7% in an Italian study (Merikangas, 2013). Regardless, the weighted average prevalence of people with symptoms fitting the second edition of the ICHD migraine criteria (ICHD-II) was found to be 11.5% by Merikangas (2013), concurring with that found in previous prevalence studies. These results lead the authors to conclude that research in the field of migraine epidemiology had reached maturity. Unfortunately, this is debatable due a large unbalance of studies in favour of Western, Caucasian populations. Most prevalence studies have been done in the United States and Europe, while there is a real lack of data concerning other parts of the world. Such is the case for the New Zealand population, which has never been the subject of an epidemiological study on migraine. The only available data for this country comes from health reports evaluating the impact of a wide range of diseases. The New Zealand Ministry of Health reports an estimated lifetime prevalence of diagnosed migraine between 10.5% and 12.2% (Ministry of Health, 2007). These numbers are based on a rural/urban comparison report accomplished during 2002 and 2003. No significant differences in migraine prevalence between areas with different levels of urban development were found. While this set of migraine prevalence data presents the advantage of being shown in the wider context of New Zealand health, it presents a very limited set of estimates. These numbers could be an
underestimation depending on the method used to gather the data, which was not reported in the publication. A concern is that undiagnosed PwEM may have been left out of the count if these estimates were based on self-reported diagnoses of migraine. Although these numbers are outdated, they would suggest a similar prevalence than that found in the United States and Europe, perhaps indicating equivalent risk factors at play.

The imminent publication of the final version of the third edition of the ICHD will be an opportunity to refine the state of knowledge in this field by using improved diagnostic criteria to conduct new prevalence studies. A better understanding of the condition in New Zealand could be gained conducting such studies in this country. Specific factors make the New Zealand population unique, such as a multi-ethnic diversity which includes Māori and Pasifika populations, warranting investigation. As discussed below, migraine is known to have a large impact on society; a better knowledge of the epidemiology of migraine in New Zealand is essential to improve health care policies aimed at decreasing its burden.

Migraine and disability

Migraine is a common condition, affecting 10.5% to 12.2% of adult New Zealanders (Ministry of Health, 2016). Because of this, migraine has a considerable social health impact. Despite a mortality rate close to none, the level of disability caused by migraine during attacks and throughout PwEM’s lives, is significant. Migraine is responsible for 3% of the total disability caused by specific diseases worldwide, which places it as the seventh highest specific cause of disability globally (Steiner et al., 2013). Because of its chronicity, and the high impact the condition has on a large population of individuals over decades of life, migraine is the number one cause of disability caused by a specific neurological disorder (Leonardi & Raggi, 2013).

The extent of disability experienced by PwEM has been investigated by many studies, often in prevalence surveys, with the use of disability questionnaires. This method results in the collection of very large data sets with high levels of generalizability. The international prevalence study conducted by MacGregor et al. (2003), discussed above (p. 7), found that across western countries, 28% to 31% of the PwEM rated their migraine attacks as ‘very severe’ on a scale starting from ‘not at all severe’ to ‘very severe’. A further 48% to 58% expressed having attacks that were ‘fairly severe’. Moreover, 23% to 42% of the PwEM reported having experienced over 24 attacks in the last 12 months. This portrays migraine as a condition that has a significant impact on the lives of most PwEM. Similar conclusions can
be drawn from other studies focusing on the impact of migraine on individuals. Lipton et al. (2001), found that 91% of the 3738 American PwEM surveyed experienced some degree of disability during attacks. Of those, 53% stated that their headaches were so incapacitating as to cause severe functional impairment or necessitate bedrest. Although these large population studies are now well over ten years old, their findings are still relevant today as the foundation of a growing body of knowledge.

More recent reports refine and add a more globally inclusive understanding of the individual and social burden of migraine. Buse et al. (2012) examined the extent of disability in a specific population of PwEM: individuals who experience chronic migraine. Chronic migraine occurs when migraine attacks occur more than fifteen days per month, and was experienced by 7.68% of PwEM surveyed. Those people reported almost fourfold disability rates through a standardised questionnaire compared to other PwEM, with 24.81% of them experiencing very severe headache-related disability. Women with chronic migraine also experienced higher disability rates compared to men.

In a large international population survey, Salomon et al. (2012) sought to refine perceived disability scales for 220 health states, including migraine attacks. The study uses a 0 to 1 scale, in which 1 represents a full health state, and 0 represents death. On this scale, the common symptoms of a migraine attack (throbbing headache, photophobia, phonophobia, limited ability to perform day-to-day tasks, nausea and vomiting) were found to be perceived as 0.433 with a 0.287–0.593 certainty interval. Such a rating represents significant disability, comparable to that found for severe chronic obstructive pulmonary disease, which is 0.383 on the same scale; untreated epilepsy (0.420); severe dementia (0.438); or the first two days following an acute myocardial infarction (0.422) (Salomon et al., 2012).

While disability scales paint a picture of the day-to-day impact migraine has on individuals, health loss is a more comprehensive health measure which reveals the overall impact a condition has on the health of a population. Health loss is measured by way of a calculated unit called the disability adjusted life-year (DALY), which combines years lost due to premature mortality with years lived with a disability. This measure provides an estimate of the years lived in full health that are lost due to a condition. The Global Burden of Diseases (GBD) is a large, high-quality international systematic analysis compounding data sets concerning over 300 diseases in 188 countries (Institute for Health Metrics and Evaluation, 2017). DALYs were calculated to quantify the impact of those health conditions across the
world. The GBDs report on migraine disability (Leonardi & Raggi, 2013) includes the effects of factors other than the direct symptoms of migraine attacks, that add to the difficulties PwEM face (Leonardi & Raggi, 2013; Steiner et al., 2013). These include common co-morbid disorders, such as depression, epilepsy, gastrointestinal disturbances, and asthma (Diener et al., 2008); and higher risks of stroke, diabetes, and hypertension (Bigal et al., 2010) that add to the burden of migraine. Moreover, interictal disability (which occurs outside of attacks), accounting for anxiety, apprehension of next attack, lifestyle compromises and negative social effects (Brandes, 2008) was included in the measure. All these factors contribute to the degree of disability encountered by PwEM and were accounted for by The GBD while calculating the DALYs experienced by PwEM. The researchers found migraine to be the highest contributor of DALYs (22,362 DALYs) among neurological diseases, accounting for over half of all years lived with a disability from these diseases. Overall, migraine was found to be responsible for 0.89% of the total DALYs for all diseases in 2010 (Leonardi & Raggi, 2013). This is consistent with the high degree of disability experienced during attacks reported by Salomon et al. (2012).

Using the same measure of health loss, the New Zealand Ministry of Health reports migraine to be the 13th leading cause of health loss among women in 2013 (Ministry of Health, 2016), contributing 2.4% of the total DALYs for New Zealand women. From these numbers, migraine is responsible for more health loss in women than bowel cancer (2.3%), chronic kidney disease (2.2%) and arthritis (2.1%). While migraine does not feature among the 20 leading conditions contributing to health loss in men of all ages, the condition is still the 8th greatest cause of DALYs in people aged 25-44 years old, regardless of gender. Individuals in the 15-24 year range are also affected significantly, with migraine being the 9th leading cause of disability in this group (Ministry of Health, 2016). The impact of migraine on young adults may be explained by the tendency in which migraine first appears during teenage years (Linde, 2006).

The impact of migraine on individuals has also been investigated by many studies from a qualitative point of view (Peters, Huijer Abu-Saad, Vydelingum, Dowson, & Murphy, 2005; Rutberg & Öhrling, 2012; Rutberg, Ohrling, & Kostenius, 2013). Although there are many varied differences in the experiences of PwEM, these studies highlight shared aspects of the struggle, anxiety and frustration many PwEM experience. Besides the disability they experience during attacks, many participants in these studies find that the threat of an attack is always on their mind. The unpredictability of attacks challenges the efforts PwEM put into
maintaining a feeling of control and safety in their lives (Rutberg & Öhrling, 2012). Thus, continuous strategic management of their activities, energy levels, and avoidance of triggers is required for them to minimise the impact of the condition and maximise their well-being. In this way, migraine can be a chronic condition invisible to others, but always present in the life of those who experience it (Rutberg et al., 2013).

The economic burden of migraine
The impact of the disability caused by migraine also contributes to a major economic cost. This is mainly the result of direct health care costs, and productivity loss from PwEM. It has been estimated that in the United States alone, 1 billion $US are spent annually on migraine treatments (Yi, Cook, Hamill-Ruth, & Rowlingson, 2005). However, productivity loss is a far greater economic cost when considering the 13 billion $US loss attributed to migraine annually. Although no studies have been undertaken to identify the extent of migraine cost in New Zealand, the European Eurolight Project conducted a large cross-sectional survey across eight European countries between 2008 and 2009 to evaluate the cost of migraine in Europe (Linde et al., 2012). The project found an average individual yearly cost of €1222 among PwEM, corresponding to approximately NZ$1,942. This was mainly contributed to by productivity loss (approximately NZ$1216) and absenteeism (NZ$590) which accounted for 93% of the individual cost. Direct costs such as medication, outpatient care, and investigations, accounted for the other 7% and had a much smaller impact on individuals’ wallets. Due to the high level of disability migraine attacks can cause, many PwEM suffer a loss of productivity felt by themselves, their employers and the corporations that employ them. Loss of productivity manifests itself through absenteeism as well as presentism (decreased productivity while at work) due to attacks occurring at work or because of fatigue following an attack (The World Health Organization, 2011). The effect of migraine on productivity is further accentuated by the fact that most PwEM are affected during the most productive years of life (The World Health Organization, 2011), as prevalence peaks in the 25 to 55 year-old population (Lipton et al., 2001).

Across the whole of the European Union (27 countries) migraine accounts for 64% of total headache costs with €111 billion lost annually (Linde et al., 2012). Although these numbers will invariably be much smaller in New Zealand, these figures still retain their meaning when considering the impact of migraine on productivity, in a country where it is the 8th highest cause of DALYs in women during their most productive years (Ministry of Health, 2016).
Migraine is a very prevalent condition responsible for significant disability to individuals and contributes to large productivity losses. Improving the treatment of the condition is essential to improving the lives of the people affected and reducing the global economic and social burden of migraine. This can only occur by the advance of pharmaceutical and non-pharmaceutical treatments and further understanding of the underlying mechanisms of the condition itself.

The Pathophysiology of Migraine

Introduction to a complex subject

There are few things that can be said with a high degree of certainty about the pathophysiological origin of migraine. One of these is that migraine is currently viewed as a manifestation of a central nervous system dysfunction and therefore originates in the brain. Pietrobon & Moskowitz (2013) report with remarkable detail the main advances made in understanding the neurophysiological basis of migraine in the last decade in an expansive literature review. The authors provide context for the multitude of questions, theories and debates continually developing in the field of migraine, providing a valuable contribution to the literature surrounding the topic. The article is the basis of the information shown in this chapter. Despite the fascinating character of the subject of migraine pathophysiology, a complete review of the current knowledge on the subject is outside the scope of this thesis. The pathophysiology discussed here provides the information needed to consider the results of this study in the relevant context.

In the section below, a neuroanatomical review essential to understanding the anatomical structures in which the mechanisms underlying migraine take place is presented first. This is followed by specific aspects of migraine pathophysiology, including the neuroanatomical relationships underlying neck pain in migraine, the role of central sensitisation, and the cortical spreading depression as a key mechanism. Lastly, a brief discussion of the vascular and hormonal contributions to migraine is offered.

The anatomy of migraine

Migraine appears to be a disorder related to central sensitisation, and involves sustained activation of the trigemino-cervical complex. This is the neural network involving the trigeminal system as well as the dorsal roots of C1 and C2 (Noseda & Burstein, 2013). The
trigeminal system refers to the neural pathway that relays sensory information (touch sensation, heat or pain) from the face to the brain. These neural pathways link to multiple areas of the brain, eventually ending in the somatosensory cortices, the parts of the brain that process the sensory information from the whole body (Pietrobon & Moskowitz, 2013).

The trigeminal system involves three main afferent nerve divisions (ophthalmic, maxillary and mandibular), each serving a part of the face. These are the three main branches of the trigeminal nerve, which is the largest cranial nerve. The relevance of those nerves is that they also carry sensory information from the meninges and meningeal blood vessels, mainly through the ophthalmic division (Noseda & Burstein, 2013). The origin of migraine pain is thought to begin in the activation of nociceptors of the meningeal blood vessels, signals of which are then carried by the trigeminal nerves. These nerves converge inside the cranial cavity to form the trigeminal ganglion, a bundle of nerve tissue where most of the cell bodies of the trigeminal sensory neurons are located. The information they carry is then transmitted across different parts of the brainstem and processed in the primary and secondary somatosensory cortices. The main area of connection between the sensory nerve fibres and the second-order neurons is the spinal trigeminal nucleus. Specifically, the most caudal part of this nucleus, the trigeminal nucleus caudalis, appears to be a key component of the transmission of headache pain (Pietrobon & Moskowitz, 2013). Synapses between second and third-order neurons occur mainly in the ventral posterior nucleus of the thalamus. Other higher connections to different thalamic nuclei, the hypothalamus, the cortical area and additional structures in the brain from the spinal trigeminal nucleus represent a vast and complex area of research. Many of these connections suggest the involvement of a multitude of areas attributable to certain characteristics of migraine (affective, hormonal, sleep, sensory) (Burstein et al., 2015; Noseda & Burstein, 2013). A schematic representation of these connections is shown in Figure 1 below.
The trigeminal system as described in the section above does not represent the entirety of the structures involved in migraine. Nonetheless, it provides a basic anatomical point of reference for the transmission of pain experienced during migraine attacks.

The relationship between migraine and cervical structures
An important detail of the anatomy described above is that the trigeminal nucleus caudalis (see above) extends inferiorly into the top of the spinal cord. This area overlaps the spinal tissue from the dorsal horns of C1 and C2, which transmit sensory information from the upper cervical spine. Moreover, it is thought that the afferent projections carrying information from the meningeal vessels can extend as far as C3 (Noseda & Burstein, 2013). This suggests a convergence between sensory information from the meningeal vessels, the skin of the head and face, and that from the upper cervical structures. The convergence is thought to account for the cranial allodynia PwEM often experience during attacks. More importantly, however, this finding suggests a neural link between the trigeminal pain pathway and upper cervical structures. Although not recognised as a symptom of migraine in the ICHD’s symptom criteria, neck pain has been found to be highly common during migraine attacks (Calhoun et
al., 2010). This is particularly relevant from a manual therapy point of view, where direct treatment to the cervical spine is possible. The prevalence of neck pain and neck dysfunction in PwEM has been explored only by a few small-scale studies. One pilot study, further discussed in the following chapter, found that PwEM showed a significantly higher prevalence of C0-C1 and C1-C2 joint stiffness compared to controls (Tali, Menahem, Vered, & Kalichman, 2014). The neural connections that appear to exist between the upper cervical spine and the rest of the trigeminal system suggest the potential benefit of treatment to this region to influence trigeminal input, and the need to pursue research on the topic.

Migraine and the sensitive Brain

As described above, migraine is often defined as a sensitisation of the central nervous system, specifically involving the trigeminal system (Burstein et al., 2015; Noseda & Burstein, 2013; Pietrobon & Moskowitz, 2013). While this is widely accepted, how the sensitisation occurs originally is uncertain, and is the subject of continued research and theorisation.

Sensitisation refers to a state in which the threshold of stimulation required to activate a particular neural pathway is lowered, and the resulting response is amplified (Borsook, Maleki, Becerra, & McEwen, 2012). Sensitisation is thought to affect the trigeminal system so that an enhanced response to meningeal stimuli provokes an inappropriate nociceptive response and the activation of an inflammatory cascade. This is exemplified by the aggravation of the headache pain during coughing or bending down during an attack, which momentarily increases the intracranial pressure. The change in arterial pressure is sensed and responded to by the nociceptive mechanoreceptors of the meningeal blood vessels (Burstein et al., 2015). The existence of premonitory symptoms in migraine suggests that this neural over-reaction starts before the headache appears, even before the onset of an aura. The prevailing conception is that a complex chain of events occurs in the building up to an attack, ultimately leading to a form of aseptic, neurogenic inflammation driven by the release of inflammatory mediators and activation of the pain pathway (Burstein et al., 2015; Pietrobon & Moskowitz, 2013). This causes vasodilation, extravasation, and further release of inflammatory mediators such as mast cells and cytokines.

Sensitisation, however, does not occur only while leading up to and during attacks. It is a varying, continuous state in PwEM, much like in other chronic pain conditions (Borsook et al., 2012). The process by which this dysfunction becomes a chronic maladaptive state that causes recurrent attacks is, however, uncertain. There is some indirect evidence that
neurogenic inflammation may contribute to the sustained activation of meningeal nociceptors and genetic predisposing factors may be a possible explanation for why some individuals develop migraine and others do not (Pietrobon & Moskowitz, 2013). What appears to be evident is that in PwEM, the brain shows a hypersensitivity to homeostatic changes, and a dysfunctional response to correct those, even interictally. Several studies have shown that interictally, PwEM show enhanced sensitivity to sensory stimulus and decreased habituation compared to controls (Burstein et al., 2015; Pietrobon & Moskowitz, 2013). Considered together, the findings of this body of research suggest that migraine should not be understood as a series of separate headache attacks, but as an underlying condition which episodically reaches a threshold resulting in an attack.

Borsook, Maleki, Becerra, and McEwen (2012) propose a model of migraine as a vicious cycle resulting in allostatic load. The term refers to a state in which the regulatory mechanisms for maintaining homeostasis are overloaded, resulting in adaptive malfunction. In the allostatic load model, migraine attacks themselves produce repeated instances of high stress, followed by a failure of the brain’s homeostatic systems to habituate to various stimuli as the response threshold stays low. Such a process deregulates normal adaptive responses, and the elements of the normal stress response fail to deactivate after stimulation. This leads to increased responses to normally innocuous stimuli, as seen in allodynia, photophobia, or the triggering of an attack by some foods. The allostatic load model explains the potential PwEM have to experience a worsening of their condition over time, or see their episodic migraine attacks become chronic (Burstein et al., 2015).

The theories described above do not address the exact origin of the dysfunction causing migraine attacks, and this topic is widely debated. One emerging concept is that the problem resides in the modulatory mechanisms of the trigeminal system, rather than the trigeminal system itself (Pietrobon & Moskowitz, 2013). The inhibitory/stimulatory balance is modulated by parts of the hypothalamus and brainstem, but the nature of the abnormalities which would lead to such dysregulation is unknown. Two prevailing hypotheses attempting to explain how this phenomenon could take place exist. One describes modulatory brainstem and hypothalamic neurons allowing the transmission and amplification of nociceptive signals from the meninges to the thalamus, resulting in the signals being perceived as pain. On the other hand, it is thought that these same neurons could activate meningeal nociceptors by altering the autonomic balance of the area toward an overly parasympathetic tone as a response to homeostatic changes (Burstein et al., 2015; Pietrobon & Moskowitz, 2013).
The latter hypothesis is driven by the concept that migraine is also an autonomic system disorder, in which the processes involved in regulating the sympathetic and parasympathetic balance are overwhelmed (Burstein et al., 2015; Peroutka, 2004). The theory finds evidence in multiple autonomic nervous system tests, where PwEM show sympathetic hypofunction compared to controls (Peroutka, 2004), possibly because of lower noradrenaline levels. Noradrenaline stores may be depleted after chronic, sustained sympathetic activation and/or genetic predisposition. This causes subsequent unbalanced sympathetic responses associated with excessive levels of other sympathetic substances, such as dopamine, prostaglandins, and adenosine. In addition, the imbalance of these substances is known to cause some symptoms that are found in migraine, such as irritability, fatigue, nausea, yawning, increased pain sensitivity (Peroutka, 2004). The complete picture linking sensitisation, modulatory dysfunction, and autonomic dysregulation ultimately leading to pain is still to be discovered, and the role of other facets of the condition yet to be understood. Below is an overview of some additional characteristics of migraine which contribute to the current understanding of its pathophysiology.

The cortical spreading depression

A cortical spreading depression (CSD) is a wave of cortical depolarisation which propagates from the occipital cortex and has been identified in several neurological disorders including migraine (Zhang et al., 2010). The occurrence of CSD has been correlated to aura symptoms, and has been an important aspect of imaging technology-led investigations of migraine. However, a new perspective has emerged in recent years, proposing CSD as a potential key element in the initiation of migraine attacks. It has been shown that CSD can lead to the delayed activation of the trigeminal pathway—the same delay found between the start of aura symptoms and the onset of pain experienced by PwEM (Noseda & Burstein, 2013; Zhang et al., 2010) and can increase the activity of dural nociceptors over the areas it travels. CSD has also been found to cause the release of calcitonin gene-related peptide in vitro. Calcitonin gene-related peptide is an inflammatory mediator that appears to play a central role in the ongoing activation and sensitisation of trigeminal neurons. CSD also appears to increase gene expression of immune-reactive proteins (Pietrobon & Moskowitz, 2013), suggesting an important role of CSD in the neurogenic inflammation leading to migraine attack. Originating from in-vitro studies, most of the evidence for this concept is indirect and still requires much more research to be translated into effective pharmaceutical treatments.
Unfortunately, as the idea of CSD as an initiating mechanism brings researchers closer to a broader understanding of migraine, it also raises new questions. The main unresolved issue involves the link between migraine with and without aura. While CSD has not been associated with migraine without aura, the question of whether CSD could still play a role in its pathophysiology is worth asking. Some studies show indirect evidence that this is the case, and it has been theorised that ‘silent’ CSD, that occur over other parts of the brain and do not result in aura symptoms, are involved in the initiation of headaches in migraine without aura (Pietrobon & Moskowitz, 2013). Another unresolved question involves premonitory symptoms. As discussed above, these appear before aura symptoms, so contradict the concept of CSD as the sole initiating factor in migraine attacks.

Another issue involves the understanding of the link between the recent discoveries involving CSD and the sensitisation mechanisms described on page 15 above. One hypothesis describes a progressive increase in dysfunction in central processing and sensitivity to triggers which develops between attacks, leading to premonitory symptoms. When a certain threshold of dysfunction is reached (possibly due to a trigger), a CSD is elicited, causing activation of pain pathways. In this context, the CSD would be the miscarried effect of cortical hyperactivity, itself the result of maladaptive neural self-regulating mechanisms attempting to rectify excessive cortical stimulation (Pietrobon & Moskowitz, 2013).

CSD as an initiating mechanism for migraine is still a new and debated idea. Drug trials of pharmaceutical agents\(^1\) aimed at increasing the CSD activation threshold show wildly inconsistent results, and are critiqued for their small sample sizes and weak methodology (Pietrobon & Moskowitz, 2013). Research in this area, however, still provides much potential to further the understanding of the initiation of migraine attacks and consequent development of preventive medications.

The vascular component of migraine

Until recently, the prevailing view of migraine pain heavily focused on vasospasm of the meningeal blood vessels. The vascular theory, advanced by Wolff in the 1940s and 1950s, argued that cerebral artery dilation was the cause of the headache and aura symptoms (Graham & Wolff, 1938; Schumacher & Wolff, 1941; Wolff & Tunis, 1953). Specifically, that intracranial vasospasm caused aura symptoms and that extracranial vasospasm resulted in headache pain (Shevel, 2011). Although this concept has been discredited by many studies

\(^1\) Tonabersat and lamotrigine (generic names)
and has fallen out of favour with most headache specialists (Shevel, 2011), the topic is still a cause of contention because vasospasm is sometimes observed during attacks, and its role is disputed.

While some studies have found correlations between the dilation of certain cerebral arteries and migraine attacks, others have not, and there is no evidence that vascular change can provoke nociceptive signals (Charles, 2013). Pietrobon & Moskowitz (2013) explain that studies have demonstrated that vasodilation does not occur in every attack, and that artificially provoked cranial vasodilation does not trigger migraine attacks. In this way, vasodilation is neither sufficient nor required for a migraine attack to occur. In 2008 and 2007, one research group carried out two studies examining the effects of two peptides of the same type in vivo, both of which have equally strong cranial vasodilation effects. While one provoked migraine attacks in PwEM, showing results which would confirm Wolff’s theory, the other caused no attacks. From these studies arose the idea that the activation of particular receptors, rather than vasodilation itself, could be a contributing cause of migraine attacks (Goadsby, 2009). These studies account for the now prevalent view that any vasodilation accompanying an attack is merely an epiphenomenon occurring alongside pain mechanisms, and is part of the neurogenic inflammation process (Pietrobon & Moskowitz, 2013).

On the other hand, Shevel (2011) posits that while intracranial vasospasm has been dismissed as a cause of migraine pain, the possible role of extracranial blood vessels remains relevant. Although only a small number of studies have investigated this part of Wolff’s theory, Shevel (2011) asserts that there is significant evidence supporting the idea of nociceptive vasospasm from the external cranial arteries, specifically the superficial temporal and occipital arteries. Shevel (2011) explains that small studies carried out by Wolff in the 1940s and 1950s show that the mean pulse amplitude of the temporal artery is twice as great in PwEM interictally compared to controls and that the amplitude of pulses correlates with headache intensity. Studies showing increased frontotemporal blood flow and a greater luminal diameter on the painful side of the heads of PwEM during attacks are also presented as evidence to the role of extracranial vasospasm in migraine pain (Shevel, 2011). Another part of Shevel’s (2011) assertion is that abortive medications (triptans, ergotamine) are strong vasoconstrictors so that their action decreases the nociceptive effect of extracranial vasodilation. However, both these pharmaceutical agents carry other properties. Despite having been developed in a search for vasoconstrictive substances resulting from the understanding of the understanding of migraine at the time, both triptans and ergotamine are 5-HT 1b and 1d agonists. This makes
these medications comparable to serotonin. As a consequence, they are thought to inhibit the release of calcitonin gene-related peptide, a strong inflammatory mediator which causes vasodilation and is thought to play an important role in migraine attacks (Pietrobon & Moskowitz, 2013). Therefore, these medications act on inhibiting the inflammatory cascade which vasodilation is a part of, but this does not demonstrate that the vasoactive effect is the direct mechanism for migraine relief by these substances. From the available evidence, it is difficult to ascertain the role of vasodilation as a nociceptive mechanism in and of itself, and the debate is far from settled.

**Hormonal relationships**

It is well established that migraine disproportionately affects women (Dhillon et al., 2011; Lipton et al., 2001; MacGregor et al., 2003; Merikangas, 2013; The World Health Organization, 2011). The prevalence of migraine is low in children and substantially increases in the adolescent population, and falls following menopause (Dhillon et al., 2011). Animal studies also found differences between male and female individuals such as the greater amplitude of CSD in female mice compared to male - a difference which has been found to be reversed after ovariectomy and orchietomy (Ferrari, Klever, Terwindt, Ayata, & van den Maagdenberg, 2015). Taken together, these findings strongly suggest a female hormonal component to the condition, which has been the subject of research for several decades. It is currently well established that higher oestrogen levels account for an increased risk of migraine, but the mechanisms behind this are highly complex and yet to be fully understood (Burstein et al., 2015; Dhillon et al., 2011; Pietrobon & Moskowitz, 2013). In some PwEM, attacks occur consistently around the start of the menstrual cycle, a time characterised by an increase in oestrogen levels. On the other hand, pregnant PwEM tend to see their attacks subside during the pregnancy because of an increase in progesterone, which counteracts the effects of oestrogen (Dhillon et al., 2011).

Dhillon et al. (2011) explore the role of oestrogen in PwEM and propose a hypothesis linking high levels of the hormone with increased neuro-sensitivity. The proposed mechanism involves the increased uptake of copper due to oestrogen. Excessive amounts of copper then cause a decrease in the absorption of zinc and reduce the production of melatonin. This results in zinc deficiency and further hormonal imbalances. Other hormones, of which atypical levels are found in PwEM, are also thought to contribute to the endocrine dysregulation resulting in a cascade of effects increasing the risk of migraine. Thyroxine

~ 20 ~
regulates oestrogen levels and is thought to contribute to its high levels in PwEM. Parathyroid hormone is believed to decrease levels of magnesium and vitamin B6 when deficient, which appears to be the case in PwEM; and cortisol, which is found in high levels in PwEM, reduces copper and iron bioavailability, resulting in the generation of free radicals. Oestrogen is also thought to upregulate nociceptive gene expression and downregulate anti-nociceptive genes, which is thought to play a role in menstrual migraine (Dhillon et al., 2011). All these effects result in a cascading effect which disturbs mineral homeostasis. Copper, iron, selenium and magnesium appear to be the most affected substances, which result in the generation of free radicals, lipid peroxidation, oxidative stress, axonal demyelination. All these effects are thought to contribute to the neural dysfunction seen in migraine because the functioning of the central nervous system relies on a complex interplay of many neuroendocrine substances and mineral cellular intake (Dhillon et al., 2011).

Based on this hypothesis, Dhillon et al. (2011) performed a pilot project to evaluate if zinc, vitamin B and vitamin A supplementation in 30 PwEM could have a positive effect. The authors report that after six weeks, almost all participants were completely free of the attacks. At a three-year follow-up, only two women out of the thirty participants had experienced one mild headache during the entire period (Dhillon et al., 2011). Although these results are extremely positive, they seem almost exceedingly so. As promising as the hypothesis and results can be, the complete absence of descriptions of the method, statistical analyses and lack of detail in the reporting of the results render the validity of this pilot project minimal. However, the undertaking of other clinical trials pursuing a hormonal line of reasoning is very much worth exploring and may uncover modes of treatment truly beneficial to PwEM.

**Conclusion of Chapter I**

Many studies have demonstrated the high prevalence of migraine, the most important of which have been discussed in this chapter. Although these sources are mostly drawn from the United States and European populations, numbers reported in New Zealand appear to be within a similar range. These indicate a prevalence between 10.5% and 12.2% in the general population (Ministry of Health, 2007), disproportionately affecting women. The impact migraine has on individuals is well-documented, both from qualitative and quantitative perspectives. PwEM experience the burden of migraine as a chronic disorder, which affects their work, relationships and social life both during and between attacks. Co-morbidities, like
anxiety, depression and cardiovascular diseases add to the degree of disability PwEM face outside of attacks, which themselves are highly incapacitating. The high prevalence and high degree of disability linked to migraine result in a large economic and social burden, involving high health care costs and loss of productivity. Through the literature presented throughout this chapter, it can be concluded that migraine clearly poses a global health problem. While migraine is known to be a neurological condition, the mechanisms behind it are still unknown. Genetic, vascular, and hormonal components of its pathophysiology add to the ever-evolving understanding of migraine. Diverging expert opinions, interpretations and theories exist alongside research findings, the most important of which have been summarised in this chapter. Musculoskeletal factors, specifically the neuroanatomical relationship between the cervical spine and the trigeminal system are of special interest in the context of this thesis, as they point toward potential musculoskeletal treatment avenues. These are explored in Chapter Two below, as part of a review of the main treatment modalities currently used to address migraine.
Chapter II: Literature Review - Current Treatment & Management
Chapter Introduction

In Chapter One, the impact of migraine as a global health burden and the possible pathophysiological mechanisms behind it were explored. In the face of a condition that is difficult to treat, many pharmaceutical and non-pharmaceutical approaches have been put forward to help PwEM. Because of the complex interplay of factors involved in the aetiology of migraine, the prevention of migraine is a largely overlooked topic in research. This chapter provides an overview of the guidelines for the pharmaceutical management of migraine, and the limitations of these treatments. The clinical guidelines published by the National Institute for Health and Care Excellence (NICE) (2016) are used as a basis for the discussion. This is followed by a review of the literature surrounding the main non-pharmaceutical approaches used by PwEM to complement or replace the use of medication. A critical appraisal of the evidence for each modality is provided, including that of osteopathy. Additionally, a more comprehensive discussion of osteopathy, its place in the New Zealand healthcare landscape, and the theories underlining its use in the treatment of migraine are presented. The chapter closes with a discussion on the clinical implication of the literature discussed and the use of a multidisciplinary model of care for PwEM.

To start this discussion, the diagnosis of migraine must be examined, since the appropriate treatment of the condition can only take place following its correct diagnosis. However, this first step in the management of migraine carries its own difficulties.

The Diagnosis of Migraine

The first step to treating migraine, as for any other condition, is to identify it. The diagnosis of migraine is mainly based on the history of symptoms, and while there is no medical test to confirm a diagnosis, examinations can be used to rule out other causes of headaches. Despite the diagnostic criteria provided by the ICHD-II, many authors describe the diagnosis of migraine as difficult, and its possibility is often overlooked by health professionals. Many articles explore the phenomenon of the under-diagnosis and misdiagnosis of this condition (Miller & Matharu, 2014; Tepper et al., 2004; Yi et al., 2005; Yin et al., 2015).

Unfortunately, none of these involve the New Zealand population, and existing studies mainly show a perspective from the United States. Several of these articles (Evans & Wheeler, 2003; Tepper et al., 2004) cite Lipton, Diamond, Reed, Diamond, and Stewart (2001), which reports that 48% of PwEM have not received a diagnosis of migraine by their
physician. Attention must be drawn, however, to the fact that this study constitutes one of the very few data sets which attempts to quantify the problem. Furthermore, the study took place in 2001, making it outdated.

A perhaps more accurate estimation of the prevalence of undiagnosed PwEM is proposed by a well-designed, more recent American population study of 5133 people experiencing headaches (Lipton, Serrano, et al., 2013). The researchers found that in this sample, as much as 43.6% of people whose symptoms fit into the IHCS-II criteria for migraine had not been given such a diagnosis. This percentage is less than the results reported by Lipton et al. (2001) but still speaks to the impact of the issue. So much so that Lipton, Serrano, et al. (2013) identifies the diagnosis of migraine as one of the key barriers preventing successful treatment of PwEM.

A possible cause for these high rates of undiagnosed PwEM may lie in the frequency of incorrect diagnoses claimed by some authors. In the international literature, there are reports that migraine attacks are often mistaken for tension headaches or sinus headaches by physicians (Evans & Wheeler, 2003; Miller & Matharu, 2014; Yi et al., 2005). These instances of misdiagnoses are thought to disproportionately affect PwEM who do not have auras or experience less severe disability associated with attacks. In those cases, tension-type, cervicogenic or sinus headaches come to physicians’ minds before they consider the possibility of migraine (Yi et al., 2005). Such tendencies can be a barrier to the successful treatment of PwEM, as medications used for other headaches, most notably non-steroidal anti-inflammatory drugs (NSAIDs), are often not effective enough for PwEM. In a published expert opinion piece, Evans & Wheeler (2003) call attention to the over-diagnosis of sinus-types headaches in PwEM, raising the question: ‘why this fixation with sinus headaches?’ (p. 1). The authors point to misconceptions about migraine shared by both physicians and patients.

Schreiber et al. (2004) screened 2991 patients describing themselves as having sinus headaches, and found that 88% of them had symptoms fulfilling the IHCS-II criteria for migraine. These numbers suggest that cultural and educational factors may affect the rate of migraine diagnosis, which can result in delayed care and higher healthcare costs for PwEM. Other studies do exist exploring the attitudes around migraine, showing the cultural and social stigma surrounding migraine and its impact on physician knowledge, diagnosis, and treatment quality (Dekker, Neven, Andriesse, & Kernick, 2012; Patwardhan, Samsa, Lipton,
& Matchar, 2006). It is important to establish whether the under-diagnosis of migraine is also a problem in New Zealand, so the care of these patients can be improved. In the meantime, it can be speculated that similar problems to those reported in the United States do occur in New Zealand, due to the similarities found in migraine prevalence, cultural and societal context between the two countries.

Pharmaceutical Management

The pharmaceutical management of migraine reflects the complex pathophysiology of the condition. Successful treatment is relative, and usually requires trial and error to find the correct combinations and doses of medications to suit the individual needs of PwEM (Miller & Matharu, 2014; National Institute for Health and Care Excellence, 2016). There are many choices of medications that can be used, each with different levels of effectiveness, varied responses depending on the individual, and different side effects. The optimal treatment for a patient depends on multiple factors. Mainly, the person’s preferences regarding the mode of administration, the value they place on effectiveness relative to the risk of adverse effects, the possible interactions with other drugs, and the patient’s co-morbid conditions (Miller & Matharu, 2014). Pharmaceutical treatment of migraine, therefore, tends to require time, patience, long-term management, and adaptation.

Pharmaceutical agents used by the medical profession can be simplified into two categories, abortive and prophylactic medications. Abortive migraine medications, also referred to as acute medications, include analgesics used in the event of migraine attacks, to reduce or end the headache pain. Abortive medication also consists of other types of medications used to improve other symptoms of migraine attacks. An example of this is anti-emetic medication. Abortive medications are most effective when taken as early as possible in the attack (National Institute for Health and Care Excellence, 2016). On the other hand, the other type of medication is prophylactic, which is taken consistently and regularly, regardless of symptoms, to decrease the frequency of attacks (Weintraub, 2000). The use of abortive and prophylactic medications is described in more detail below, followed by a discussion on the limitations of these types of therapies.

Acute treatments

In cases of mild or moderate severity, PwEM usually self-medicate with over the counter analgesics, like ibuprofen. These are considered to be the first line of treatment, but tend to be ineffective for the high level of pain experienced by people who have severe and/or frequent
migraine attacks (Weintraub, 2000). In the 1990s, the development of triptans (serotonin 5-HT 1b/1d receptor agonists) revolutionised migraine care. Triptans became the preferred acute migraine prescription treatment over opioids, narcotic and ergotamine for severe migraine pain (National Institute for Health and Care Excellence, 2016; Roberto et al., 2015). The use of these older substances is advised against by the NICE clinical guidelines and the Canadian Headache Society Guidelines, because of the greater adverse effects they cause and their lack of clinical advantages compared to triptans (Cameron et al., 2015). Instead, the NICE recommends the use of prescription NSAIDs, aspirin, or paracetamol as first-line analgesics, or combinations of these. NICE guidelines recommend following this with triptans as a second-line of intervention if the former are unsuccessful in relieving the patient. Linde (2006) reports that triptans are helpful in 60% of cases where the patient finds NSAIDs ineffective. In a large meta-analysis, it was found that 43% to 76% of PwEM find relief after two hours following standard dose triptan tablets (Cameron et al., 2015). These studies exemplify the well-demonstrated clinical usefulness of this class of medication, the evidence for which has been assigned a grade A by an evidence review conducted by The American Headache Society (Marmura, Silberstein, & Schwedt, 2015).

There are multiple versions of triptans (sumatriptan, zolmitriptan, naratriptan, rizatriptan, eletriptan, almotriptan, frovatriptan) and each has similar mechanisms of action but show differences in their efficacy, speed of action, duration of action, likelihood of adverse effects, and individual responses. Sumatriptan was the first to be developed (Humphrey & Feniuk, 1991) and is the most well-known type of triptan. Its mechanism of action is still only partially understood, but is thought to involve cranial vasoconstriction, the reduction of neurogenic inflammation through the activation of serotonin receptors, and the inhibition of the trigemino-vascular system (Tfelt-Hansen, De Vries, & Saxena, 2000; Weintraub, 2000). Sumatriptan is usually the first triptan prescribed to PwEM, as it is cost-effective and available through different routes of administration. While most patients prefer taking triptans orally, patients experiencing severe nausea, children, or patients who need rapid relief often opt for nasal sprays or suppositories (Weintraub, 2000).

Although the adverse effects of triptans are mild and infrequent compared to other analgesics such as ergotamine, they may still occur. The most frequent of these include dizziness, tightness in the chest and jaw, tingling, heat sensations and nausea (Monson & Schoenstadt, 2017). Additional acute migraine treatments include agents that target symptoms other than
pain, typically anti-emetic medications like domperidone, metoclopramide, and prochlorperazine (Linde, 2006).

**Prophylactic treatments**

Prophylactic treatments are used in cases of severe, frequent migraine attacks and are usually taken daily (D’Amico & Tepper, 2009). They are recommended for people who experience two or more attacks per month, people who have severely disabling attacks, or those who do not find relief through abortive medications (Linde, 2006). As Mueller (2007) points out, none of the medications used for migraine prevention were originally developed for this particular purpose. Thus, the exact mechanisms of action of these substances are uncertain, although they are known to affect central nervous system sensitivity. Topiramate (an anti-epileptic) or propranolol (a beta-blocker) are recommended by the NICE guideline as first choice for migraine prophylaxis (National Institute for Health and Care Excellence, 2016). Alternatives such as amitriptyline (a tricyclic antidepressant) and riboflavin (vitamin B2) may also be offered in combinations depending on the patient’s circumstances, co-morbidities and individual responses to these substances. For example, someone who experiences migraine, and also has depression, fibromyalgia or insomnia, may be more likely to benefit from amitriptyline since this drug is also used for these conditions (Mueller, 2007).

It is reported that approximately 45% of PwEM who receive prophylactic medication notice at least a reduction by half in the frequency of their migraine attacks. Of these patients, 20% experience a decrease in frequency of over 75% (D’Amico & Tepper, 2009). In view of these numbers, there is no doubt that this type of medication provides valuable relief to those for whom it does work. For patients who do not respond positively to prophylactic medication, another option exists. Regular toxin type A injections around the head and neck can be offered as a preventative intervention (National Institute for Health and Care Excellence, 2016). Botulinum toxin blocks neuromuscular transmitters and has been found to significantly lower the frequency and intensity of attacks in several studies (Nissan & Diamond, 2005). Nevertheless, various adverse effects such as facial paresis, eyelid ptosis, muscular weakness, stiffness, spasm, pain, and rashes at the sites of injection are often encountered. Unfortunately, headaches and migraine have also been cited as potential adverse effects of botulinum injections, so this solution can be counter-productive (Nissan & Diamond, 2005).
The limitations of pharmaceutical management

Despite advances in pharmaceutical treatments in the last two decades, PwEM continue to face many difficulties managing their condition. The pharmaceutical treatments described in the sections above do help many PwEM, but the extent of their suitability is limited to only a portion of individuals, leaving many PwEM feeling disenchanted in their search for a reliable solution. This includes people with pre-existing conditions and other contraindications to these medications, who are left with very limited treatment options; people who experience more side effects than average; those who find the positive effects of the treatments limited; and people who cannot afford the cost of migraine medications. Additionally, multiple problems can stem from the use of both abortive and prophylactic medications, which PwEM are often concerned about. In a qualitative study, Rutberg et al. (2013) report that the PwEM interviewed avoided using medication more than what was ‘absolutely necessary’, for fear of loss of effectiveness over time, negative long-term effects, or risks of dependency. The struggle PwEM encounter in finding relief is well demonstrated in the literature. Published in 2013, a United States survey of 5591 patients with episodic and chronic migraine as defined by the ICHD-II revealed significant problems encountered by this population (Lipton, Buse, Serrano, Holland, & Reed, 2013). Multiple areas in which patients’ needs were not addressed by medical treatment were identified, affecting 40.7% of all participants. Surprisingly, this portion of PwEM was more likely to use triptans and prophylactic treatments, the standard recommendation of medical care for migraine, showing the limitation of these types of treatments. Additionally, the study showed that of all the patients with unmet needs, 47% had moderate or severe headache disability; 37.4% were dissatisfied with their acute treatment; 32.0% had encountered excessive opioid or barbiturate use or probable dependence; and 26.2% had limited treatment options (Lipton, Buse, et al., 2013). These large numbers show the extent of the limitations of pharmaceutical treatment and the high prevalence of problems found in the use of these substances.

Among the types of abortive treatments, triptans, as discussed above, are the most effective and present fewer side-effects compared to ergotamine, barbiturates or opioids. Despite these benefits, their use still presents considerable disadvantages. First, triptans are usually contraindicated for any person living with a cardiovascular condition, due to their potential of increasing risks of stroke. While this area of research is still lacking, and the long-term effects of triptans are still unknown (Roberto et al., 2015), people with at-risk co-morbidities must rely on other, less effective or otherwise problematic, forms of treatment. Secondly,
triptan use, combined with that of other serotonin agonists (e.g. selective serotonin reuptake inhibitors, tricyclic antidepressants, tramadol, or metoclopramide) can lead to serotonin syndrome. Serotonin syndrome occurs due to an excessive amount of serotonin in the central nervous system and can cause neuromuscular rigidity, hyperthermia, hyperreflexia, akathisia, and anxiety (Mueller, 2007). Fortunately, cases of serotonin syndrome are quite uncommon. Lastly, medication-overuse headaches (or rebound headaches) are the most common problem affecting many patients who take abortive medication regularly. Medication overuse headache refers to headaches that occur because of the excessive use of acute pain medication to treat headaches (migraine or otherwise). This situation may result in a new, superimposed headache, or correspond to a worsening of the pre-existing headaches (Olesen, 2013). Medication overuse headaches lead to a vicious cycle when more medications are being taken to treat them. Discontinuation of medication, in turn, often causes headaches as part of withdrawal symptoms. It is thought that a large proportion of patients experiencing chronic migraine do so because of medication overuse for what used to be episodic migraine attacks. This condition, termed ‘transformed migraine’ by some authors (Weintraub, 2000), corresponds to medication overuse headaches in the context of migraine. Transformed migraine can be caused by any type of acute migraine medication, including triptans. Such situations cause a diagnostic challenge, because it is difficult to ascertain whether the migraine condition is worsening by itself or due to medication. Transformed migraine can only be helped by going through a limited medication withdrawal, and using prophylactic medications instead of acute ones (Linde, 2006).

Prophylactic treatments, while helping reduce the adverse effects of abortive medications, also present disadvantages of their own. Because of their frequent side effects and long term impact, it has been reported by many authors that PwEM are often reluctant to start taking them or will discontinue their treatment (D’Amico & Tepper, 2009; Edmeads, 2006; Lipton, Buse, et al., 2013; Smelt et al., 2014). D’Amico and Tepper (2009) explain that the most common adverse effects include weight gain, (from flunarizine, valproate, or amitriptyline); central nervous system difficulties (topiramate), and somnolence (amitriptyline). For this reason, prophylactic treatments must be chosen to suit the person’s lifestyle. For example, a truck driver or a machine operator should not be prescribed amitriptyline due to the safety risks associated with somnolence. Nonetheless, many patients are reluctant to rely on the daily ingestion of a medication which has only a 45% likelihood of decreasing the attacks by over 50% after three months of consistent use (D’Amico & Tepper, 2009).
Despite the number of acute and prophylactic medications available, many PwEM are unable to find adequate relief, or face issues such as side-effects, dependency, and medication overuse headaches. In such circumstances, it is understandable that many PwEM turn to other forms of treatments.

Non-Pharmaceutical Management

In the face of the limitations of medications described above, non-pharmaceutical management of PwEM may be recommended by physicians as complements and are sought out by many PwEM themselves (Rossi et al., 2005). Medical professionals usually use education (especially about trigger avoidance and lifestyle), the use of headache diaries to keep track of attacks, or stress management as a first line of treatment before prescribing medications (Marmura et al., 2015; Nappi et al., 2006). While non-pharmaceutical treatments are commonly thought to present the advantage of causing minimal adverse effects, evidence of their effectiveness varies widely across modalities. This section offers a review of the evidence available for four common non-pharmaceutical approaches: nutrition, behavioural therapies, acupuncture, and naturopathy; and three manual therapies: physiotherapy, massage, and chiropractic. The literature concerning osteopathy is then discussed in detail. A discussion on multidisciplinary management, where various modalities are employed in conjunction, is offered at the end of this chapter.

Nutrition

Although the impact of food triggers on migraine has been known for a long time, quality nutritional and diet studies are a relatively recent area of migraine research. A United States study, Bunner, Agarwal, Gonzales, Valente, and Barnard (2014) carried out a randomised crossover trial of a low fat, high fibre vegan diet, based on the hypothesis that this type of diet can reduce estrogenic activity. The diet was maintained for 16 weeks by 42 adults diagnosed with migraine as defined by the ICHD-II. The participants were divided into two groups, each one going through the 16-week diet intervention as well as 16 weeks of taking a placebo supplement. A period of four weeks at the beginning of the diet intervention was carried out to eliminate all foods that would be potential triggers. These were then progressively re-introduced while recording migraine attacks in a diary to identify triggers. During this period, all participants eliminated wheat, soy, citrus fruits, nightshade vegetables, chocolate, coffee, sugar, tea, and alcohol, among others. A crossover occurred between the two groups so that
while one started with the diet intervention, the other started with the placebo intervention. The researchers found promising results, where both headache frequency and intensity had reduced in both groups during the diet interventions. Although this study involved only a small number of participants, it was well designed and offers strong evidence for the importance of diet in PwEM. A limitation, however, involved the difficulty separating the effects of the elimination of trigger foods and those of the diet itself. Interestingly, another limitation of the study reflects the positive effect the diet intervention had on the participants: In the group who started the diet first, 30% of the participants did not want to go back to their old diet. This resulted in a change in the baseline data for the group in the placebo intervention, despite the researchers’ instruction to return to their pre-intervention diet.

Other nutrition studies have focused on specific diet components. Most recently, the effect of lipids has been a common subject of investigation. Another crossover study involving 128 Italian participants, carried out in 2015, found a significant decrease in migraine attack frequency during a three-month period of implementing a low-lipid diet compared to a normal-lipid diet (Ferrara et al., 2015). An Iranian study, published in the same year, found that lower dietary intakes of omega 3 fatty acid in the diet of 105 PwEM was associated with a higher frequency of migraine attacks (Sadeghi, Maghsoudi, Khorvash, Ghiasvand, & Askari, 2015). From these studies, it appears that a diet eliminating common dietary triggers, including animal products and the reduction of lipid, combined with an increase in omega 3 fatty acids intake, could be helpful for PwEM. However, more studies in this field are needed, specifically systematic reviews evaluating whether these types of interventions could become a part of standard recommendations for migraine care. A significant advantage of diet interventions is the lack of adverse effects. Furthermore, these interventions can lead to a general improvement in diet and health to those who try them, and require low financial expenditure compared to medications. However, the true cost of diet interventions resides in the difficulty found in maintaining them. Beyond the need for long-term motivation and habit-making, accessibility is a real problem for many people. Such diets require consistent preparation of food in a certain way, access to the foods that are part of the diet, and the ability to avoid foods that are not. In New Zealand, socio-economic disparities also result in limited access to food and food choices (Rush, Puniani, Snowling, & Paterson, 2007; Wang et al., 2009). Physical, practical, or financial limitations can render this type of migraine management close to impossible for some patients.
**Behavioural therapies**

Behavioural therapies, specifically cognitive behavioural therapy, biofeedback and relaxation therapy, are common non-pharmaceutical approaches mentioned in the medical literature. These modalities are often suggested in discussions on the management of PwEM without further discussion of the available evidence, such as in Fuller and Kaye (2007) or Mueller (2007). Weintraub (2000) asserts that ‘deep relaxation is particularly useful during an acute migraine attack’ (p. S3) with no supporting reference. Biofeedback is also recommended in the same article, based on a reference dating from 1986 (Chapman, 1986). However, the study cited did not reveal significant evidence for the benefit of this therapy for migraine (Chapman, 1986), revealing problematic assumptions behind these recommendations. A search of the literature reveals that most of the effectiveness studies for relaxation, biofeedback or other behavioural therapies for migraine were done prior to 2000. A review of the strength of evidence for migraine treatments by Silberstein (2000) attributed to behavioural therapies an A grade\(^2\), suggesting the usefulness of these therapies. Despite these promising results, a hiatus in this area of research can be felt post-2000, and clinical guidelines such as those published by the NICE do not include any type of behavioural therapy in their treatment recommendations for migraine (National Institute for Health and Care Excellence, 2016).

Fortunately, recent reviews are seeking to fill this gap in the literature with updated evidence-based reports on behavioural therapies. Sullivan, Cousins and Ridsdale (2016)’s study is one of the most recently conducted systematic reviews of behavioural interventions for migraine including relaxation therapy, cognitive behavioural therapy, biofeedback, and combinations of these. Varied results were found, with improvements in outcome measures (migraine attack frequency and psychological/cognitive outcomes) ranging between 20% and 67%. The systematic review showed that the best outcomes came from an intervention consisting of a combination of relaxation therapy, cognitive behavioural therapy, biofeedback, and pharmaceutical treatments, demonstrating the benefit of prescribing different therapies in conjunction with each other. Unfortunately, a major limitation found in Sullivan et al. (2016) was the inclusion of studies which also used participants diagnosed with tension-type headaches. These types of headaches may have been more responsive to behavioural therapies, resulting in an overestimation of its effectiveness in migraine. The overall quality

\(^2\) Corresponding to consistent evidence from multiple well designed studies.
of the studies was also reported to be low. The main factor limiting the qualities of the studies used in the review was a difficulty to perform sham treatments and assess the degree of placebo influencing the results. Based on the literature, it can be said that behavioural treatments have their place in the care of PwEM, especially if used in combination, but better ways to assess their effectiveness should be explored in future research.

**Acupuncture**

Acupuncture, involving the needling of specific points of the body, is now recognised as a valid non-pharmaceutical treatment for PwEM, as many studies show strong evidence for its positive effects on PwEM. A course of up to ten sessions of acupuncture, over the course of five to eight weeks, is recommended by the NICE clinical guideline for preventive treatments of migraine if prophylactic medications are not effective (National Institute for Health and Care Excellence, 2016). Although the underlying mechanisms of acupuncture are unknown, it is believed that multiple factors are involved, including placebo mechanisms, local musculoskeletal effects, spinal and cortical effects (Allais et al., 2016). The latest review of this therapy for episodic migraine includes 22 trials and was undertaken in 2016 (Allais et al., 2016). In the review, a significant reduction in headache frequency was discovered with acupuncture treatment compared to prophylactic medication treatments. This difference diminished after six months, when the effectiveness of both acupuncture and pharmaceutical treatments appeared to be approximately equal. This shows valuable benefit since acupuncture is associated with very minimal adverse reactions. Yet, only a moderate reduction in headache frequency was found compared to no acupuncture, while only a small, but statistically significant difference was found compared to sham acupuncture. This may speak for the difficulty involved in creating successful sham treatments mimicking acupuncture. Results from studies attempting to use sham interventions should be interpreted with caution, as it is very difficult to avoid creating physiological changes, and the difference for the participants may be noticeable (Allais et al., 2016). Another limitation of the review includes the absence of long-term follow-up studies (over more than one year). Allais et al. (2016) conclude that their work shows overall moderate quality evidence, but indicates the value of suggesting acupuncture as an option to patients.

Rutberg & Öhrling (2009) explore the use of acupuncture for migraine from a different point of view. Qualitative interviews of ten Swedish women with migraine who had been receiving acupuncture treatments for migraine revealed they found that it was effective to relieve their...
pain, decrease their use of medication, and improved their mental health. The authors report that the participants felt that owing to acupuncture, they could enjoy life more, felt more in control of their condition, and saw the social and productivity burden of migraine on their family and their work lessen. Although this study appears highly rigorous from the methods reported, it must be pointed out that the women had to have received at least eight acupuncture treatments to participate. The aim of the study was to describe the experiences of acupuncture treatment among women who experience migraine, but the study sample used means that only the narratives of women who think acupuncture is helpful for them and continue using it, is expressed. Learning the points of view of patients who received only a few treatments could have resulted in a more balanced perspective. It may have helped identify reasons why some PwEM may not find acupuncture suitable, and highlight areas for improvements. Because of this, the study offers valuable, but incomplete insight into how acupuncture can help PwEM.

Naturopathy

Naturopathy encompasses many types of therapies, including herbal remedies, homeopathy, and natural health supplements. Naturopathy is considered a type of complementary and alternative medicine (CAM) and may be sought by PwEM who want a more natural approach to migraine prevention, with fewer side effects than medication. Unfortunately, naturopathy shows limited evidence for its efficacy. There is a lack of high-quality studies, and most studies that have been published only investigate specific naturopathic remedies, so that the effectiveness of naturopathy as it is practiced (where the naturopath proposes several remedies depending on the patient’s needs) is left unexplored. Lavender, valerian, and peony, among others, are plants commonly used by naturopaths to treat PwEM, according to Villella (2002). However, few studies investigating the use of these herbal remedies have been conducted. Feverfew, on the other hand, is the most common herb traditionally used by naturopaths for migraine prevention, and has been the subject of multiple studies, many of which were undertaken in the late 1990s. De Weerdt, Bootsma, and Hendriks (1996) undertook a systematic review of four trials assessing the use of feverfew for migraine. The authors conclude that a small positive effect is plausible but that there is a real lack of

Evans and Taylor (2006) reviewed the evidence for six common herbs and supplements for PwEM and also concluded that a grade B could be given at best for some of these remedies (Evans & Taylor, 2006). Magnesium was one of these, and was investigated by several trials showing conflicting results. Again, the issue of low-quality studies predominates and it is difficult to arrive at a firm conclusion based on the current state of the literature. Moreover, adverse effects, mostly diarrhoea, was found to be associated with magnesium supplementation, making it less preferable to other naturopathic remedies. Another naturopathic treatment discussed by Evans and Taylor (2006) is the extract of the plant butterbur. The effectiveness of Petadolex, a branded capsule containing butterbur extract, was investigated by several trials. These showed overall grade B evidence for a therapeutic gain for the higher dose version of this product, where 150mg showed 50% therapeutic gain in 19% of participants. The main side effect, burping, although mild, was quite common (Evans & Taylor, 2006; Lipton, Göbel, Einhäupl, Wilks, & Mauskop, 2004).

Homeopathy has also been investigated, although by very few studies, as demonstrated by Ernst (1999), a systemic review including only four trials. It should be kept in mind, however, that this review was undertaken 18 years ago and the topic calls for an up-to-date review. Although no statistically significant benefits were found by the three, higher quality studies, the fourth found significant improvement in all outcome measures. Due to the fourth study’s weak quality, Ernst (1999) concluded that homeopathy does not appear to provide significant therapeutic value for PwEM.

Overall, the literature surrounding the use of naturopathy for migraine is lacking, in both quality and quantity. Even though no firm conclusion can be made, the literature on this subject shows no convincing indication of therapeutic benefit. Nonetheless, most of these remedies have no or very mild side effects, so PwEM who want to use them may still personally benefit from their use.

**Manual therapies**

The use of manual therapies by PwEM is not new. While some articles aimed at medical professionals suggest their use as CAM for PwEM who do not respond well to medication,

³ Some evidence from randomised-controlled trials exists, but is too inconsistent or sparse to warrant optimal scientific support
manual therapies are not generally part of official treatments guidelines for migraine (Fuller & Kaye, 2007; Linde, 2006; Weintraub, 2000). This is because the degree of evidence is still quite limited and not many studies are of high quality. The difficulties found in carrying out successful blinding are the same as those encountered evaluating the other non-pharmaceutical therapies described above, although some recent manual therapy trials have attempted to solve these. This section offers an overview of the current evidence concerning physiotherapy, massage, and chiropractic in relation to migraine. This is followed by a discussion of the nature of osteopathy and its place in New Zealand. An exploration of the different aspects of the literature relating to osteopathy and migraine concludes this section.

**Physiotherapy**

Physiotherapy can include exercise, manual therapy, soft-tissue techniques, and strength and endurance training. One of the most recent studies involving physiotherapy and migraine provides insight into the specific kind of protocol manual therapists may use to help PwEM. Bevilaqua-Grossi et al. (2016) carried out a randomised controlled trial assessing the specific effects of a physical therapy protocol on PwEM. Two groups of 25 women with migraine were assigned to either a control or intervention group, and both groups received similar prophylactic and acute migraine pharmaceutical treatment throughout the study. The participants in the physiotherapy group received eight therapy sessions over four weeks comprising diaphragmatic breathing practice, cervical mobilization and traction, deep tissue massage and myofascial release of the cranio-cervical muscles, muscle trigger point release, and passive cervical muscle stretching. The researchers found that the pain threshold for sub-occipital pressure significantly increased in the participants who received physiotherapy, suggesting a beneficial effect on the neuro-sensitivity of this area. Cervical range of motion, however, remained unchanged in both groups. While differences in migraine frequency and pain intensity improved across both groups, a slightly greater effect was found in the physiotherapy group, associated with a better perception of change reported by these participants. However, the differences between the two groups were not statistically significant, and could have been accounted for by a placebo effect. Overall, 23 participants experienced side-effects from the medication, but no adverse effects in the physical intervention were reported. The authors pointed out that the study could be improved upon by the addition a third group receiving physiotherapy alone, to eliminate the effect of medications. Another limitation is the set format of the physiotherapy sessions, which do not reflect the individuality of treatment in clinical practice. Alone, this study does not provide a
conclusive stance on the effectiveness of physiotherapy for migraine but suggests potential benefits of physiotherapy on the sensitisation in migraine worth exploring further.

Biondi (2005) reviews multiple manual therapies for different types of headaches, and recommends physical therapy combined with aerobic exercise or physical therapy combined with relaxation and thermal biofeedback for PwEM. It was found that these therapies offer little benefit on their own, mirroring the need for combining several modalities shown in behavioural therapies (p 33). However, this recommendation is only based on a few trials, many of which were composed of very small numbers of participants. Luedtke, Allers, Schulte, and May (2015) provide a more recent systematic review of a higher quality. It presents a systematic review and meta-analysis of 26 trials from 15 different countries to determine the effects of various physiotherapy interventions on different types of headaches. However, only five trials dealt solely with migraine, together involving 316 participants. The authors found that migraine attack intensity, frequency and duration had improved with aerobic exercise, or a combination of manual therapy and relaxation, corroborating the line of thought put forward by Biondi (2005). Unfortunately, what is meant by ‘manual therapy’ in this review is vague as there is great variety in the types of treatments physiotherapists provide and not every study describes the intervention in detail. Luedtke et al. (2015) conclude that since physiotherapy has a low cost and presents nearly no adverse effect, it appears beneficial for PwEM. Nonetheless, the overall quality of studies used was low and improvement in the quality of studies in this field is required to provide evidence for ways to use physiotherapy in the management of migraine.

**Massage therapy**

The focus of massage studies in the context of migraine is therapeutic massage. This consists in the use of a variety of hands-on techniques to affect soft-tissue. These techniques overlap with some of the techniques used in other manual therapies such as osteopathy. Lawler and Cameron (2006) argue that the most beneficial aspect of massage for PwEM lies in the relaxation response it can elicit, and its influence on the autonomic nervous system. A New Zealand study, one of the very few randomised-controlled trials assessing massage, involved 47 participants diagnosed with migraine assigned either to a control or intervention group (Lawler & Cameron, 2006). Those in the intervention group (n=23) were given a weekly massage for 13 weeks. Their medication use, headache frequency and characteristics, as well as sleep quality, were self-recorded in diaries. Salivary cortisol levels and anxiety levels were measured before and after each session, and perceived stress and coping efficacy were
assessed throughout the study. The massage intervention was based on a strict protocol targeting the head, neck, and shoulders with deep-tissue massage and trigger-point release techniques. After the massage sessions, decreases in anxiety, heart rate, and cortisol levels were found. Improvement in migraine attack frequency, sleep quality, stress and feelings of coping-efficacy were found in the intervention group, and these changes persisted at a follow-up assessment three weeks post-intervention (Lawler & Cameron, 2006). This well-designed study showed the benefit PwEM can gain from massage therapy. Following its publication, Lawler and Cameron (2006) was included by Chaibi, Tuchin, and Russell (2011), in a systematic review of manual therapies for migraine. The review concluded that massage therapy can benefit PwEM through decreases in headache frequency, but did not change medication usage.

From the literature, there are not enough studies done on this subject to draw a firm conclusion as to the benefit of massage therapy for migraine. However, like other forms of manual therapy, the risk of adverse effects is minimal, and the little benefit that has been shown justifies suggesting massage therapy as a complementary treatment for PwEM. Studies of specific types of massage, including relaxation massage, traditional Thai massage, deep-tissue massage, Swedish massage, shiatsu, or Romiromi⁴, would provide a broader sense of the potential benefits of this therapy for migraine.

**Chiropractic**

Chiropractic is a common type of complementary and alternative medicine (CAM) typically focused on manipulative techniques. This treatment modality was the subject of careful consideration in the systematic review of manual therapies for migraine conducted by Chaibi et al. (2011). This is because of the potential health risks associated with cervical joint manipulation. In the review, the authors concluded that the infrequency of such events does not warrant advising against chiropractic. Despite the variable quality of evidence examined, the authors recommended chiropractic for PwEM who want an option other than medication because of the potential benefits it may bring.

Most recently, one of the highest quality effectiveness trials in manual therapy research was conducted by Chaibi, Benth, Tuchin, and Russell (2017). The study evaluates the effect of chiropractic for migraine, with a meticulously designed single-blinded, three-armed randomised controlled trial conducted in Norway. The study involved 104 patients with

---

⁴ Bodywork and massage as part of traditional Māori healing.
migraine, who received either chiropractic manipulative therapy, sham treatment or were part of a control group taking medication for three months. Assessment included three follow-up measurements up to 12 months post-intervention. The researchers put forward a strong attempt to tackle the issue of successful blinding, a recurrent problem in trials involving non-pharmaceutical treatments. A sham treatment was devised consisting of broad contact, low-velocity and low-amplitude pushing forces across the scapula or gluteal region. The authors specified the manoeuvre did not follow any therapeutic direction, and the practitioner avoided all tissue or joint tension. Both the sham and therapeutic treatments followed a specific protocol and the same pre-session physical examination. The chiropractic treatment intervention followed a specific examination and treatment method called the Gonstead method. Both interventions (sham and therapeutic) were performed by one practitioner to ensure as much consistency across treatments as possible. Blinding after each intervention session was assessed, showing that about 80% of participants believed they had received a therapeutic treatment. Adverse effects were more common in the intervention treatment, but were mild and transient; local tenderness was most common, experienced by 11.3% of participants in the treatment intervention group. All three groups of participants showed a statistically significant improvement in outcome measurements (decreased headache frequency, intensity, and duration) compared to baseline measurements - but all to the same extent. Therefore, these results appear to mainly be due to a placebo effect rather than any therapeutic benefit from chiropractic treatment. However, the beneficial response brought on by placebo cannot be discredited based only on its nature, and the authors recommend chiropractic treatment for patients who cannot take or refuse to take medication, as the risks of adverse events were found to be low.

**Osteopathy**

*What is osteopathy?*

In the face of a challenging condition to live with, some PwEM turn to osteopathy to seek care. Osteopathy is described as a type of CAM (Duke, 2005) and involves the use of manual techniques to change specific tissue characteristics and improve their functioning. Prescription of home exercises may also be part of the treatment. It was first developed by Andrew Taylor Still in 1875 in the United States (Still, 1991). Still was a physician, disillusioned by the failings of the medicine of his time. He argued that all pathologies came from unbalances in the body. Still believed that restoring the body’s healthy state was possible by bringing back into proper function all physical components of the body, starting
with the bones. This idea resulted in him coining the word ‘osteopathy’ from the Greek osteon (ὀστέον) meaning bone (Still, 1991). Although osteopathy today has changed since Still’s time, the philosophy he advocated still forms the basis of the osteopathic principles used today, differentiating this form of manual therapy from others.

Over the years there have been several attempts at reducing osteopathic philosophy into specific principles based on the writings of Still. These are broad and do not call for any specific technique to treat any condition. This allows osteopaths the freedom to practice their own interpretation of what osteopathy is, and treat patients in a way that is highly individualised.

The Osteopathic Council New Zealand (OCNZ) presents the following principles on their website:

- Structure and function are reciprocally interrelated.
- The body possesses self-regulatory mechanisms.
- The body has the inherent capacity to defend itself and repair itself.
- When normal adaptability is disrupted, or when environmental changes overcome the body’s capacity for self-maintenance, disease may ensue.
- Movement of body fluids is essential to the maintenance of health.
- The nerves play a crucial part in controlling the fluids of the body.
- There are somatic components to disease that are not only manifestations of disease but also are factors that contribute to maintenance of the diseased state. (OCNZ, n.d.-c)

A particularly important aspect of osteopathy is the uniqueness of each treatment, as osteopaths seek to provide patient-centred care. Each treatment is built around the needs of the individual patient and based on the physical findings the osteopath has identified as contributing to the problem. There are three main components of osteopathic practice: cranial and biodynamics, structural, and visceral. Additionally, there are many other specialised areas osteopaths can become involved in, such as the care of older people, pain management, sports rehabilitation, paediatrics, or obstetrics (Paulus, 2013). In this way, there is no one typical osteopathic practice. While one osteopath may have a very broad practice and use all three osteopathic approaches; another osteopath may employ only cranial techniques and see mostly pregnant women, and infants. The wide variety of patients and conditions osteopaths treat is reflected in the OCNZ’s broad description of the general scope of practice:
‘Osteopaths have a particular interest in conditions of the neuro-musculoskeletal system and the management of pain. Osteopaths seek to prevent disease and promote health by empowering patients through sharing knowledge on lifestyle choices that improve health outcomes’ (OCNZ, n.d.-b, para. 3).

Paulus (2013) writes that ‘Osteopathy has always been greater than the sum of its parts.’ (p. 16), which perfectly sums up the wide meaning of ‘osteopathy’. In the same article, he describes a more extensive set of osteopathic principles, developed after careful examination of the meaning of osteopathy today and the historical foundations laid out by Still. His revised set of principles is provided in Appendix A for further consideration of the philosophical basis of the profession.

Osteopathy and the New Zealand healthcare system

Osteopathy arrived in New Zealand in the early 1930s and slowly developed, until the creation of the New Zealand Register of Osteopaths in 1978. In 1986, the profession enjoyed an increase in recognition by being included in the list of therapies funded by the Accident Compensation Corporation scheme (ACC) to treat injuries from accidents. Because of this, osteopathy patients can receive partial subsidising for their treatments under certain conditions (Duke, 2005).

Osteopathy is a small but growing profession. In 2003, the Osteopathic Council New Zealand (OCNZ) was established to regulate the profession, which currently encompasses over 500 registered osteopaths (OCNZ, n.d.-a). Osteopaths are primary healthcare practitioners, so referral is an important part of osteopathic practice, as osteopaths use referrals to ensure medical and specialist care for those who need it (OCNZ, n.d.-b). Because of this, osteopaths participate in the New Zealand primary, traditional health care system. The profession is, however, perceived as a type of CAM by most people, rendering the place of osteopathy in New Zealand ambiguous. The profession is increasingly turning to evidence-based practice (Fryer, 2008), which moves it further away from other types of CAM, while at the same time not being viewed as part of the medical profession. Thus, the divide between CAM and conventional medicine exists on a spectrum, in which these two approaches represent opposite ends, while osteopathy sits somewhere in between. This is illustrated by a cross-sectional survey of 500 New Zealand general practitioners (GPs) conducted in 2006, in which 41.5% of the participants identified osteopathy as a type of conventional medicine, while 51% saw it as a type of CAM (Poynton, Dowell, Dew, & Egan, 2006). Similar numbers were
found for acupuncture and chiropractic, while the other modalities proposed in the survey (including reflexology, aromatherapy, homeopathy, naturopathy) all appeared to be perceived by the participating physicians as CAM to a much greater degree (ranging from 83% of GPs classifying traditional Chinese medicine a form of CAM and 94% for reflexology and homeopathy). This difference correlated to the willingness of GPs to refer their patients to osteopaths. It was found that 70% of the GPs would be prepared to refer to osteopaths, closely following chiropractors and acupuncture therapists. The portion of participants willing to refer to these modalities was well above that of homeopathy (12%) and reflexology (1.7%), between which all other modalities fell (Poynton et al., 2006).

The complex interplay between the conventional and CAM approaches in which the osteopathic profession is involved remains mostly unexplored in New Zealand. However, some studies outside of New Zealand have investigated the attitudes and referral patterns of GPs towards osteopaths and other CAM practitioners. These show results ranging from a stark lack of collaboration (Simpson, 1998), to more recent reports of increasingly positive working relationships (Greene, Smith, Allareddy, & Haas, 2006; Wardle, Sibbritt, & Adams, 2013). Conversely, no study to date has been undertaken to illuminate the role of osteopaths themselves in the referral of patients to either traditional or alternative practitioners, leaving a gap in the knowledge on the role osteopaths play in healthcare systems, particularly in New Zealand.

**Osteopathy and migraine: A very limited amount of published studies**

Within the osteopathic profession, there appears to be a belief that migraine can be helped with osteopathic treatment, despite the scarcity of research on this subject in the osteopathic literature. An internet search using the keywords ‘osteopath’, together with a New Zealand city, and selection of the first few results in each search allowed access to a sample of 36 New Zealand osteopathy clinic websites. Seven of these were for clinics based in Auckland, five in Tauranga, one in Gisborne, one in Queenstown, two in Dunedin, four in Wellington, two in Nelson, three in Hamilton, one in Taupo, two in New Plymouth, three in Whangarei, three in Christchurch, and two in Napier. This search revealed that most osteopaths claim on their websites that migraine can be treated, or at least helped with osteopathy. Out of the 36 New Zealand osteopathy websites consulted, 19 mentioned migraine, the clear majority of which were listed next to ‘headaches’ as part of commonly treated conditions by osteopaths. In the same context, 11 additional websites mentioned simply ‘headaches’. Only 6 websites out of the 36 referred to neither. Moreover, the OCNZ website also mentions headaches as
part of commonly treated conditions by osteopaths (OCNZ, n.d.-d). Osteopaths New Zealand (ONZ), the professional association of osteopaths, specifies migraine in their information page for the general public entitled ‘What osteopaths treat’ (ONZ, n.d.). All this appears to reflect a belief in the New Zealand osteopathic profession that PwEM can find relief from osteopathy and should seek such treatment.

However, these claims appear to be mostly based on osteopaths’ personal experiences and expert opinions, and are not supported by strong evidence in the literature. The extent to which osteopaths treat PwEM, the effectiveness of osteopathic treatment for migraine, and the means employed by osteopaths to do so are questions still left unanswered. In general, there is only a very limited body of research concerning osteopathy (Clark & Blazyk, 2014), which includes an extremely small amount concerning migraine. The necessity for further research in this area was demonstrated by Mallinson (2014), who developed a research agenda for New Zealand osteopathic research, based on New Zealand osteopaths’ opinions. The author reports that the topic of migraine, specifically the effectiveness of osteopathy in treating migraine, was one of the most important research concerns.

There are only two randomised controlled trials to date that have sought to evaluate the effectiveness of osteopathy in the treatment of PwEM. Both show a potential benefit to be gained from osteopathic treatment in these patients. The first randomised controlled trial to be undertaken involved a group of 42 German women experiencing episodic migraine, divided into one control group and one intervention group (Voigt et al., 2011). The participants’ symptoms fit the diagnostic criteria for migraine with or without aura set by the International Statistical Classification of Diseases and Related Health Problems (ICD-10). In this study, the intervention group received fortnightly 50-minute treatments for 10 weeks, all performed by the same practitioner. The specific aspects of the treatment intervention were not described in the published article. The treatments followed the practitioner’s preference according to each participant’s needs, and could include any approach (visceral, cranial, or structural). The main outcome measures were pain and disability, evaluated with several self-reporting questionnaires before the intervention, and six months later. The researchers found a significant improvement in migraine frequency and intensity. An increase in vitality, a decrease in disability and an improvement in the participants’ mental health state in the intervention group was also found, which was not observed in the control group. Unfortunately, this randomised controlled trial used a relatively small sample, and assessed the outcome measures only twice. Additionally, some participants could have needed more
than the five treatments offered. Nonetheless, the method used and the statistical analysis described in the article appears sound. Another point to note in the study is the use of the ICD-10 diagnostic criteria for migraine. This set of diagnostic criteria is less detailed than the ICHD-II and is an unusual choice seeing that most other migraine studies use the ICHD-II to define PwEM. The use of the ICD-10 could have decreased the specificity of the results because a slightly broader definition of PwEM was used. Finally, the lack of description of the osteopathic intervention in the article reduces the usefulness of the study and highlights the need to investigate what constitutes the osteopathic treatment of PwEM. Nevertheless, this pioneering study provides a first insight into the potential value osteopathy can add to migraine management and the value of research in this area.

Following Voigt et al. (2011), the second and most recent randomised controlled trial investigating the effect of osteopathy on PwEM is an Italian study which attempted a more ambitious research project. Cerritelli et al. (2015) used a study sample comprised of three groups of 35 adult PwEM to compare an osteopathic intervention with a sham treatment and a control group made up of the same number of participants. All 105 participants were diagnosed with chronic migraine following the ICHD-II criteria. The intervention period took place over six months, during which participants in the intervention group received eight osteopathic treatments delivered by six practitioners who were graduates from the same osteopathy school. In contrast with Voigt et al. (2011), much more detail on the osteopathic intervention is offered in the published article. The authors describe that treatments were given on a per-needs basis based on individual osteopathic examination findings. All techniques used were of an indirect type, so that no spinal manipulation or direct soft tissue work (such as deep tissue massage) was performed, unlike the approaches used in Voigt et al. (2011). The techniques used by this group of osteopaths included cranial techniques, balanced-ligamentous techniques and myofascial release techniques. The outcome measures were effectively the same (attack frequency and pain) but the researchers utilised different types of questionnaires. Perhaps the most important aspect of this study was the inclusion of a group receiving manual sham treatment, which is still uncommon in the realm of osteopathic research in general due to the difficulty in mimicking manual treatment without producing physiologic changes (Cerritelli et al., 2015). Still, the researchers showed great creativity in developing a sham treatment that resembles osteopathy while minimising therapeutic benefit, a process which is described and discussed by the authors. The sham treatments, like the intervention treatments, varied among each session, and lasted 30 minutes. This approach
offers a stark contrast to the set sham protocols used in the chiropractic randomised controlled trial conducted by Chaibi et al. (2017), described above (p. 39). Nonetheless, the authors of Cerritelli et al. (2015) also report a successful blinding of the participants who received the sham treatment. Following the osteopathic intervention period, a single-question telephone survey revealed that none of the thirty-five participants from the sham intervention group could correctly guess which group they took part in. Throughout the study period the outcome measures from the control group stayed at baseline level, while the sham group showed a slight improvement, indicating either a placebo effect or therapeutic benefits of the sham treatments. In the osteopathic intervention group, a decrease in the use of medication, and a clinically significant decrease in migraine attack frequency and impact were seen compared to the sham and control groups. At the beginning of the study, all participants in the three groups of 35 were taking medication. Post-intervention, 35, 32, and 7 participants were still taking medication in the control, sham, and osteopathic intervention groups respectively. Similarly, the baseline frequency of attacks in the three groups was approximately 22.5 headache days per month at the beginning of the study. At the end of the intervention period, this was 22.3, 18.6, and 1.2 in the control, sham, and osteopathic treatment group respectively. In view of these results, the authors concluded that the osteopathic intervention was highly beneficial. The study adds a valuable contribution to osteopathic research as a relatively high-quality randomised controlled trial. Despite exclusively examining chronic migraine, Cerritelli et al. (2015) adds support to the notion that osteopathic treatment can be helpful in the management of PwEM. Moreover, the use of a successfully blinded sham treatment is an important achievement, showing the possibility of assessing osteopathic treatment through a quantitative research framework.

The rest of the osteopathic research literature is very limited. Although a few osteopathic randomised controlled trials examining primary headaches do exist, most concern tension-type headaches, not migraine. Based on the neurovascular basis of migraine, studies specific to this condition are needed and results from studies concerning other causes of headaches cannot be extrapolated to migraine. A few non-randomised controlled trial studies, however, do bring further clues as to the role osteopaths play in treating PWEM. One of these was carried out by Schabert and Crow (2009), and consisted of a retrospective review of electronic medical records from 631 out-patients from two family medical practices in the United States. One was an osteopathy clinic offering osteopathic manual treatment, while the other was a strictly conventional medical practice. The researchers found a reduction by half
in the cost of medications prescribed to PwEM who went to the osteopathic clinic compared to that prescribed by the medical practice. Although the study did not aim to provide direct evidence of the effectiveness of osteopathy for migraine, these results suggest that the PwEM who received osteopathic treatment did not need as much medication as those who did not. It is important to keep in mind that this is a study performed in the United States, a country in which the role of osteopaths, or Doctors of Osteopathy (DO), is very different from that of osteopaths in New Zealand. DOs have a similar scope of practice and prescription rights as medical doctors, and practice manual treatment only as an addition to their medical practice. In the study, only 23.86% of visits in the osteopathy clinic included osteopathic manual treatment. Because of this, the reasons behind the difference in cost between the two clinics are uncertain. A follow-up investigation comparing the nature of consultations conducted in both clinics would have provided valuable insight. Nevertheless, the authors of Schabert and Crow (2009) concluded that osteopathy can be useful in the management of an expensive chronic health condition, while presenting minimal risks of adverse effects.

From the current osteopathic literature, it appears clear that an important aspect of research yet to be developed concerns the way in which osteopaths treat PwEM. Research identifying specific aspects of osteopathic treatment, such as techniques, or clinical reasoning, would be particularly valuable in understanding the osteopathic approach to treating PwEM. Any enquiry into this topic can ultimately lead to the improvement of the care provided to these patients and promote the advancement of the profession. Unfortunately, no study of the same kind has been undertaken to date, other than an unpublished masters’ thesis project in Austria. In this qualitative project, Michal (2009) interviewed seven osteopaths in Austria and reported the kind of techniques the participants used when treating PwEM. The study found that all osteopaths used a wide variety of techniques, and combinations of different approaches (cranial, biodynamic, visceral, and structural). This went against the hypothesis that the researcher had put forward, which was that osteopaths used mainly a cranial approach to treat PwEM. Numerous specific techniques, opinions and approaches are reported in detail by the author. The results are presented in the form of summaries and key points from each interview, thus presenting an insightful report on the subject. The researcher found that most of the participants supported the use of other CAM treatments, especially acupuncture and homeopathy, alongside osteopathy. Another commonality found between the interviews was that the participants found that PwEM generally had already been diagnosed and treated by medical professionals long before seeking help from an osteopath.
This suggests that osteopaths typically do not act as a first port of call for patients seeking treatment for migraine. The osteopaths interviewed also expressed that PwEM generally received osteopathic treatment at longer intervals than other patients, with more time between each session. Michal (2009) concludes that an important common theme found in the seven osteopaths’ approaches was the highly individualised treatment for each patient. Another key finding was that the osteopaths believed that their treatment was effective in helping PwEM. A limitation to the thesis project, however, lies in its reporting. Michal (2009) describes the methodological underpinnings of the thesis in little detail, and the description of the method used is only briefly outlined. This renders invisible the process that the researcher has undertaken to draw their conclusions. While transparency is shown through the description of the interviews in a minimally interpretative form, the accountability and reproducibility of the study are affected. Despite these limitations, Michal (2009) offers valuable insight into an unexplored subject, and provides interesting data for comparison with that which emerges from this current study.

**A note on evidence based practice**
The osteopathic studies described throughout this chapter represent the main contributions to a very small body of evidence. The mere scarcity of osteopathic studies in the field of migraine simply does not yet permit the development of systematic reviews and meta-analyses. In turn, the claim that osteopaths can successfully treat PwEM is supported by only a few studies. For critics of osteopathy, this constitutes a failure on the part of the profession to provide current standards of evidence justifying its benefit (Ernst, 2013; Hartman, 2006).

Evidence based medicine (EBM) is defined as ‘the integration of best research evidence with clinical expertise and patient values’ (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). The application of this concept as it applies for osteopaths is often referred to as evidence based practice (EBP), and aims to provide the best possible clinical outcome for patients (Fryer, 2008). The advancement of the osteopathic profession is argued by many to rely on furthering osteopathic research to conform to an EBP model of care. EBM tends to require double-blind, randomised controlled trials as the gold standard in research (Clark & Blazyk, 2014; Mallinson, 2014). However, the pursuit of high quality evidence in the field of osteopathy is the cause of much debate among osteopaths. This is mainly because the way in which osteopathy is practised is difficult to translate into the reductionist format required to perform randomised controlled trials. The variability, complexity, and individuality of osteopathic treatments cannot be accurately assessed through standardised treatment
protocols. This provides a major challenge for researchers in osteopathic profession. To conform with a randomised controlled trial format, there is a need to deconstruct osteopathy and assess its parts, and such a process would not accurately represent the nature of osteopathic treatment.

To advance the osteopathic profession, there is a need to find ways to adapt research methods to fit the osteopathic model of care. The recent publication of Cerritelli et al. (2015) shows that this is possible though a study design which adapts aspects of classical randomised controlled trial methods to still retain clinical relevance in the context of osteopathic practice (see p. 45). More studies of the same sort would increase the profession’s participation in EBP without losing the defining characteristics of the modality. Another way that the osteopathic profession can embrace the concept of EBP is by valuing other types of knowledge and research which may be better suited to reflect osteopathic practice. Greenhalgh, Howick, & Maskrey (2014) propose a version of EBM open to broader, more creative forms of research, such as qualitative studies. The value of qualitative research, observational studies and clinical experience have been increasingly recognised since the recent emergence of movements advocating for a new understanding of EBM closer to its original definition. An example of this is ‘The Campaign for Real EBM’, launched by the Institute for Healthcare Improvement in 2014 as a response to the growing criticism toward EBM by physicians (Gauthier, 2014). Critics of EBM point out, among other issues, the pressure health professionals feel in keeping up-to-date with current research evidence, and the fixed standardised guidelines developed in this context, which fail to reflect an individualised patient-centred practice (Greenhalgh et al., 2014). ‘The Campaign for Real EBM’ movement calls for a more patient-centred approach to healthcare, in which the clinical encounter is not only guided by the newest randomised controlled trial or treatment algorithm, but is also informed by clinical experience, patient values and other types of research.

In this climate, the osteopathic profession has an opportunity to embrace research which suits its practice better. Osteopathic theories and experiences should not be dismissed because of their unsuitability to translate into randomised controlled trials, but constitute valid ideas that should be explored through appropriate models of research. Osteopathic practice should be guided by a combination of knowledge from randomised controlled trials as well as from the consideration of the different levels of importance and evidence provided by various aspects of the literature and the professional knowledge base. A thorough discussion of the
implications, support and criticisms of the application of evidence-based medicine to osteopathic practice is beyond the scope of this review but can be explored through the writings of Clark & Blazyk (2014); Danto (2014); Fryer (2008); Humpage (2011); and Parker (2014).

_The wider osteopathic literature_

There are very few published studies regarding the physiological effects of osteopathy, and none pertaining to the specific aspects of neurophysiology involved in migraine. Most of the information surrounding this subject in the osteopathic literature comes from expert opinion and clinical experiences from members of the profession. These constitute a large amount of the osteopathic literature which guides osteopathic philosophy and teaching. Such texts propose theories on treatment approaches and mechanisms behind osteopathic treatment, but rarely rely on research evidence. Instead, these theories are guided by osteopathic philosophy principles applied to anatomy. These theories form a central role in clinical practice, and can be criticised, refined, employed or rejected by individual practitioners through their own clinical experiences. Used in this way, these theories must not be dismissed. They provide valuable professional opinions and hypotheses waiting to be explored through research.

One text contributing to this body of literature was published in 1982 and is one of the very few directly relating to migraine. Latey (1982) provides an opinion piece pointing out the importance of the emotional and cognitive aspects of migraine. The author argues that osteopaths cannot cure the condition, but that much benefit can be gained by facilitating the patient’s self-healing process. A key component of this involves the recollection of traumatic events associated with the onset of the condition. In view of the clinical evidence supporting the use of cognitive and behavioural therapies (p. 44), as well as the current understanding of pain science, a degree of influence of cognitive factors on neurological function is possible. Precisely how to reflect this in an osteopathic clinical setting has not yet been the focus of any published text. While a predominantly mental health approach does not characterise the osteopathic scope of practice, it certainly is a part of the support osteopaths provide to patients.

Osteopathic textbooks form the basis of many practitioners’ osteopathic philosophy education. One of the few discussions on migraine found in these books is offered in Ward (2003), a classic, core text on osteopathy. The author asserts that osteopathy is valuable for many PwEM, and that treatment mainly takes place on a long-term basis, in between
migraine attacks. The author’s recommended treatment approach involves treating any
dysfunction of the lower cervical and upper thoracic spine, due to the physical relationship
with sympathetic ganglia and sympathetic nervous system. The ribs and myofascial tissues
associated with these areas are also considered relevant. Ward (2003) states that upper
thoracic dysfunctions affect the sympathetic tone of the corresponding innervated blood
vessels of the head, leading to vasoconstriction. However, this explanation relies heavily on
the vascular theory of migraine, which as discussed earlier, has fallen out of favour due to
recent research findings (p. 18). The contribution of a vascular component in the
pathophysiology is still believed to play a role, however, although not central. Considering
this, the mechanism of action of osteopathic treatment advanced by Ward (2003) remains in
the realm of conceivable. Treatment directed to the structures of the head, neck and
shoulders is a general guideline also offered by Ward (2003), based on the osteopathic
principle of improving the function of these structures. The use of cognitive and behavioural
techniques is also suggested by the author as complementary treatments. This
recommendation was based on the published evidence for these modalities. Ward (2003) also
points out the range of techniques that can be used to target the musculoskeletal problems
PwEM may have that contribute to their condition. These include acupressure, trigger point
therapy, heat and cold applications, massage, acupuncture, traction, and local anaesthetic
blockades for trigger points. All these techniques are described as having the common goal of
decreasing the afferent activity from areas contributing to the sensitisation occurring in
PwEM (Ward, 2003, p. 439). The recommendations made by Ward (2003) indicate that the
idea that musculoskeletal structures can influence nervous system function is an important
aspect of osteopathic philosophy. While this concept has not been demonstrated directly,
several studies have suggested that musculoskeletal changes in the context of spinal
manipulation can affect neural input (Pickar, 2002; Taylor et al., 1995). For example, Haavik-
Taylor et al. (2007) found a decrease in cortical somatosensory responses after cervical spine
manipulation of dysfunctional joints in participants with neck pain. Based on current
knowledge, it can be reasoned that the convergence of sensory input from the cervical spine
and the trigeminal afferents to the trigeminal nucleus caudalis (p. 13) could provide a
pathway for osteopaths to reduce the neural input to structures involved in migraine. This
concept, and the extent to which nonmanipulative osteopathic techniques can influence the
function of neural structures involved in migraine, require further examination.

~ 51 ~
The cranial approach to migraine described by Ward (2003) is also based on the principle of improving function by increasing the mobility of structures. The author explains that the irritation of intracranial nerves contributes to the sensitisation PwEM experience because of physical pressures on the nerves exerted by a cranial dysfunction. A similar mechanism is described to affect the cortex, thalamus, and hypothalamus in ways that would increase afferent stimulus to the spinal trigeminal nucleus. This theory remains unsupported, although some studies propose indirect evidence for the existence of cranial mechanisms such as those traditionally advanced by cranial osteopathy practitioners (Ferguson, 2003).

Another valuable text to consider in this discussion is Smith, Clark, and Shi (2011), in which the effect of manual therapy techniques on the autonomic nervous system is discussed. The authors highlight the current state of evidence in this field, which seeks to understand the mechanisms responsible for the therapeutic effects of osteopathy and other forms of manual therapy. Multiple studies use monitoring of heart rate variability and skin conductance to detect changes in autonomic function following manual techniques. Studies of this type have found vagal responses following mechanical stimulation of the cervical spine, and cervical myofascial release (Smith et al., 2011). Two studies assessed the effect of a specific cranial technique (CV-4) and detected a decrease in sympathetic tone and changes in blood flow velocity. These studies represent an emerging field of research, albeit consisting mostly of small, low-quality studies. Nevertheless, the potential for manual therapy to influence autonomic system function is suggested, and represents a significant opportunity for research. This is particularly relevant for PwEM, who experience what is thought of as a form of central nervous system sensitisation and autonomic imbalance.

**A Multidisciplinary Approach**

It becomes clear while reviewing the different treatments options available to PwEM that no single modality appears to offer a comprehensive solution. While pharmaceutical treatments may significantly help some patients, their use comes with drawbacks. On the other hand, non-pharmaceutical treatments present the clear advantage of causing minimal adverse effects, but their effectiveness is highly variable depending on the modality. Overall, the available evidence in favour of those treatments for migraine is of low quality. In the face of such a complex condition to treat, some authors offering conventional medicine practice parameters also describe non-pharmacologic treatment possibilities as complementary
therapies (Mueller, 2007; Weintraub, 2000). Further, the approach of combining tailored pharmaceutical treatment with multiple non-pharmaceutical treatment modalities is increasingly recommended by others (Gantenbein, Afra, Jenni, & Sándor, 2012; Horwitz & Stewart, 2015). This approach is most strongly advocated by Buse (2014). The author explains that interdisciplinary and multidisciplinary care should not be confused. Interdisciplinary management is said to occur when professionals from different disciplines work together to treat one patient. It is an unfortunately rare model of care in the treatment of migraine and headaches in general. The communication and shared decision-making processes involved in interdisciplinary practice call for a clinical facility specially set up for this model of care (Buse, 2014). Only a few such facilities in the world exist for people who experience headaches. The other, more common way to implement a treatment approach combining multiple treatment modalities is referred to as a multidisciplinary model of care. This takes place when health care providers from different professions work independently but alongside each other in the care of a patient. Multidisciplinary management of migraine is much more common, and presents similar benefits as interdisciplinary management. Therefore, multidisciplinary management is the focus of this discussion. Buse (2014) explains that such a model of care is particularly suited to the treatment of PwEM, because of the complex, multifaceted expressions of the condition. The social, psychological, and physiological factors involved in the development and experience of migraine requires an equally diverse range of care to provide effective management (Buse, 2014).

Buse (2014) identifies three areas of non-pharmaceutical care that can be combined with pharmaceutical treatment for PwEM. The first involves behavioural therapies, and the second includes physical therapies, such as exercise therapy, physiotherapy, occupational therapy, and alternative therapies, in which Buse (2014) places osteopathy, chiropractic, massage, and yoga. The third area highlights a rarely discussed aspect of treatment that is usually only touched upon in medical treatment reviews and migraine guidelines: patient education and self-management. This includes the education of PwEM about migraine, triggers, and the use of medication. It also involves the development of a management plan and setting realistic goals; adjusting the patient’s expectations and talking about the side-effects medications. These aspects of treatment are much more important than their relative presence in the literature, because, as Buse (2014) asserts, many aspects of migraine management rely on the patients’ participation at home. Examples include practicing relaxation techniques daily, exercising, building healthier lifestyle habits, trigger avoidance, and even proper use of
medication. The importance of this aspect of management is also highlighted in Silberstein, (2000), a clinical practice guideline for migraine. Additionally, the use of diaries to monitor the frequency of attacks and identifying triggers is an important tool in empowering patients and is recommended by many other authors (D’Amico & Tepper, 2009; Fuller & Kaye, 2007; Linde, 2006; Nappi et al., 2006). It can be considered that these strategies may play a positive role in the patient’s adherence to the treatment plan and promote a feeling of empowerment. While discussing multidisciplinary management, it must be kept in mind that patient empowerment, education and planning is a highly important component of any treatment, and should be a part of any modality used to treat PwEM.

While few studies evaluating the effectiveness of a multidisciplinary approach for PwEM have been undertaken, those that do exist point to better outcomes and greater patient engagement. Lemstra, Stewart, & Olszynski (2002) is a Canadian study which sought to evaluate a multidisciplinary intervention for PwEM, involving 77 participants with migraine, divided into an intervention group and one control group. Participants in the control group continued conventional medical care, which included specialist referral and/or medication, as required. Those in the intervention group received 18 group-supervised exercise therapy sessions, two group stress management and relaxation therapy lectures, one group dietary lecture, and two massage therapy sessions. Significant differences in outcome measures were found between the two groups after six weeks and three months, reported as decreased pain, disability, and depression in the intervention group.

Following this study, Gunreben-Stempfle et al., (2009) carried out a pilot study in Germany, using a much more intensive multidisciplinary intervention program, for participants with tension-type headaches and migraine. This intervention may be better described as interdisciplinary, following the definition provided by Buse (2014). While 42 patients were treated in a 96-hour program, 80 patients received conventional primary care (pharmaceutical and non-pharmaceutical treatments as required). The participants in the multidisciplinary program went to the clinic twice a week for six hours over eight weeks. The program consisted of stress management, relaxation technique training, aerobic exercise, stretching, light weight training, education (headache physiology, discussion of triggers), biofeedback, psychological interviews, neurologist assessments, and optimised pharmacotherapy if needed. The participants were also asked to perform daily relaxation exercises at home. Outcome measures were compared with those from an earlier study undertaken by the same researchers. The previous study had involved 46 patients with headaches who had
participated in a less extensive, 20-hour program involving education and discussion of headache treatments, and learning muscle relaxation techniques. The researchers found significant reductions in both tension-type headaches and migraine frequency, decreases in depression symptoms and pain medication intake in the 96-hour intervention group. Follow-up data at 15 months appeared to show persistence of this effect. Headache intensity, however, remained mostly unchanged, suggesting a reduction in the impact of migraine in PwEM’s lives, but not on the pain itself. This was in great contrast with data from the conventional treatment group and the 20-hour program participants, both of which showed a much smaller effect. The authors concluded that the 96-hour intensive program was highly effective and that its beneficial effects could justify the cost and effort put by both patients and medical professionals into such programs (Gunreben-Stempfle et al., 2009). The pilot study demonstrated the large space for improvement that exists in the treatment of patients with headaches. A larger study, focusing on migraine, would provide much-needed clues as to how CAM therapies can fit into such a multidisciplinary model of care.

Unfortunately, headache clinics offering such specialised multidisciplinary care are few in the world, but studies revealing their utility can help call for their development. Two studies examining patient records from multidisciplinary headache clinics have contributed evidence for this. Zeeberg, Olesen, and Jensen (2005) examined records of 336 patients discharged from the Danish Headache Centre, including 98 who had been diagnosed with migraine. The authors reported a significant decrease in attack frequency and work absenteeism in PwEM. Interestingly, no such improvement was found in patients with post-traumatic headaches, implying that this kind of intervention may not be effective across all headache types. However, the use of multiple modalities was much less intensive than in the trials discussed above, and although the clinic made use of referrals to physiotherapists, no hands-on treatments were reported. Most treatments involved pharmaceutical management, while only 32% of the patients had received physiotherapy consisting of exercise and education, and 10% were seen by a psychologist (using relaxation and biofeedback). Nevertheless, the authors concluded that a specialised headache centre can provide valuable care to people with headaches.

Five years following this, the same authors performed another study based on the patient records from the same headache clinic to produce predictors of outcome (Jensen, Zeeberg, Dehlendorff, & Olesen, 2010). 1326 patient outcomes over two years were reviewed. Of those, 31% had some form of migraine, and an additional 38% had probable migraine. In this
study, there appears to be a more structured multidisciplinary management put in place for the different headache types, including a detoxification program for patients with medication overuse headaches. Outcomes were most favourable for patients with migraine and medication overuse headaches, who saw a reduction in attack frequency averaging 50% and 72% respectively. This is indicative of the benefit of multidisciplinary care for these kinds of patients. The authors point out that the average treatment for these patients only took 5.7 visits over 7.8 months, arguing that this method of treatment can be time and cost effective. Long-term follow-up of these patients, however, would be required to support the claim.

While these studies show positive results for PwEM, they offer a very limited view of the issue, showing only the effectiveness of one headache clinic, which uses one version of what a multidisciplinary model of care can be. Additionally, the lack of control in these studies call for research comparing outcomes from multidisciplinary headache clinics with those from other contexts of care (outpatient neurology clinics, general practices). While study populations may not be the same in different types of practices, such studies may help identify which type of care may be more appropriate for which types of patients, and guide the development of improved systems of care for PwEM.

Multiple sources point toward the benefit of treating PwEM in the context of a multidisciplinary model of care. Unfortunately, not many interdisciplinary headache clinics exist, which in turn severely restricts the amount of research being undertaken on this subject. On the other hand, the use of a multidisciplinary model of care in the context of general practice using referrals to multiple modalities should be explored further. It is worth pointing out that the clear majority of multidisciplinary clinics devoted to treating headaches are in countries in which such medical care is either publicly funded, or patients have insurance which covers all costs. All costs of care in the four studies presented above were not paid for by the participants themselves. For such clinics to be developed in more countries, including New Zealand, financial access must be made available. This would be possible through more public health care funding, or more inclusive and affordable health insurance options. Ultimately, financial constrains may be a major barrier in the multidisciplinary management of PwEM.

**Conclusion of Chapter II**

Migraine is a complex condition. Its diagnosis is not always made as early as it should be, and when it is, no single treatment has been shown to offer a solution to all PwEM. While
pharmaceutical treatments are very helpful for some patients, especially since the arrival of triptans, there are many limitations to their use. Because of this, medical professionals usually employ non-pharmaceutical management strategies in their practice and may recommend non-pharmaceutical therapies. Those may also be sought out by the patients themselves, who may be reluctant to using medication. This chapter reviewed the main non-pharmaceutical therapies used in the management of PwEM, including osteopathy. In discussing the evidence of these modalities, the limited number of studies pertaining to migraine is clear. Overall, non-pharmaceutical studies were of low-quality, due to the difficulty in carrying out successful participant blinding, and the impossibility of implementing researcher blinding. Based on this review of the literature, it can be concluded that combinations of behavioural therapies and acupuncture therapy present the best quality of evidence in favour of their use for migraine.

An important aspect of this chapter was the discussion of the potential benefits of a multidisciplinary model of care indicated by recent prospective studies. More studies of the sort are greatly needed, especially in the evaluation of different multidisciplinary programs for PwEM. Studies on the role of osteopathy within a multidisciplinary model of care have not yet been undertaken, but would be highly valuable in the improvement of osteopathic practice and in enhancing current understanding of the role the profession plays.

Although the osteopathic effectiveness studies discussed in this chapter suggest that the modality can contribute positively to the management of PwEM, the scarcity of studies in this field leaves much to be desired. The relatively high-quality studies seen in recent randomised controlled trials show the promise of more studies of this sort, which would be needed to perform systematic analyses. Systematic analyses of osteopathic treatment for PwEM would help establish the potential role osteopathy can play in the management of these patients. In addition to efforts to undertake more high quality randomised controlled trials in the field of osteopathy, a focus on qualitative research is needed to reveal the approach osteopaths use for these patients. Conversely, the experiences of PwEM receiving osteopathic treatment are unknown. Achieving clinically relevant trials of the osteopathic approach cannot take place without prior qualitative exploration and understanding of what the osteopathic approach in question is. Only one thesis project has sought to open this field of research. Michal (2009) showcases the many techniques osteopaths may use in treating PwEM and offers a first insight into this subject. The results of the project, nevertheless, only exist in isolation and represent a very limited view. Due to the nature of osteopathy, it is probable that multiple
ways to treat PwEM will emerge from undertaking similar studies, requiring further exploration. Research on the mechanisms at play behind osteopathic treatment also represents a deficient area of research, of which no study specifically relating to migraine could be found.

The thorough review of the literature undertaken in this chapter has revealed a gap in osteopathic research relating to migraine. Still, such a deficiency must not be regarded as a failure on the part of osteopathy to justify its benefit to patients, but it is an opportunity. The evidence of the effectiveness of osteopathy for migraine may be of a small scale, but is consistent across existing studies. This shows a strong potential for more evidence of clinical benefits yet to be demonstrated. The present exploratory study seeks to contribute to this emerging body of research by shedding light on the approaches New Zealand osteopaths take to address the challenges migraine presents. This study hopes to contribute to building a foundation for further, more specific research aimed at understanding the way osteopaths can contribute to the care of PwEM.
Chapter III: Methodology
Chapter Introduction

This chapter discusses the methodological frameworks that underpin the methods used in this study. A qualitative paradigm was chosen due to its suitability for answering the research question. After careful consideration of the possible methodologies in the realm of qualitative research, a descriptive phenomenological approach was found to be the best suited for this project. A discussion on how this decision was made is presented here. Following this, the issue of trustworthiness is explored in relation to the measures taken throughout this study to ensure its quality.

A Qualitative Approach

The first step in determining the kind of methodology most suited to answer the research question was deciding between using a qualitative or quantitative paradigm. This was a significant decision, as the difference between these two approaches means a completely different way of carrying out research. Quantitative research takes it roots from a positivist philosophy, which seeks to gain factual knowledge through the systematic, objective observation of the world and reproducible experimentation (Slevin, 2010). On the other hand, qualitative research seeks to understand the subjective experiences of the world through human eyes, rather than describing measurable phenomena. Qualitative and quantitative research represent different sides of the same coin, and to thoroughly understand a subject, the application of both types of research is necessary. This is particularly true in healthcare research. Quantitative research is vital to developing effective healthcare, whether uncovering new modes of treatments or establishing epidemiological data. Nonetheless, it is the patient’s experience which is at the centre of the clinical encounter. A qualitative type of enquiry is required to understand and improve this experience. Ultimately, the combination of findings from both types of research offers the most complete set of information. For example, qualitative interviewing of a small sample of patients may uncover specific issues or unmet needs experienced by those people. Qualitative research may be used to guide the line of questioning forming a survey to establish the impact of these issues in the wider patient population. The combination of these two types of research would inform the best clinical solution by way of essentially asking the same question in two different manners.
This idea played an important role in the greater research context surrounding this project. As demonstrated in Chapter Two: ‘Literature Review – Current Treatment and Management’, there is a clear lack of both qualitative and quantitative research focused on migraine and osteopathy. Because of the sparse research base, the purpose of this study must be an exploratory one, to provide an overall view of the subject. Understanding the issues osteopaths deal with, the sort of treatment approaches they use, and their experiences in treating PwEM were considered most important to establish the current state of the situation. This led to the broader research question ‘What is the role of osteopaths in treating PwEM in New Zealand?’ A qualitative approach was deemed best to explore the answers to this question first, but both qualitative and quantitative inquiries are expected to take place following this study, to build towards a deeper understanding of the subject.

Qualitative enquiry has been described by multiple experts to be well suited for the exploration of a previously unknown topic (Lopez & Willis, 2004; Merriam, 2009). The exploratory nature of this study sought to describe the knowledge and experiences of osteopaths in the process of providing care for PwEM. This kind of objective lends itself well to a qualitative research paradigm, which typically serves to generate rich, in-depth data from the personal knowledge of a few expert individuals (Green & Thorogood, 2004). Qualitative research is about uncovering what it is to be human, and to explore the experiences that shape lives (Willig, 2001). Similarly, this project seeks to discover what is involved in being an osteopath providing care to PwEM and what one does for these patients within the scope of osteopathy. As existing research is limited in this field, a qualitative design is the most appropriate modality to inquire about the current situation in New Zealand osteopathic practice with regards to migraine care.

The limitations of qualitative methods are argued to be the lack of generalisability and the potential for bias (Green & Thorogood, 2004). The former is not a major concern as this project does not aim to describe how all osteopaths approach the care and management of PwEM, but to uncover a small proportion of the knowledge and experience found in the New Zealand profession. Secondly, subjectivity is an essential part of qualitative research, as it seeks to explore the experience as recounted by the participants (Willig, 2001). Researcher bias, however, needs to be minimised so that the experiences described stay true to the interviewees’ accounts and the conclusions accurately reflect the ideas of the participants. All possible efforts were made throughout the project to ensure the minimisation of researcher
influence. These procedures are described further in this section, under the title ‘Ensuring trustworthiness’.

**Descriptive Phenomenology**

Phenomenology is a philosophical movement seeking to understand human existence which has led to a way of studying the ‘lived experiences’ of people (Green & Thorogood, 2004). It represents a stark contrast to positivist philosophy, as succinctly expressed by Mortari and Tarozzi (2010): ‘phenomenology is seeking realities, not pursuing truth’ (p. 18). Developed initially through the ideas of Edmond Husserl (1859-1938), phenomenology argues that the essence of a phenomenon can be uncovered by analysing the descriptions and interpretations of the people who experience it (Dowling, 2007). The phenomenological enquiry is widely used in health care research, especially when seeking to expand knowledge on human experiences such as caring, healing, health, and illness in the context of holistic healthcare (Wojnar & Swanson, 2007). This greatly justifies the use of a phenomenological approach for osteopathic research, where osteopathy itself embraces the concept of holism. There are seven different perspectives within phenomenology, as described by the Encyclopaedia of Phenomenology (Embree, 1997). They are descriptive, naturalistic, existential, generative historicist, genetic, interpretive, and realistic. Descriptive and interpretive phenomenology are the two most common types of phenomenological inquiries in health science research, because both argue that understanding lived experiences are an important aspect of healthcare (Wojnar & Swanson, 2007).

Interpretive phenomenology (also known as Hermeneutic phenomenology) was developed when Heidegger (1889-1976) and other students of Husserl further developed and took phenomenology down a divergent path. All the while, Husserl’s original ideas of phenomenology gave rise to descriptive phenomenology, also termed Husserlian phenomenology (Lopez & Willis, 2004). The key difference between these two schools of thought lies in the object of focus of the investigation. In interpretive phenomenology, the contextualised meaning of a phenomenon as experienced by the people living it is the focus of the enquiry. To do this, interpretive phenomenology uses interpretation, understanding and subjectivity to compile a work of co-creation between the researcher and the participants (Lopez & Willis, 2004; Wojnar & Swanson, 2007). In contrast, descriptive phenomenology attempts to uncover the universal essence of a phenomenon, its core meaning through lived
experiences (Colaizzi, 1978; Giorgi, 2010; Lopez & Willis, 2004). This ‘essential meaning’ is characterised as the common meaning given to a phenomenon by most people who experience it (Colaizzi, 1978; Wojnar & Swanson, 2007). An important aspect of descriptive phenomenology which serves to discover the essential meaning is a process called ‘Bracketing’. Bracketing refers to a conscious acknowledgement of the researcher’s personal biases, beliefs, presuppositions, and knowledge of the phenomenon prior to collecting the data and throughout the length of the study (Dowling, 2007; Hah, 2010). After having identified these, the aim is to put them aside to allow an unclouded examination of the phenomenon as it presents itself (Wojnar & Swanson, 2007). Bracketing is discussed further in sections below.

A descriptive approach to phenomenology was quickly found to be the most appropriate to answer the research question. This study sought to determine the role of New Zealand osteopaths in the care of PwEM. The aim was to describe the experience of treating PwEM as an osteopath and describe specific aspects of osteopathic management which could be further studied. Using descriptive phenomenology, discovering the essential meaning of the phenomenon of treating PwEM as an osteopath could provide the understanding sought by this project. In addition, that kind of osteopathic research focuses on the clinical practice aspect of osteopathy, and aims to provide insight into universal osteopathic treatment approaches that can be used to enhance the treatment experience of patients. Wojnar & Swanson (2007) suggest that there is a belief from some authors that descriptive phenomenology is helpful for studies aiming at developing clinical interventions, providing another reason why descriptive phenomenology was found to be better suited to reach the aims of the study. Finally, the phenomenon of caring for PwEM from osteopaths’ point of view in New Zealand is a previously unexplored topic. Lopez and Willis (2004) state that a descriptive approach to phenomenology is better suited for research inquiries seeking to investigate a phenomenon which has not yet been studied. Similar views have been expressed by other authors (Dowling, 2007), and may be explained by the applicability of the essential meanings descriptive phenomenological enquiries provide.

In carrying out this study, the works of numerous authors who provide extensive guides to applying a descriptive phenomenological approach to research were used. The application of phenomenology to inform the methods used in this study is described below in Chapter Four. However, it is important to mention here the guidance of Colaizzi (1978) in carrying out the analysis of the data of this study. Colaizzi (1978) describes specific steps for descriptive
phenomenological analysis, which continue to be used frequently in descriptive phenomenological research (Abalos, Rivera, Locsin, & Schoenhofer, 2016; Morrow, Rodriguez, & King, 2015; Sanders, 2003; Shosha, 2012). The steps described by Colaizzi (1978) are expanded upon and discussed by other authors (Edward & Welch, 2011; Sanders, 2003; Shosha, 2012), adding insight into the ways in which this method of analysis can be applied to various research contexts. Because of Colaizzi’s recognised method of analysis in the field of descriptive phenomenological research, this type of analysis was chosen to guide the analysis process in this study. A discussion of what these steps entail and their application in this project is offered in Chapter Four: ‘Methods’.

**Ensuring Trustworthiness**

The quality of research, quantitative or qualitative, is highly important. Obtaining valuable information is the purpose of research, and the value of a study rests on its quality and relevance. The concepts of validity and reliability, referring to the quality of a study, are rooted in positivist philosophy and were developed in a scientific context consisting solely of quantitative research. The administration of quantitative quality control criteria is widely argued to be inadequate for qualitative research (Golafshani, 2003; Krefting, 1991; Sandelowski, 1993; Schwandt, 2007). The more recent emergence of qualitative research calls for a reconceptualization of these terms and the creation of new tools for quality assessment (Golafshani, 2003). The reason for this is that the qualitative paradigm is based on such different principles than its quantitative counterpart that what makes a study credible is radically different. This mostly stems from the philosophical differences relating to the nature of reality. While a quantitative epistemological framework considers reality to be consistent, objective, and pertaining to a single truth, qualitative philosophy admits to a multidimensional reality plane, changing and multifaceted. This divide results in a difficulty in assessing the quality of qualitative studies, as no single truth can be tested. Opinions on the ways in which assessment of quality in qualitative research should be done vary across authors and the topic is still debated. Nonetheless, one concept that has emerged from works on the topic is trustworthiness, or rigor. This concept is explained below and the ways in which this study has addressed trustworthiness are discussed.
What is trustworthiness?

An important contribution to the qualitative field of research seeking to address this issue is provided by Lincoln & Guba (1985). These two authors coined the term ‘trustworthiness’ to refer to quality in qualitative research (Schwandt, 2007). Trustworthiness corresponds to a set of four criteria developed by these authors to mirror those used to assess quantitative research, adapted for a qualitative framework. The first criterion is credibility, and parallels the principle of internal validity, or ‘truth value’ (Krefting, 1991). It requires an accurate representation of the participants’ views in the researcher’s reconstruction. The second criterion is transferability. It relates to the concept of external validity employed in quantitative research (Schwandt, 2007). In the context of qualitative work, this is formed through the contribution of information that readers can use to apply the findings of the study to other situations they see fit. Transferability can be thought of as the applicability of a study to its field (Krefting, 1991). The third criterion is dependability. It parallels the quantitative research concept of reliability. While the reliability cannot exist in a philosophical framework which acknowledges multiple realities, dependability ensures that the research process itself is logical, traceable and documented. Finally, confirmability is the last criterion described by Lincoln & Guba (1985). It represents the qualitative equivalent of objectivity in quantitative research. It ensures discernible, strong links between the data, their interpretation, and the researcher’s findings and assertions (Schwandt, 2007). Confirmability requires the results to be tangibly traced to their origin, and not come from the researcher’s imagination. Lincoln and Guba (1985) argue that operating in a qualitative paradigm, trustworthiness allows readers to have confidence in the findings, without being given ‘the truth’ through measures of validity and reliability.

Several authors propose a variety of research strategies to address each of these criteria of trustworthiness and strengthen qualitative research (Fereday & Muir-Cochrane, 2008; Golafshani, 2003; Krefting, 1991). A variety of those strategies were used throughout this study to ensure quality. Below, the key methods and strategies carried out to increase the quality of this study are described, and the multiple ways in which they strengthen trustworthiness is discussed. The main strategies are participant validation, peer reviewing, a dense description of the results, the use of a reflection journal, and the recording of an audit trail. It is worth mentioning that in addition to those strategies, this study was supervised by two experienced qualitative researchers, which strengthened its overall quality.
Participant validation

Returning transcripts, analyses, or results to participants is considered by many authors to be highly important in ensuring credibility (Golafshani, 2003; Krefting, 1991). Colaizzi (1978) is also an advocate for this process. Participant validation, or ‘member checking’, can be done at multiple stages of analysis, including at the end. It does, however, present drawbacks, as pointed out by multiple authors (Giorgi, 2000, 2010; Sandelowski, 1993). Sandelowski (1993) affirms that participant validation can present its own set of practical, theoretical, representational, and even moral problems. In Sandelowski (1993), the author contends that participant validation contributes to excessive attempts to strictly follow principles of rigor. Sandelowski (1993) argues that such attempts come in the way of the artistic, naturalistic qualities of qualitative research that make this kind of enquiry valid in its own way. Sandelowski (1993) explains that participants presented with a fully analysed result may fail to recognise their experience despite the adequate quality of analysis. Such a situation can occur because the interview took place a long time prior to participant validation, or the generalised language used by the researcher to describe the essential meaning stops the participants from recognising their personal story (Sandelowski, 1993). In the context of this study, participant validation was sought in the middle of the analysis process, rather than at the end of the analysis, to allow participants to verify the accuracy of their transcripts and recognise their ideas in the preliminary results before the final results were developed and written, minimising the issue described by Sandelowski (1993). Consequently, the process still ensured that the results would be based on findings approved by the participants, and corresponded to the stage of analysis in which Colaizzi (1978) recommends its use. A more detailed description of the process is presented in the Method section below.

Peer reviewing

During the process of analysis, peer reviewing by three students also involved in qualitative research served to identify inconsistencies or inaccuracies in representing the participants’ views. This method is considered to be a strategy to increase both credibility and dependability in qualitative research (Krefting, 1991; Schwandt, 2007). The first steps of analysis (identifying significant statements and formulating meanings) were identified as the most open to interpretation in which misrepresentations of the participants’ views could occur. This is also the opinion of Colaizzi (1978), who describes the process of formulating meanings as a precarious leap from what the participants say to what they mean, requiring
creative insight (p. 59). Therefore, peer review occurred for this part of the analysis. Each student was shown and explained the steps that were followed to create formulated meanings from the transcripts. The students then had to carry out the same process with several random anonymised passages from the transcripts. Their analysis was then compared with the one that had already been done, and discussed. The students confirmed that the reasoning process used in the analysis was sound and did not stray to excessive degrees of interpretation, increasing dependability and credibility.

A dense description of the results
Transferability is argued to have been addressed if the researcher has provided enough information for readers to be able to apply the results to an outside situation that they see fit (Krefting, 1991). To enable this, sufficient descriptive data must be provided to allow comparisons to occur between the situations in which the participants find themselves, and the outside world. In this thesis, the point of view of health care providers was explored, but no defined clinical recommendations were expected to result from it. Additionally, this study is an exploratory one, and only provides one of the first insights into the subject of the osteopathic treatment of PwEM, as well as directions for future research. Because of this, while the treatment approaches described in Chapter Five can inspire other members of the profession in the context of clinical practice, the need for transferability is small. Instead, the relevance of this study pertains mainly to the development of an unexplored area of research. Nevertheless, the dense description of the results provides information for any desired application within the context of osteopathy. Moreover, the diversity sought in the participants’ background contributed to increase the applicability of the findings.

In conclusion, all four criteria of trustworthiness, as described in Lincoln & Guba (1985), were addressed in this study. However, more could have been done to produce higher-quality results. Areas of improvement are discussed in Chapter Six, ‘Discussion and Conclusion’.

Reflection journal
The journal consisted of a collection of 75 A4 pages of hand written notes. It is a tool to aid in reflection and self-criticism, and is commonly used in qualitative research to increase credibility and confirmability (Krefting, 1991). The journal played a major role in ensuring the neutrality of the interview and analysis process, and helped make accountable, logical decisions. Reflection was used from the very start of the study, so that any preconceived views could be exposed, and researcher influence during the interviews and analysis could be
monitored. Introspective thoughts, early insights, presuppositions, opinions, ideas, and critiques were written to be used in a constructive manner or discarded. Appendix C shows an example of this, as an extract from a journal entry written just before conducting an interview. Reflection using the journal also contributed to the process of bracketing, which is discussed in further detail in Chapter Four: ‘Methods’.

Creation of an audit trail

An audit trail consists of the record of relevant material that demonstrate each step of the research process (Sanders, 2003). These records may be made up of recordings, raw data, field notes, thematic constructions, or process notes used in making decisions (Krefting, 1991). Audit trails should reflect the research process in such a way that another researcher could arrive at the similar conclusion using the same data and following the same steps. An audit trail is the main method to ensure confirmability in qualitative research (Krefting, 1991; Lincoln & Guba, 1985; Sanders, 2003). In this study, the journal was used to keep a detailed account of the study’s processes, and together with the documents used in the analysis and the raw data, provide an auditable trail. All steps taken in carrying out the study were recorded in the journal, and written entries also assisted in making fully accountable and demonstrated decisions with regards to analysis (examples are shown in Appendix D1-2). While the entirety of this material is not shown as part of this thesis, Chapter Four: ‘Method’, provides a detailed account of the steps undergone in this study. Extracts of the journal and of documents written as part of the analysis process are shown in the appendices for further evidence of the procedures used throughout the study.
Chapter IV: Method
Chapter Introduction

This chapter describes the methods and processes that were used to carry out this study. First, the ethical considerations that arose in the early stages of the project and the ways in which they were addressed are discussed. Second, a discussion on the methods used to recruit the participants and collect the data is provided. Throughout this study, the methods employed were informed by descriptive phenomenological philosophy described in Chapter Three above. The ways in which this philosophical framework was applied to research methods as guided by multiple authors, will be explained throughout the chapter. A detailed account of each step undertaken in the process of analysing the data gathered from the interviews is also provided in this chapter.

Ethical Considerations

Before carrying out this study, an outline of how potential ethical concerns would be avoided or addressed was submitted to the Unitec Ethics Committee, who approved this project (see Appendix E). Because of the personal nature of interview-based qualitative research, the main ethical concerns in this project involved informed consent, confidentiality and anonymity (Vivar, McQueen, Whyte, & Armayor, 2007). These subjects are explored below.

The participants’ involvement in this study was relatively straightforward but concerns existed around their rights in the context of the recording and use of the material contributed during the interviews. Thus, the practice of gaining informed consent was of chief importance. This was addressed by giving a full written and verbal explanation to the participants on their role in the study, their rights, and the methods of data gathering and analysis. The participants were encouraged to raise any concerns or questions they may have throughout the study. The five osteopaths were informed of their right to withdraw their participation at any point, including during the interview, and up to two weeks following the interview. Such a situation did not arise and all five participants fully partook in the study. Before their interview, the participants were required to read an information sheet (see Appendix F) before signing a consent form (Appendix G). Through these processes, the participants’ involvement was completely voluntary and informed consent was successfully obtained.
The second ethical concern was the confidentiality and anonymity of the interviews. All identifiers from the interviews, such as names and places, were edited out of the digital audio recordings before being sent to a professional transcriber. The participants’ only records of identity and contact information are kept electronically, in a secured document. Each participant was assigned a letter (A - E), and these were used as pseudonyms throughout this study and in this thesis. These measures permitted the successful anonymity of the participants. Confidentiality was also protected throughout the study. The transcriber was the only person other than the researcher to hear the audio recordings of the interviews and was made fully aware of the sensitivity of the material. The transcriber was required to sign a confidentiality agreement prior to receiving copies of the material (see Appendix H). Owing to these procedures, confidentiality was retained throughout the study.

Another aspect of this project considered under the light of ethics was the minimisation of harm to the participants. The potential for emotional stress from recounting events in the interview was unlikely due to the subject of the enquiry but was addressed by ensuring the participants knew their rights to not answer any given question or terminate the interview if needed. This did not occur, and all five participants appeared pleased to be interviewed. The interviews took place at the participants’ choice of location and at their preferred time to maximise their comfort and minimise inconvenience. During the interviews, all efforts were made to ensure that the participants felt at ease, under minimal pressure, and free to talk or not talk about what they wished. For these reasons, any inconvenience to participants caused by this study was minimised.

**Participant Selection**

Undertaking any study starts with identifying the type of participant sample needed to answer the research question. A small number of participants is typical in phenomenological research, as a large amount of data is expected to result from the in-depth interviews and generalisability is not the aim (Guetterman, 2015; Hycner, 1985). Recommendations for sample size in phenomenology studies vary from at least three to six participants (Englander, 2012; Palinkas et al., 2015), while large studies or doctorate projects can include as many as 20 or more participants (Guetterman, 2015). Increasing the number of participants is understood to result in a greater comprehension of the phenomenon, but lead to a lengthier analysis process. Therefore, 90-point thesis projects usually rely on smaller numbers of
participants to provide an amount of data manageable within the two-year period. A common number of participants used in existing 90-point qualitative theses is five (Albertson, 2011; Consedine, 2007; Harrison, 2009), which still provides enough data to construct useful and relevant results. Therefore, this study sought to recruit five participants.

The participant sample sought for this study was a diverse group of osteopaths who would be experienced enough in treating PwEM to be interviewed about it in depth. The study hoped to gain insight from a variety of opinions, so to gain as much data as possible over the course of the five interviews. To obtain this variety in the participant sample, the osteopaths sought were from different parts of New Zealand and had different education backgrounds. The selection criteria were very broad, to allow most osteopaths with experience with the phenomenon to participate. Colaizzi (1978) argues that experience with the investigated phenomena and adequate communication skills are sufficient criteria to include participants (p. 58). A few additional criteria, however, were used in this study to avoid some specific issues. The inclusion criteria allowed participation to any registered osteopath practicing in New Zealand at the time of the interview, was fluent in English, and had at least five years of working experience as an osteopath at the time of the interview. While osteopaths who were experienced with treating PwEM were sought out, there were no specific requirements concerning the aptitude, experience or knowledge of the participants pertaining to migraine. This is because it was deemed reasonable to expect that the osteopaths who agreed to be interviewed about migraines were already knowledgeable and confident enough to be willing to do so.

The exclusion criteria applied to osteopaths who were employed as clinic tutors at the osteopathic student clinic at Unitec or were involved in any administrative positions at Unitec at the time of the study. This was a precaution to avoid any power relationships between the participants and the interviewer. Additionally, it can be noted that clinic tutors at Unitec are often involved in student research, so sampling outside that population ensured a different perspective to one that may be predominantly portrayed.

Participant recruitment was successful in that it led to the participation of five osteopaths from four different regions of New Zealand, of ranging professional and educational backgrounds, and who had a wide range of years of experience working as an osteopath. Despite these differences, the main underlying themes found in the interviews were common
to all participants, which indicates success in identifying the essential meaning that this study sought out to pursue (Merriam, 2009).

**Participant Recruitment**

The five participants in this study were recruited using purposive sampling. Purposive sampling is the most common form of participant sampling in qualitative research because it allows the participation of people from which the most can be learnt on the subject under study (Merriam, 2009; Palinkas et al., 2015). This method of sampling results in rich, in-depth data, making it particularly suitable for phenomenological research (Merriam, 2009; Sanders, 2003). In this study, the selection criteria presented above (p. 72) determined the attributes sought for in participants.

To find the osteopaths needed as participants, two types of purposive sampling were used. First, osteopaths in different parts of New Zealand who were known to fit the inclusion criteria were directly contacted. These participants lived in different regions of the North Island where face-to-face interviews could be conducted. This reflected the practice of convenience sampling (Merriam, 2009). In this sampling method, constraints in communication and location guided the search for participants in the direction of osteopaths who met the inclusion criteria and were easily accessible. This method led to the recruitment of three participants. A fourth participant was found after having exhausted options through the first method, and directly contacting osteopaths who were personally unknown, and lived in a different location from the other participants. In this way, close control of the participant selection was maintained to ensure desired characteristics (variation in professional background, location, and experience).

The fifth participant was found by the method of snowballing. Snowballing is another type of purposive sampling. It involves the referral of potential participants, usually by individuals already involved in the project (Merriam, 2009). In this study, an osteopath who was contacted but declined to participate suggested another potential participant. When contacted, the suggested osteopath volunteered to participate and joined the sample as the fifth participant. This participant was the only osteopath in the sample to explicitly describe themselves as an osteopath who seeks to treat PwEM, and this seems to have accounted for the other osteopath’s recommendation.
Data Collection

The data collection in this study consisted in one face-to-face, in-depth interview with each participant. In the context of phenomenological enquiry, Giorgi (2010) explains that the aim of interviewing participants is to gain an account of the lived experience of the phenomenon as precisely as possible. This precision is encouraged by the researcher by enabling the participant’s free expression, but refraining from prematurely interpreting it. The researcher then aims to clarify the participant’s description, and discover the essential meaning of the phenomenon through analysis. Colaizzi (1978) describes the formulation of the questions to ask participants as the result of identifying presuppositions which form a preliminary basis for enquiry. The author argues that the success of these questions is measured by the extent to which they tap into the lived experience of the participants (Colaizzi, 1978). In preparation for conducting the interviews, such presuppositions were recorded in the reflection journal, which informed the development of an interview guide. Before data gathering, interview techniques were practiced with peers and relatives to facilitate in-depth conversations with minimal researcher influence. These skills were also reviewed with the two research supervisors, both experienced experts in qualitative interviewing, to ensure the adequate capability of the interviewer.

The interviews were semi-structured and steered by the interview guide (see Appendix I). This entailed a list of 14 broad topics and questions used to ensure that the participants addressed all areas of interest. The questions were broad and non-leading to encourage an unhindered flow of the participants’ own thoughts and minimise researcher influence. The interview guide also helped ensure that all interviews were conducted in a similar manner. The five interviews were anticipated to last 30 to 60 minutes each and all lasted between 53 and 60 minutes. The interviews were fully recorded on an electronic recording device, with full consent from the participants. During the interviews, written notes were also taken to record any other information such as non-verbal cues and topics to keep track of. The interview recordings were then transcribed word-for-word, and used in their written and audio formats to constitute the data to which analysis was applied. This process is described below.
Carrying Out Phenomenological Methods of Analysis

As discussed above (p. 73) the purpose of a phenomenological enquiry is to reveal the essence of the phenomenon through the careful analysis of accounts of lived experiences shared by participants. In the context of this study, the participants were experts sharing their experiences of treating PwEM as osteopaths. Little less than five hours’ worth of audio data and 93 transcribed pages composed this account, and a systematic step-based method was needed to fully consider the meaning of the data. There are multiple ways of doing this within the field of phenomenology, as expressed in the previous chapter. However, the chosen approach used in this thesis was guided by the steps outlined in multiple works in the field of applied descriptive phenomenology; mainly Colaizzi (1978), Hycner (1985), Sanders (2003), and Wojnar and Swanson (2007). Colaizzi (1978) advocates the use of descriptive phenomenology to understand the experiential aspect of phenomena, which lacks from traditional definitions and understanding. The meaning of the phenomenon comes from a close understanding of the experience of the participants, and importance is placed on staying close to the data throughout the analysis so that the role of interpretation is kept to a minimum (Colaizzi, 1978; Morrow et al., 2015). Following these texts, the key components of this study were bracketing, analysing, intuiting, and describing. These concepts are considered essential to descriptive phenomenological methods of research (Colaizzi, 1978; Hah, 2010; Wojnar & Swanson, 2007). Bracketing is an important characteristic of descriptive phenomenology and occurred throughout the study. It is discussed in detail below. Analysing refers to the multiple steps that allow understanding of the essential meaning of the phenomenon from the raw data. The seven steps of analysis carried out in this study were guided by Colaizzi (1978), and are each described in the section below. Finally, intuiting refers to the process of understanding the phenomenon on a deep level (Abalos et al., 2016; Dowling, 2007; Wojnar & Swanson, 2007). Intuiting develops over time during the research process and results in a sense of having personally experienced phenomenon through the participants’ accounts (Wojnar & Swanson, 2007). It plays a role in acquiring a sense of the essential meaning of the phenomenon without prematurely attempting to hypothesise emerging themes but rather letting the data speak for itself (Colaizzi, 1978; Wojnar & Swanson, 2007). Throughout the study, the journal played a role in the process of intuiting, providing a platform to record thoughts, ideas, mind maps, and attempting to understand the experience of treating PwEM through the participants’ eyes. Lastly, describing refers to the creation of an exhaustive description representative of the essential meaning of the
phenomenon (Colaizzi, 1978). In this thesis, Chapter Five: ‘Results’, provides the description of the phenomenon of the osteopathic treatment of PwEM as developed through the analysis conducted.

In this section, the way bracketing, analysing, and describing were carried out are discussed, illustrated with examples from the data.

**Bracketing**

Bracketing involves bringing into awareness any assumptions, beliefs and personal opinions about the phenomenon under investigation so to allow an unhindered representation of it (Lopez & Willis, 2004). Originally, the idea of bracketing as described by Husserl suggested the possibility of a complete separation of the researcher from their prior knowledge and beliefs (LeVasseur, 2003). Husserl referred to this state as ‘transcendence’ (Abalos et al., 2016). However, most modern phenomenological authors describe a more naturalistic form of bracketing, which recognises complete objectivity as unrealistic and philosophically incongruent with phenomenology (Dowling, 2007; Hycner, 1985; LeVasseur, 2003). Colaizzi (1978) emphases that in bracketing, the researcher’s experience cannot and should not be completely removed, as the researcher’s existence is itself, part of the phenomenon under study.

Bracketing is a defining characteristic of descriptive phenomenological methods (Hah, 2010; Lopez & Willis, 2004), and is not a definite step in the analysis of the data. Bracketing is a continuous process, employed as a strategy to minimise the influence preconceived beliefs may have on the truthfulness of the results (Wojnar & Swanson, 2007). Bracketing in this study can be demonstrated through written reflections such as personal assumptions, confusions and observations about the phenomenon. However, bracketing also involved broader aspects of this study, such as the decision to write the literature review after the analysis of the data to limit prior knowledge of the phenomenon. As described by Hah (2010) bracketing is part of and informs many components of a phenomenological study such as the development of an audit trail, conversations with supervisors, and the practice and reflection of interviewing skills. In this study, bracketing guided all these aspects of the method.

**Analysing**

Analysis of the collected data was comprised of multiple steps, and this section describes each of these in the order in which they took place. Analysis started after the collection of the
five interviews so that all the transcripts could be analysed together as a whole. This allowed the drawing of comparisons and parallels between the interviews of each participant. Colaizzi’s method was used as a guide with the help of additional recommendations from other authors (Hycner, 1985; Kleiman, 2004; LeVasseur, 2003; Sanders, 2003) to create a form of analysis which best suited the data. This idea is encouraged in descriptive phenomenological methods literature, including by Colaizzi (1978), who argues that every set of data is unique and not one set of steps can suit all descriptive phenomenological studies. This was particularly true in the case of this study, where the enquiry sought to understand a phenomenon experienced by the practitioner, as opposed to the patient, which is atypical for clinical qualitative research in general.

The analysis of the data was carried out in seven steps, described below, guided by those initially described by Colaizzi (1978) and discussed by Hycner (1985), Sanders (2003) and Wojnar & Swanson (2007). These are immersion, extracting significant statements, creating formulated meanings, categorising into themes, describing, returning to participants, and making changes per the participants’ feedback (Wojnar & Swanson, 2007, p. 177). Data analysis also involved continuous reflection in the journal and the use of the field notes written during the interviews.

**Immersion**

Immersion was the first step in carrying out analysis and occurred over the course of one week involving continued exposure to the data. The goal was to concentrate the immersion of the data over a short length of time, so to result in extreme familiarity with it. Without drawing any premature conclusions, a strong understanding of the interviews’ contents was gained owing to this process.

To carry out the process of immersion, the audio recordings of the interviews were first listened to while reading each corresponding transcript. The accuracy of the transcription was checked and corrected as needed during this first reading. Once the transcripts were as accurate as possible, they were read another five times and the audio recordings were listened to four times each; as recommended by Sanders (2003). This amounted to approximately 50 hours of immersion over the course of one week. Although Colaizzi (1978) recommends reading each transcripts twice, it was deemed necessary to accomplish the immersion in such an intensive way because the data were very rich and detailed. By the end of the immersion
phase, a transcript could be read while keeping the content of the others in mind, resulting in a broader understanding of the data.

**Extraction of significant statements**

Significant statements are defined by Colaizzi (1978) as phrases or sentences in the transcripts that relate to the phenomenon being investigated. Narrowing down the analysis process to these allows for a greater focus on the relevant and meaningful aspects of the data. This step involved reading through each printed transcript again and highlighting each passage or statement which carried meaning relevant to the subject of the role of osteopaths in treating PwEM. Taken alone, the highlighted text resulted in a ‘clean’ transcript, bare of interviewer interjections and conversational fillers (such as ‘like’, ‘um’, ‘kind of’, ‘you know’). This procedure was repeated electronically and both soft and electronic versions were compared to ensure consistency in the selection of significant statements. This increased the validity of the selection process.

The highlighted selections were copied and pasted onto an electronic document which showed all the interview transcripts on the left-hand side of the page and the copied highlighted statements on the right-hand side (see Appendix J). Each highlighted passage was numbered 1 to 960 in order of appearance across all five interviews. These numbers were also embedded into the full transcripts documents for ease of navigation. From that point on, these numbered, highlighted passages were referred to as significant statements.

While most significant statements corresponded to discrete sentences, some involved multiple sentences which all pointed to one meaning. This was often the case for ‘example stories’ in which the participants recounted an experience to illustrate a point. In such cases, the passage was marked in bold and the resulting extracted statement was a sentence or short summary of the example story and its meaning. These instances were easily identified by being marked in bold and labelled with the mention [collated] next to their numerical reference (see Appendix K). This method of extracting significant statement is consistent with that described by Colaizzi (1978), who reports the re-formulation of context-specific statements to a general interpretation that retains the original meaning (p. 59).

**Formulating meanings**

Following the extraction of all significant statements, corresponding formulated meanings were written to clarify and expose the meaning of each significant statement. Formulated meanings are defined by Colaizzi (1978) as the spelling out of significant statements, written
by the researcher. Further, Hycner (1985) explains that they represent a ‘crystallisation and condensation of what the participant has said’ (p. 282), while keeping to the literal meaning that the significant statements carry. The questions ‘What does this mean? What does this say about the role of osteopaths in the treatment of PwEM?’ were asked about each significant statement to inform the formulated meanings. In this process, all 960 significant statements were copied on the left-hand side of an electronic document, and corresponding formulated meanings were written on the right-hand side of the document (Appendix L). During this process, referring to the transcripts to check the context of the significant statements was useful in ensuring a truthful representation of what the participants meant. Colaizzi (1978) stresses the importance of avoiding overinterpreting the participants’ words. Instead, Colaizzi (1978) instructs to ‘let that which shows itself be seen from itself in the very way it shows itself from itself’ (p. 59).

In 46 instances, a significant statement gave rise to multiple meanings (Appendix M). These meanings conferred additional information which needed to be acknowledged to reflect fairly all that had been said by the participants. An example of this is provided below:

**Significant statement:**

819. *when they come with a migraine they have, all the baggage that’s come with it, so I tend to like this sort of treatment more… Emotional stuff, yeah*

**Corresponding formulated meanings:**

819a. *PwEM often carry emotional burdens*

819b. *An osteopath enjoys treating PwEM because of the importance of psychological-emotional support involved in treating them.*

In these instances, the significant statement gave rise to two formulated meanings referenced with the same number, but with a letter (a. and b.) This differentiation allowed the significant statements to be represented across two different themes in the following stage of analysis.

To continue the example used above:

819a was categorised under the theme: *‘The typical PwEM in the osteopathy clinic’*

819b was categorised under the theme: *‘Role of osteopaths in mental health’*
Conversely, in some circumstances, several consecutive significant statements were very similar in meaning. This mostly occurred when the participant emphasised a point during the interview. These significant statements were collated together into one formulated meaning which showed the reference numbers of the significant statements from which it was generated (Appendix N). An example of this is presented below:

**Significant statements:**

- 322. *I think that really one of the most important things about being an osteopath is knowing where to send people*
- 323. *People ask me constantly about all sorts of things [context: referral to other medical professionals]*

**Formulated meaning:**

- 322, 323. *Osteopaths have an important role to play in the referral of patients to various other medical practitioners (alternative or allopathic).*

These were not premature attempts at grouping similar statements, a process which occurred in the proceeding step, but aimed at minimising repetitive, consecutive formulated meanings. A similar method can be found described by Colaizzi (1978, p. 59). The original significant statements remained traceable throughout the analysis process through their numerical references, allowing each to contribute to the themes despite having been collated into a common formulated meaning. An extract from the journal showing the thought processes behind these formulated meanings is shown in Appendix O.

**Categorising into themes**

The next step was to sort the formulated meanings into themes and subthemes in a way that successfully represented the content of the interviews (Colaizzi, 1978; Morrow et al., 2015; Sanders, 2003). Each formulated meaning was read, and corresponding categories created to sort them into, giving rise to 72 ‘initial themes’. This was done using a new electronic document and using only the reference numbers for ease of navigation. At this stage, the initial themes were inconsistent and rough, but provided an early portrayal of the different ideas that the participants had expressed. An example of this step is shown in Appendix P. In the same manner that some significant statements gave rise to two formulated meanings in the previous step, some formulated meanings fit in more than one theme. In such cases, the formulated meaning was put into both relevant themes, to fully represent all that the
participant meant. These instances were easily kept track of using the corresponding numerical references, as shown in Appendix Q. Categorisation of the first few hundred formulated meanings resulted in most of the initial themes, and by the time the formulated meanings from the last two interviews were categorised, most themes already existed. According to Lincoln and Guba (1985), this indicated successful data gathering because the participants had provided enough information so that further data would become repetitive.

Following the allocation of all formulated meanings into themes, numerical references in each initial theme was replaced with the full formulated meaning, so that the contents of themes could be seen in their entirety. This procedure was followed by the creation of six larger categories referred to as ‘theme developments’, into which the initial themes were sorted. These broader categories were developed through the extensive utilisation of the journal in the form of written reflections and mind maps. These tools were essential for the completion of this step, and examples of their use are shown in Appendix R1 and R2. Refinement of the theme developments was carried out in an electronic format, where all the themes and groups were improved on, refined, and developed. This led to a classification of all the 960 formulated meanings into 4 groups, 21 themes and 28 subthemes, and some additional subsets.

Phenomenological enquiries seek to uncover the essential meaning of a phenomenon (Colaizzi, 1978; Morrow et al., 2015; Shosha, 2012). At this stage, the classification of themes still showed the entirety of the content of the data relating to the phenomenon, and was far from concise. While the process of reducing the data to its essential meaning is ultimately the result of subjective interpretation requiring the use of human intuition and insight, the relative weight of each theme contributed significantly to the development of the final model. The number of formulated meanings in each theme indicated the prevalence of the corresponding idea, and high prevalence across participants indicated importance (Hycner, 1985, p. 287). The number of participants associated with each theme was recorded and each formulated meaning color-coded to correspond to each participant. This enabled rapid determination of the proportion of each participant’s contribution to every theme (see Appendix S) which also helped identify commonly recurring ones.

**Describing the preliminary results**

For this step, a summary of all the key themes found in the data which were common to all participants was written. Colaizzi (1978) describes a statement representing the fundamental
structure of the essence of the phenomenon. This was guided by the classification of the themes done in the previous step and their prevalence across all interviews. Decisions were made regarding the most important and relevant themes, because of the high number of themes that were common to all five participants. These decisions were guided by the research question ‘what is the role of osteopaths in the treatment of PwEM?’ In doing so, an early representation of the essential meaning of the phenomenon was developed: that which is relevant, important and fundamental to understanding the phenomenon of treating PwEM as an osteopath. The summary was made of 750 words and consisted of 18 bullet points. This summary, termed ‘preliminary results’, was the starting point for developing the model described in Chapter Five of this thesis.

**Returning to participants**

A defining characteristic of the essential meaning of a phenomenon is that its description should be relatable to any other person experiencing it (Colaizzi, 1978). In the context of this study, the phenomenon investigated was ‘treating PwEM as an osteopath in New Zealand’. Therefore, the essential meaning extracted from the participants’ interviews should feel accurate to other osteopaths in New Zealand who treat these patients. To make this possible, it first was essential that the participants themselves could recognise their own accounts in the ideas presented in the preliminary results. The preliminary results were sent electronically to the participants with their transcript to review, along with a detailed explanation of this step of analysis. The electronic letter containing the preliminary results sent to each participant at this stage is shown in Appendix T. Participants were encouraged to provide feedback within two weeks. One participant clarified something they had said in the interview and gave positive feedback. Two other participants gave positive feedback and no suggestion. The two remaining osteopaths did not respond.

**Making changes per the participants' feedback**

The participants’ responses to the preliminary results were positive and did not justify any changes in the themes themselves. Participant A was the only one to make minor suggestions, mostly relating to word choice. These suggestions were noted and included in the following steps of analysis.

**Describing**

After completion of the analysis process, the final phase in carrying out a descriptive phenomenological enquiry involves writing a ‘descriptive theoretical model’ (Colaizzi,
The description aims to portray the essential characteristics of the phenomenon under investigation (Colaizzi, 1978; Sanders, 2003; Wojnar & Swanson, 2007). Colaizzi (1978) also refers to it as an ‘exhaustive description’. In this study, the large number of common themes resulted in a very lengthy description, reflective of its exploratory role and its broad area of enquiry. The description of themes was focused and reduced to those representing the essential meaning of the phenomenon, guided by the theme categorisation and the intuiting process. Multiple themes which were common to all participants, but were less relevant, had to be left behind to allow clarity in the results. The resulting description of the essential meaning of the phenomenon of treating PwEM as an osteopath can be found in Chapter Five: ‘Results’. This description also offers insights into approaches to clinical practice and highlights subjects for future osteopathic research. The wider context of the essential meaning uncovered by this study is explored in Chapter Six: ‘Discussion and Conclusion’.
Chapter V: Results
Chapter Introduction

This chapter presents the results obtained from the analysis of the data generated through the in-depth interviews. These resulted in a vast amount of rich information, which was categorised into over seventy recurring themes and subthemes. From these, the researcher identified the most common and relevant themes to show a form of the data which could reveal the essential characteristics of the phenomenon of treating PwEM as an osteopath. The two overarching themes described in this chapter should represent the key common elements experienced by osteopaths who treat PwEM in New Zealand. The first overarching theme, ‘The Migraine Challenge’, describes the difficulties osteopaths encounter when treating PwEM. Migraine is a condition characterised as complicated by all five participants. The two main themes that constitute this overarching theme describe the key characteristics of the condition that osteopaths feel contribute to its complexity, and the difficulties osteopaths experience in treating PwEM. The idea that migraines are difficult to treat because of their vastly unknown and complex nature resonates throughout the interviews, and leads to the second overarching theme. The second overarching theme, ‘The Role of the Osteopath in the Care of PwEM’, describes the multiple roles osteopaths take on to care for PwEM, and the treatment approaches they use to answer to the difficulties associated with migraine. This overarching theme is made up of four main themes. The first, ‘A Multidisciplinary Approach’ relates to the role of referrer osteopaths play when incorporating both alternative and conventional medical care for PwEM. The second main theme, ‘Osteopaths being osteopaths: Osteopathic principles to tackle the problem’, describes the extent to which osteopaths rely on osteopathic principles to treat PwEM, and the problems they encounter when doing so. The third main theme, ‘The Osteopath in Action: Specific Treatment Tactics’ describes four common treatment strategies found throughout the interviews, although no single approach was identified as key by the participants. The last main theme, ‘Beyond the treatment table’, describes the role osteopaths play outside of manual treatment, including providing education and advice, management plans, and support, which was highlighted by the participants as highly important in the care of PwEM. All six main themes are themselves made up of 20 subthemes that describe their various aspects and show corresponding quotes from the transcripts. This large number of themes reflects the wide scope of knowledge osteopaths draw from to provide care to these patients, and the exploratory role of this study. The structure of this chapter and its three levels of themes is demonstrated below in table 1.
### Overarching themes

<table>
<thead>
<tr>
<th>Main themes</th>
<th>Subthemes</th>
</tr>
</thead>
</table>
| **The Migraine Challenge** | Migraine: A complex condition | - The unknown nature of migraine  
- Misconceptions of migraine by PwEM and the public  
- Rarity of presentation of migraine in the osteopathy clinic  
- Migraine as a diagnostic challenge for osteopaths |
| **Treating PwEM: A difficult endeavour** | Migraine as a multifactorial condition  
- Unpredictability of migraine attacks and periods of worsening  
- PwEM’s unmet needs in the traditional medicine framework |
| **A multidisciplinary approach** | Osteopathy is only one part of a multidisciplinary solution  
- Patterns of referral from osteopaths to other health professionals |
| **Osteopaths being osteopaths: Osteopathic principles to tackle the problem** | Uniqueness of every PwEM and individualised treatment  
- Treating the whole body  
- Treating around the underlying pathophysiological cause  
- Using a wide range of techniques |
| **The osteopath in action: Specific treatment tactics** | - The neck  
- Fluid movement  
- Breathing  
- Autonomic balance |
| **Beyond the treatment table: Non-manual components of osteopathic care for PwEM** | - The osteopath as a health educator  
- The osteopath’s role in providing support  
- The management plan |

*Table 1. Structure of the themes presented in this chapter*
A guide to reading this chapter

Throughout the results, participants are referred to by their assigned alphabetical letter, which corresponds to the order in which each interview took place.

Example: ‘Participant B’.

The language used to refer to participants and any other person is gender-neutral wherever possible.

Quotes from the participants are italicised and are used throughout this chapter to exemplify subthemes. After each quote, the participant (part.) from whom the quote was taken is shown, along with the reference number of the significant statements (Stat.) corresponding to the quote. The symbol […] is used to denote a part of the original quote that was edited out.

Example of a quote:

[…] that’s the thing with migraines, they’re not always predictable. You think you’re doing alright and then will suddenly have a bad couple of weeks; (Part. C, Stat. 416-417)
Overarching Theme: The Migraine Challenge

The idea that migraine is a difficult condition to treat and a pathophysiological phenomenon about which much is unknown was clearly expressed across all interviews. PwEM are not easily treated by either osteopaths or other medical professionals, as demonstrated throughout Chapters One and Two. Some participants stated that this characteristic makes migraine an interesting condition for them to treat, suggesting that they may see a professional challenge in treating PwEM. In this context, the word ‘challenge’ refers to ‘difficulty in a job or undertaking that is stimulating to one engaged in it.’ (‘Challenge,’ 2017). Such a definition provides an accurate description for the way in which the participants viewed their role in the care of PwEM. The osteopaths interviewed seemed to regard migraine realistically with a clear understanding of their own limitations, but at the same time took an approach to treating PwEM filled with motivation to do their best. The participants’ attitudes to migraine are shown in the effort and depth of reasoning put into the treatment they provide to these patients. The various facets which make up the challenge that migraine poses are explored in this overarching theme, which contains two main themes. The first, entitled ‘Migraine: A complex condition’, describes the multiple aspects of the condition which cause the difficulties osteopaths have in understanding it. The second main theme, ‘Treating migraine: A frustratingly difficult endeavour’, highlights the ways in which osteopaths experience the challenge of treating PwEM, and the frustration of the patients themselves.

Migraine: A complex condition

The unknown nature of migraine

The unknown pathophysiological cause of migraine was a major descriptor of the condition used by all five osteopaths interviewed. Although the medical knowledge on migraine has greatly improved over the last two decades, the scientific community is still challenged by the complex nature of the disorder. This renders the condition difficult to treat for osteopaths.

*With the migraine nobody knows.* (Part. A, Stat. 86)

*This is the big question with migraines, what’s causing them.* (Part. B, Stat. 355)

*Another barrier is I don’t know where it’s coming from, why do you have a migraine? how am I going to sort this out?* (Part. D, Stat. 805)
The participants also expressed the idea that migraine is varied in the way it presents itself through patients’ symptoms. Four of the participants reported that migraine attacks share the characteristic of being unique for every individual, and the variety of presentations of make it a challenging condition to describe.

\[...] sometimes you get more of the sensory symptoms and less of the headache, and then sometimes it’s when the headache is pretty intense but with other symptoms basically as well, like visual and nausea or sensation changes, yeah a bit more of a mixed picture. (Part. C, Stat. 339)

Moreover, ‘migraine’ is a term which refers to several other conditions related to the better known ‘classic migraine’ and ‘common migraine’. These other types of migraine include chronic daily headaches, childhood migraines, abdominal migraines, ocular migraines, and basilar migraines. The nature of all these conditions is not yet fully understood, and add to the difficulty of defining migraine.

**Migraine as a diagnostic challenge for osteopaths**

A related aspect of migraine that contributes to the challenge that osteopaths face in treating PwEM is the difficulty in arriving at a diagnosis. The participants pointed out that they often saw PwEM who are undiagnosed or have been given an inadequate diagnosis. All five osteopaths expressed that diagnosing migraines correctly is a difficult task. This is mainly due to a difficulty in differentiating migraines with other types of headaches, when the patient’s symptoms are not obviously fitting into one category or the other. Participant A, who tended to base their diagnosis of migraine strictly on the ICHD-II criteria, pointed out the difficulty in diagnosing a patient whose symptoms only partly fulfils the diagnostic criteria.

\*And unless you’ve got all the other [ICHD] criteria, it’s not a migraine; so if you’ve got hemicrania with photophobia or phonophobia – fine, that’s migraine; but if you’ve got two parts of that even, well that’s not - so that’s a diagnostic challenge. (Part. A, Stat. 13)\*

The similarity between cervicogenic headaches, which can exhibit similar symptoms to migraine when severe, was used as an example by participant A in the continuation of their explanation of why patients’ symptoms do not always correspond to the textbook description of various types of headaches.
A cervicogenic headache can give you hemicrania; it can give you nausea; it can give you a kind of photophobia; so that's why there's a bit of a diagnostic misdiagnosing mix. (Part. A, Stat. 14)

This difficulty also translated itself onto the osteopathic diagnosis of PwEM. The osteopathic diagnosis refers to the diagnosis osteopaths develop that encompasses all aspects of health, including the musculoskeletal system, and is specific to the individual. This adds to the picture provided by the medical diagnosis, which is the condition itself, such as migraine. The osteopathic diagnosis guides the osteopath through treatments, and difficulties in its development add to the challenge of treating PwEM. More specifically, participant B expressed a difficulty in uncovering whether a PwEM’s musculoskeletal dysfunctions are a cause or a symptom of the migraine attacks.

There might be a secondary reaction why the muscles are tightening up, the joints are tightening up; so which one is which is hard to tell because is the neck tight because of the migraine? Or does the migraine happen because of the tight neck? (Part. B, Stat. 122)

When treating PwEM, osteopaths take on a dual role to provide a medical and osteopathic diagnosis. Determining either of these can be difficult, as migraine can present in many ways. To successfully do this, a thorough knowledge of the subject of headaches and of diagnostic criteria is often needed.

Migraine as a misused term by PwEM and the public

Not only is the term migraine difficult to define because of its unknown cause, all five participants expressed to some extent the misuse of the term by the wider community, reflecting a broader lack of understanding of migraine in society. Several participants recounted experiences of patients mislabelling their musculoskeletal headaches as migraine attacks, and participant B expressed that they had found a general lack of awareness within the general population as to what migraine is.

When people say it’s a migraine, I would say 70% of the time it’s not. [...] I would say 70% of the time it’s not a migraine because it doesn’t fall within that pattern. (Part. A, Stat. 31, 32)

This broader lack of understanding further complicates the issue of defining and diagnosing migraine, as different practitioners may use this word differently, while some patients use it
liberally. Participant D reported that some patients view migraine attacks as very painful headache, rather than a chronic condition. Others associate the term with specific symptoms they experience. All this fosters confusion around the term, and contributes to difficulties and delays in making accurate diagnoses leading to appropriate care.

**Rarity of PwEM in the osteopathy clinic**

All five participants clearly expressed that PwEM represent a minority of patients in osteopathy clinics, despite the prevalence estimated between 10.5% and 12.2% of the New Zealand population (Ministry of Health, 2007). Although some PwEM’s search for relief leads them to an osteopathy clinic, this does not seem to be the case for most PwEM. The participants explained that PwEM normally present with other types of complaints, as would be the case for any other type of patient, and reveal their history of migraines at some point in the history taking process. In such cases, many patients do not know that osteopaths are willing to treat them for migraine specifically.

Yeah, it’s not a lot in the whole spectrum of patients. Probably maybe two or three a week and not necessarily people who have come for the suffering of migraine but that’s part of their lives. (Part. B, Stat. 301, 302)

Because of this, it is difficult for osteopaths to build experience in treating PwEM and improving the care they provide. An example of this is voiced by participant D, who was the only participant in the study holding a specific interest in treating PwEM, but had limited experience due to the small number of PwEM they treated on a regular basis. Abdominal migraines and other types of atypical migraines are even rarer, and were rarely mentioned in the interviews.

I believe that I’d like to see more people, [...] I’d like to just have more experience (Part. D, Stat. 824, 825)

This is a way in which the rarity of PwEM in the osteopathic clinics contributes to the difficulty osteopaths face in treating PwEM and greatly restricts the role that they can play in helping these patients. The implications of the rarity of PwEM in osteopathic clinics are explored in Chapter Six: ‘Discussion and Conclusion’.

**Managing migraine: A frustratingly difficult endeavour**

This main theme describes the ways in which the osteopaths experience the challenge of treating PwEM. There seems to be a consensus among all participants that migraine is not a
condition which can be quickly addressed. The osteopaths appeared to perceive migraine as a complex condition, which has the potential to persist despite the osteopath’s and the patients’ best efforts.

So it’s a big job, yeah, they’ve got to look at everything in their lives and it’s quite challenging. It’s one of those really challenging things, migraines. And that’s why nobody’s - you know, people still suffer from them in 2015. It’s like, all the advances in medication didn’t do it. (Part. B, Stat. 280, 281)

Key characteristics of migraine contributing to this challenge are the multifactorial nature of migraine and the unpredictability of attacks, which are discussed in the subthemes below. An additional subtheme, describing the difficulties PwEM have in finding relief in the conventional medical system, is presented.

**Migraine as a multifactorial condition**

A characteristic of migraine which contributes to its challenge from the osteopaths’ point of view is that it is a multifactorial condition. While it is difficult to pin down the cause behind why migraine attacks occur in one person and not the next, the idea that many elements come into play to create a combined effect ensuing in a migraine attack was present in all five interviews. The multifactorial aspect of the condition was most expressed relating to migraine triggers, which are known to rarely exist singly, as explained by participant C.

There’s heaps of triggers: hormonal, food, postural decompensation. [...] structurally, physiologically or through food or diet or hormones or stress or breathing problems, that can all magnify someone who has a migraine tendency. (Part. C, 342, 344)

The osteopaths also saw the underlying condition of migraines as complex and multifactorial, some of which may be genetic, congenital, immune, dietary, hormonal, or vascular. Participant B expressed the importance of improving multiple factors underlying the individual’s health to help manage migraines.

I think the best that people have is that they do have a bit of bodywork to iron out any other factors and they do change their diet and if they don’t exercise I think they’ve got to do that or some other kind of thing that really de-stressed them on an regular basis (Part. B, Stat. 279)
This idea of addressing PwEM health on multiple levels was found to be an important theme throughout the five interviews, and is discussed below under the overarching theme ‘The Role of the Osteopath in the Care of PwEM’.

**Unpredictability of migraine attacks and periods of worsening**

Another recurrent idea pertaining to the difficulties osteopaths face when treating PwEM was the unpredictability of migraine attacks. The osteopaths described unpredictable periods of worsening as ‘sequences’, or ‘waves’ during which patients experience an increased frequency of attacks. Although some factors such as those described in the previous subtheme may be identified as the origin of such a period of worsening (increased stress, decreased exercise, or an increased exposure to triggers), these changes may come and go in a seemingly random fashion.

*I think the other thing with migraine, sometimes there’s patterns, or they come in clusters, or there’s a sequence, it’s not just kind of something that’s a bit repetitive* (Part. C, Stat. 341)

The notion was opposed to by contrasting descriptions of migraine attacks occurring sporadically, a few times a year for no apparent reason. This unpredictability, also found in the response a patient may have to osteopathic treatments, is clearly illustrated by participant A and was expressed by all the other participants.

*They start getting better and then they can relapse; you know, you treat them a couple of times, they improve, they say it’s great, it’s better; sometimes there will be a week of pain-free period and then you think ’yes! Great! now that’s fine’ and then they come back saying they have two migraines this time* (Part. A, Stat. 116, 117)

In the above statement, participant A clearly communicates a personal investment in caring for these patients. This appears to be especially difficult for the practitioner when faced with PwEMs disheartening aggravations despite their best efforts to help them.

**Unmet needs in the traditional medicine framework**

The final subtheme that needs to be addressed under the banner of difficulties bringing relief to PwEM is the other side of the issue: how this affects PwEM and fuels their search for options outside the medical profession. More accurately, this subtheme describes how osteopaths perceive PwEM to be affected. From the perspective of the participants, the difficulty medical professionals face in helping PwEM results in patients’ low satisfaction.
from conventional healthcare treatments. PwEM may encounter medications of varying efficacy, many times accompanied by side effects. The difficulty finding effective relief tends to push disenchanted PwEM to explore other avenues, and try forms of CAM. This is often the case for PwEM who try osteopathy based on a recommendation, or a search for another option, after having gone through the traditional healthcare system first. By the time they see an osteopath, the participants found that PwEM have often already tried multiple modes of treatment, traditional and alternative.

*people who have a long history of migraines might come in and they’ve sort of tried everything else and they want to know what an osteopath does* (Part. B, Stat. 275)

Participant D went as far as to describe osteopathic care as a last hope for relief for some PwEM, who have tried and been disappointed by many other treatments. This participant also described certain PwEM often carrying anger and frustration because of their struggle in finding effective treatments.

*So a lot of people that you see are already frustrated because they’ve been to their doctor, or many doctors; they’ve been to the neurologist, that has helped or not. [...] So you’re either the last resort or they have nowhere else to go. So they’re frustrated, they want it to go away* (Part. D, Stat. 588, 590, 591)

These statements communicate a certain amount of desperation coming from PwEM, sensed by the osteopaths, who appeared to empathise with these patients. This idea of conventional medicine falling short of meeting the needs of PwEM is congruent with the findings from studies discussed in first two chapters of this thesis.
Overarching Theme: The Role of the Osteopath in the Care of PwEM

In this second overarching theme, the treatment of PwEM by osteopaths is addressed, and a more direct answer to the research question ‘What role do osteopaths play in treating PwEM?’ is provided. The first overarching theme, ‘The Migraine Challenge’, presented the essential background to this answer. Essential, because, as it becomes evident throughout this overarching theme, the strategies employed by osteopaths to help PwEM are a direct response to the challenge provided by the condition, and mirror it in its complexity.

This overarching theme is composed of four main themes, each described in the form of subthemes related to different ways in which the participants treat PwEM. The first main theme relates to the role of multidisciplinary care in the osteopaths’ treatment strategies; the second pertains to the use or disuse of general osteopathic principles; the third theme illustrates certain specific physio-anatomical approaches recurring in the interviews. The fourth and last main theme describes essential non-manual components of the osteopathic management of migraine, without which a picture of the osteopaths’ role in the care of PwEM would be incomplete.

A multidisciplinary approach

Multidisciplinary health care was emphasised by some participants more than others, but all osteopaths interviewed included referrals in their strategies for treating PwEM. The osteopaths interviewed seemed to view osteopathy as a profession existing as an integral part of the healthcare landscape in New Zealand. In this manner, the osteopaths participate in an integrated model of care fitting into the idea of osteopathy as a holistic, open practice.

**Osteopathy as only one part of a multidisciplinary solution for PwEM**

The idea that osteopathy is only a part of health care for PwEM, or that osteopathy is only one of the many tools PwEM use to manage their condition was explicitly stated by four participants. This suggests a strong sense of self-awareness and understanding of the limitation of their profession by the participants and reveals an attempt to view healthcare through the eyes of their patients.

(...) you’re just another person in the chain of help (Part. B, Stat. 241)
I think we’re all part of their tools, to manage their migraines as well. (Part. C, Stat. 510)

All participants appeared to find value in forming and maintaining patient referral relationships with other health practitioners, and viewed their use of this network as an integral part of their role as osteopaths.

An interesting argument for the multidisciplinary care of PwEM was expressed by participant B, who viewed the current health care of PwEM as limited in that there is no dedicated interdisciplinary practice in New Zealand to cater specifically to the needs of PwEM. Participant B argued that the complex multifactorial nature of migraines requires targeted treatment affecting multiple aspects of the patients’ health and lifestyle to see positive therapeutic outcomes.

Yeah well I think it would be great if there’s some – I mean I don’t know if, there may well be- if there’s an institution that’s set up to deal with them – a bit like people who specialise in hands or, you know, because I think it would be good to have like a dedicated multidisciplinary approach to it; you know, sort of people who, you know, like the diet and the musculoskeletal side of things but I think that would help people a lot more. (Part. B, Stat. 331, 332)

Because of the value they placed on multidisciplinary care, the osteopaths utilised their ability to refer their patients to other practitioners in several ways. These different ways are presented in the following subtheme.

Patterns of referral from osteopaths to other health professionals

Throughout the interviews, there are recurring ways in which the osteopaths describe participating in referrals of PwEM. These include referrals of PwEM to other alternative practitioners, including other osteopaths, other alternative therapists, or to medical practitioners.

The osteopaths interviewed all appeared to be open to other alternative modalities and view them as additional tools that should be used when needed. The participants also expressed the use of referrals to investigate or address specific aspects of a PwEM’s condition. The osteopaths’ choice of practitioner to refer PwEM to is guided by the patients’ individual needs.
if there was strong evidence that there was a hormonal link there then I’d probably send them off to somebody like Patients Advocates [nursing health servicing advocating use of natural hormone therapy]; we have a practice here in [...] and they deal with hormone-based women’s issues, so I would refer them on to somewhere like that. [...] to manage pain, either back to their GP if they wanted medication, or if they wanted something more natural, for acupuncture; and that would probably be mainly the referrals that I would make. (Part. E, Stat. 879-881)

Additionally, the need to have a reserve management option, or fall-back plan, was expressed by the participants, in case the patient does not get better with osteopathy alone. This important aspect of referral was described mainly as involving a referral to another alternative practitioner.

So I say to them if the manipulation or osteopathic hands-on treatment doesn’t seem to be making a difference, let’s try some needles or try a different modality, and if that is not working and helping then you try to say to them look maybe you need to go and see a dietician, (...) (Part. A, Stat. 155)

Participant C highlighted the importance of the osteopath’s role in bringing options and developing plans with the patient.

even if you say I’m not 100% sure but this is what we’ll do; you know, give people a bit of plan, a bit of confidence and that you’re keeping an open mind and if it doesn’t help then we do this. (Part. C, Stat. 488-490)

Another way in which the participants used referral in their management of PwEM was referrals to GPs. This was expressed in two different contexts. First, when the patient has suspected migraine and diagnostic clarification is needed. Referrals of this sort appeared to be mostly motivated by a need to rule out serious causes rather than to confirm the diagnosis of migraines.

Definitely if they’re reoccurring or they’re not resolving I would tell them, you know, you have to rule out other things as well. I think they need to be – I think, more sinister things; so I think you do have to make sure that you refer them to their doctor or, yeah, get the appropriate follow-ups. (Part. C, Stat. 457, 458)

The context of these referrals all appeared to be related to a particularly difficult diagnostic situation, as none of the participants indicated their use of referral as prescriptive each time a

~ 99 ~
patient presents with an undiagnosed headache. The decision to send a patient for a referral to their GP seems intrinsically linked to the diagnostic process osteopaths undertake and their ability to recognise red flags.

The second context in which referrals from osteopaths to GPs occur is related to the need for pharmaceutical management, as a second-line intervention.

"say if someone’s in a situation where they’ve really got to go to work or they can’t avoid going to work or they’re a solo parent or something, they really need to kind of be operational and they haven’t, if they aren’t on medication and I sort of feel like they need that, I would refer them to a GP to get that sorted (Part. B, Stat. 307)"

Medical referrals of this sort appear in a context where osteopathic treatment of PwEM is regarded as a primary course or first line of action, and medical referrals are used as secondary solutions when the problem cannot be helped solely with osteopathy. This is related to the need for a management plan expressed above in case osteopathy is not enough. The only contrasting point of view on this subject came from participant A, who stated that undiagnosed PwEM who appear to experience migraines and are not already taking medication should be sent to their GP for pharmaceutical management.

"So if I decide that okay this is migraine; I do refer them to doctors for triptans - the current mainstream treatment is triptans or they can do a few other things. I do talk about diet and all those kinds of things, and lifestyle interventions, but I refer them for that [for medication]. (Part. A, Stat. 44, 45)"

All osteopaths interviewed agreed that medication is not something to condemn as a CAM practitioner, but another tool that PwEM can use to control their condition.

Lastly, it is useful to take note of the other side of these inter-professional relationships: referrals from GPs to osteopaths. Although mentioned by only three of the participants, further clues on the role of osteopaths in the New Zealand healthcare landscape can be drawn from discussion of this aspect of multidisciplinary care. The strongest recurrent notion was that the experience of GPs towards osteopathy was highly variable. As osteopathy is not a very well-known therapy, most osteopathic referrals seemed to come from GPs who personally knew the osteopath, and so happen to know about osteopathy.
An example of this sort of inter-practitioner relationship was offered by participant A, who had treated a GP for headaches, and has been receiving referrals for patients with musculoskeletal headaches since then.

I’ve got the local doctor who has got some headaches, recurrent headaches, (...) and I made him better so he improved and so he sends some patients with headaches to me, not just with migraines but just for the headaches, whether that’s a migraine or not migraine, sometimes migraine. So it depends on the experience of the doctor.

(Part A, Stat. 135, 136)

Participant C also experiences personal acquaintanceship with medical professionals, who subsequently become familiar with what osteopathy involves so that they feel comfortable for their patients to receive osteopathic treatment. But from what the osteopaths could perceive, these sorts of referrals take the form of suggestions, rather than formal referrals, and contribute to a minority of PwEM who receive osteopathic treatment.

Overall, all participants agreed that a multidisciplinary practice is beneficial and constitutes a part of their role as osteopaths in the care of PwEM. The scarcity of GP referral to osteopaths, on the other hand, suggests a potential for further development of interdisciplinary ties that could contribute to a greater involvement of osteopaths in the care of PwEM.

Osteopaths being osteopaths: Osteopathic principles to tackle the problem

In this theme, four treatment characteristics relating to osteopathic principles the participants use to treat PwEM are described. These ideas were strongly recurrent in all five interviews, and are explored in four subthemes. The subthemes describe treating patients as individuals, using a wide variety of techniques, and treating the whole body. Such aspects of practice are hallmarks of osteopathy. The fourth subtheme describes the way in which osteopaths circumvent the osteopathic principle of treating the cause of a disease, due to the root cause of migraine being unknown.

Uniqueness of every PwEM and individualised treatment

The idea that osteopaths treat PwEM as individuals with a unique condition, in a unique way, was found to be the most prevalent across all the interviews. This translated as a total of 34 recurring occurrences, which is the highest number of significant statements that were found...
to form a subtheme. Being one of the major tenets of osteopathy, the idea came across in many different aspects of care and came from a belief that all patients are unique.

*If I think of my patients they’re not all typical; they’re all quite different, really. I’ve had a man in this week with major migraines. He’s only just started them and he’s completely out of blue to what you’d – nice and fit, he’s a painter. I don’t think there are any typical. I think that’s what makes it hard.* (Part. C, Stat. 346, 347)

The participants described treating each PwEM differently, per the unique set of physical examination findings on the day of the consultation, such that there is no one type of treatment for migraine.

*Depending on what the findings are, you know; depending on what the case history is for a start as well, and depending, when I do my testing, what particular things that I find* (Part. E, Stat. 851)

Due to the complex nature of migraines, treating PwEM in this way is particularly challenging for osteopaths because it calls for an extensive investigative process to discover the best possible way to treat each individual. It may take several sessions of trial-and-error to discover the optimal osteopathic treatment, learn about the patient’s lifestyle, how to improve it, or any referrals that would be helpful.

*So every time someone says I’ve got a migraine and they come already with the diagnosis, you’re kind of like ‘huh…’, and you figure out why this is happening, so it’s a long process.* (Part. D, Stat. 806)

Treating patients individually is one of the defining characteristics of osteopathy, but also contributes to the difficulty osteopaths face in treating PwEM due to the great variability of cases.

**Use of a wide range of osteopathic approaches and techniques**

Although the five osteopaths interviewed all had their own style, and practiced osteopathy with different proportions of structural, biodynamic, and cranial techniques, they all had the commonality of using a wide range of techniques depending on the patient. Across the interviews, the osteopaths expressed that adaptations in the way manual techniques are applied take place minute to minute during treatments; guided by responses from the patient’s body, and the patient’s needs. A mix of different techniques may also be applied to the same structures being treated, to promote a greater effect.
if there’s restrictions sometimes I’ll treat them with functional cranial or sometimes I feel like they need manipulating, so I kind of just use all your tools in your toolbox. (Part. C, Stat. 378, 379)

This range and adaptability was found across interviews and conveyed a highly individualised dimension of care that can contribute to the value osteopaths provide in treating PwEM.

Treating the whole body

Treating PwEM from a whole-body, holistic approach, was also a very common subtheme. This idea applies both to manual and non-manual treatment. While the non-manual aspects of this approach (mainly seen in the way the osteopaths communicate and create management plans with PwEM) are discussed below under the theme ‘Beyond the treatment table’. In this subtheme, the ways in which manual treatments of PwEM exhibit this feature are described.

A recurrent notion was that of improving PwEM’s physical resilience, by improving multiple aspects of a patient’s musculoskeletal function. This concept guides the osteopath to treat any part of the body they feel might contribute to migraine attacks, or treat other musculoskeletal problems knowing that this will help in the function of the whole body.

I think if we – that if you make the musculoskeletal side – all the sides that we’re treating - function better then maybe the body has better resources to deal with those hormonal changes. It’s probably, you know, broadening the reserve of adaptation to cope with the triggers better. (Part. C, Stat. 440, 441)

This approach mirrors the multifactorial nature of migraine, its effects to and contributions from multiple body systems including thoses vascular, hormonal, neurological and musculoskeletal. It is also a logical response to address the inaccessible, unknown origins of the pathophysiology of migraine.

Osteopaths treat around the underlying pathophysiological cause

An important characteristic of osteopathy is the importance placed on addressing the cause of a condition. Because the underlying cause of migraine is uncertain, it is not possible for osteopaths to affect it directly. In response to this, the osteopaths interviewed did not attempt to change the neurophysiology of PwEM, but to treat around the underlying cause, not the cause itself. In this context, treating around the cause means to treat related structures, to treat indirectly the body systems involved, or to target the cause but not directly hitting it. The
participants expressed that some PwEM may present with some musculoskeletal factor which can be identified as contributing to the condition, despite the non-musculoskeletal nature of the headaches. Investigating what musculoskeletal factors may contribute to the problem is part of the osteopath’s role, and treating those is one way that osteopaths can bring some relief to PwEM, although complete resolution is rarely achieved in this way.

*We try to do the mechanical bit but the mechanical bit in true migraines is never the primary problem (Part. A, Stat. 141)*

Another approach expressed by the participants is to treat the musculoskeletal effects that migraine attacks have on PwEM. Specifically, the intense pain, and the stress of living with such a condition typically manifest as musculoskeletal pain and areas of muscular tension that add to the patients’ condition and may render migraine attacks more likely. Treating the musculoskeletal toll that PwEM bear is a way that osteopaths can remove part of the patients’ symptoms and improve their quality of life. This method of treatment may seem counterintuitive as it contradicts one of the key tenets of osteopathy: It involves treating the symptoms rather than the cause.

*going against everything osteopathy says, you tend to treat the symptoms rather than the disease because you don’t know it (Part. D, Stat. 651)*

Treating in these two ways the osteopaths reported typically seeing a decrease in the frequency of the attacks, or the severity of the pain. However, after this initial improvement, the patient usually still experiences attacks albeit not as often, because the underlying physiological cause still exists. Further progress beyond this point is often very difficult to achieve, and requires the application of different approaches from the osteopath.

**The osteopath in action: Specific treatment tactics**

This group of subthemes described here represent key manual treatments strategies used by the osteopaths interviewed to treat PwEM. These subthemes represent specific structures or systems that are common targets for treatment because of the role they can play in contributing to migraine. These treatment strategies only occur within the greater treatment principles described in the preceding theme, but provide a greater understanding of some potential avenues an osteopath may pursue when treating PwEM. These involve treating the cervical spine area, improving fluid movement, improving breathing, and improving autonomic balance.
The neck as a target for treatment

All five participants described PwEM as often experiencing neck pain and muscular tension in the area, which is consistent with studies that show a high likelihood of neck pain in PwEM (Calhoun et al., 2010). Despite the difficulty for osteopaths to ascertain whether musculoskeletal issues in the cervical area are contributing to an individual’s migraine attacks or are a symptomatic effect of the tension accrued because of them, treatment of the neck was considered important. Moreover, all five osteopaths reported investigating the cervical spine as a routine examination for PwEM.

*I tend to work a lot around the neck. I tend to try and find if there's any restriction... (Part. E, Stat. 748, 749)*

The sub-occipital region, specifically, was described as particularly relevant. This may be explained by the close anatomical connection of the cervico-trigeminal system with the upper cervical spine. The osteopaths’ approach to treatment in this area appeared to be related to the osteopathic idea that improving the function of a structure can also promote the proper function of organs, nerves or other structures anatomically related to it.

*if someone has just got head pain, so no neck pain necessarily, so they don’t have any trouble turning so, you know. C2’s usually a happy little thing and – but the OA it is really influenced by the occiput and all those sub-occipital muscles and the fascia running up through the occiput and sweeping into the temples and so, you know, sort of more of the head – what’s going on in the head seems to be more of an influence on the OA and vice-versa (Part. B, Stat. 224)*

Because of its neuroanatomical connection, and its likelihood to exhibit pain in PwEM, the cervical spine, most notably the sub-occipital region, was the most common structure osteopaths spoke about targeting in their treatments of PwEM.

Fluid motion

The importance of improving fluid motion, or in other words, facilitating lymphatic and vascular drainage, was apparent in the interviews. This approach relates to the osteopathic principle which places importance on the role of blood supply and lymphatic drainage in health. No specific technique was stressed as most beneficial, but participant A conveyed that improvement of the functionality and compliance of areas related to the drainage of the head and neck could be beneficial to PwEM.
very important is the thoracic inlet – not the outlet, the inlet, and – but anyway the base of the neck, because the jugular vein and drainage goes through the lower cervical and shoulder girdle apertures, so if there is a restriction there, there can be an effect on the head so structurally this is the area that you need to work on, with the shoulders and, you know, the shoulders anteriorly, pectoralis– you need to open them and work on that side; I’d say start to work on that. (Part. A, Stat. 81, 82)

In a similar way to treating the neck, the osteopaths aimed for improvement of structures relating to the functionality of the neurovascular elements involved in migraines such as the head, brain, meninges and trigeminal system. This may be a way to indirectly reach the currently unknown cause of migraines and promote general health in PwEM.

**Breathing**

Although a small subtheme, only touched upon by two of the participants, improving breathing patterns in PwEM was found to be a topic worth mentioning for its potential value in clinical practice. Both participants B and C noted the tendency PwEM had to present with dysfunctional breathing patterns. This primal aspect of physical function was addressed by the participants by prescribing breathing exercises and offering manual treatment of the thoracic cage, diaphragm, and accessory breathing muscles.

> that’s sort of a big sort of factor in migraines I think [breathing], and then there might be some restriction in terms of the lungs or the pleura, you know, the diaphragm or something, so I always do quite a bit around the breathing side of things, and then if they’re particularly shallow breathers or chest breathers or something, you know, then I usually include some sort of breathing advice like here’s a breathing exercise you can do because breathing’s really important, especially for people who kind of are anxious or hyperactive (Part. B, Stat. 247-249)

Improving breathing relates closely to the aim of improving autonomic balance, another approach used by the participants to treat PwEM, described in the subtheme below. This is because breathing patterns directly influence sympathetic output. The osteopaths reported the high prevalence of tension and stress in PwEM, leading to treatments that aim to help optimise the balance between sympathetic and parasympathetic outputs.

> I think a lot are quite shallow breathers; even if they’re not hyperventilating there’s definitely shallow. Breathing is the only way we can – or the most effective way that
we can calm our parasympathetic autonomics down is by adjusting our own breathing. (Part. C, Stat. 478)

As such, breathing retraining can be a very useful tool to improve various aspects of health in PwEM.

**Autonomic balance**

Throughout the interviews, PwEM were described as typically stressed individuals, hypersensitive or having a sympathetically toned disposition. In addition to the use of breathing techniques, some participants used manual techniques specifically aimed at decreasing sympathetic output in PwEM who display such traits. One example of this kind of approach involved gentle treatment to the thoracic spine, because of its anatomical relation to sympathetic ganglia, and cranial techniques, to help patients reach a deep state of relaxation during treatments.

*I feel like I’m working at a deep level with calming the nervous system down*; (Part. C, Stat. 385)

Using techniques aimed at reducing sympathetic over-stimulation is another way osteopaths aim to improve general health and promote well-being in PwEM. The participants saw this as a way to decrease the likelihood of migraine attacks in individuals with high levels of stress.

**Beyond the treatment table**

The last main theme contributing to the overarching theme ‘The role of the osteopath in the care of PwEM’ describes ways in the participants treat PwEM outside of the use of manual techniques. The non-manual side of the osteopathic consultation, such as the advice offered to patients, education, and management plan development, was of great importance in the context of treating PwEM and supporting continued health improvement. Throughout the interviews, it was clear that the difficulties osteopaths face in helping PwEM require them using as many tools as they have access to. In this context, the time osteopaths spend with PwEM during consultations is used to develop another dimension of care through effective communication. The non-manual treatment strategies used by the osteopaths interviewed are discussed here in the form of three subthemes relating to education, support, and planning.

**The osteopath as a health educator**

The theme of educating and advising patients is strong throughout all five interviews, but focused primarily on recommendations offered to the patient to improve their condition rather
than information about migraine as a condition. Osteopaths offer advice, suggestions and ideas that PwEM chose themselves whether to follow. This type of education is once more, determined by the individual’s needs, and is informed by a thorough examination of the patient’s medical history and lifestyle factors.

*it’s still important to do stress management because people will report that sometimes it’s food but sometimes it’s stress, sometimes it’s lack of sleep – all that can trigger migraines and other headaches as well. So, that’s what I give to people […] I ask them how they sleep […] – what’s their diet like … and usually go through that. […] Well if it’s the true migraine, it’s the main part of the management.* (Part. A, Stat. 54-56)

The osteopaths highlighted that most PwEM do not need factual education from their osteopath. This is because most PwEM who see osteopaths have been diagnosed as such in the past and were offered information by their GP, then may have done further research on the subject themselves. This is especially true for PwEM who have had migraines for many years, and have seen other health professionals in the past. The osteopaths reported that these patients typically know a lot about their own condition. Many PwEM may already know their triggers, their responses to medication, or what their relieving or preventive factors may be. This places osteopaths in a position of working with the patient rather than as a health educator.

*there’s probably broadly two different types; you know, there’s those that like we mentioned that are really vigilant about trying to suss out what’s going on and you can sort of explain things to them say a bit more of a technical level and they will get it and they know what they want, you know, so that’s kind of one version of a migraine sufferer; because it’s a bit like anybody suffering from a particular condition, they become the expert, so it’s not often you can presume to inform them of something. And then there’s the others that just fall over and don’t want to know anything about why – they just want it gone, you know, and that’s difficult* (Part. B, Stat. 292-296)

Of course, the tendency to know a lot about migraine does not apply to all PwEM, as participant B states. Many present to osteopaths undiagnosed, in need of information, or simply may not want to engage with information and decline participating in active management strategies. The latter scenario was expressed by other participants too, and
renders treatment, from the osteopath’s point of view, even more challenging. In such cases, the osteopath’s focus leans towards providing support rather than trying to implement lifestyle changes.

**The osteopath’s role in providing mental health support**

The idea of support and encouragement as an important part of osteopaths’ role was expressed by most participants. This appeared to be motivated by a belief that successfully achieving and maintaining lifestyle changes can be a very difficult endeavour for PwEM. The participants also stated the need for providing support in the more caring sense of the term. This was mentioned particularly in the context of providing reassurance to undiagnosed PwEM, and being a source of relief and understanding, particularly when PwEM experience a worsening of their attacks, or come to the osteopath while suffering from a migraine attack.

*A big part of the migraines is feeling that you’re taken care of; you’ve got someone, you’ll come here, you’ll feel better. You need to give them that support and they know that you’re the person they’ll come to and you’re going to make it better. And it does work. It helps because you’re treating soft tissue that’s probably tight and causing a lot of tightness. You might not make their migraine go away but you give them a lot of support and some relief as well.* (Part. D, Stat. 737-741)

Participant B highlighted the importance of being able to listen and having enough time during the consultation for the patients to get some things off their chest. This was very important for participant D as well. This osteopathy had a special interest in psychology, and considered their role in helping patients with mental health support, within their abilities, to be essential. This view contrasted with that of participant A, who preferred not to become involved in the psychological aspect of PwEM’s health. However, all participants agreed that they play a role in at least providing stress management advice for PwEM who need it.

*if I think there is a high percentage of stress involved with their problem then I will talk more to them about that and ways that they can manage that – ways that they can best manage that, which may be, for example, finding out or discussing with them what relaxes them, what are the things in their life that are relaxing and how they can fit that into their lifestyle on a daily basis rather than just once a month* (Part. E, Stat. 899,900)

From the participants’ point of view, PwEM find relief in their treatments beyond the physical results of manual treatment by personally feeling supported and cared for by their
osteopath. In this role, all osteopaths showed great empathy for PwEM and aimed at developing a trusting, therapeutic relationship with these patients.

The management plan

The development of a management plan is an essential aspect of the care osteopaths provide to PwEM, and this was reflected strongly across the five interviews.

According to the osteopaths interviewed, a management plan is co-developed by the patient and the practitioner during the initial consultation. This is informed by the medical history of the patient, and the medical and osteopathic diagnosis. Discussions about ways of avoiding migraine triggers, suggestions of specific diets or supplements may be made by the osteopath. Other aspects of lifestyle are also explored, such as exercise, sleep, posture, including at work or while driving, and levels of stress. The role of the osteopath is to explore all these topics with the patient to uncover what aspects of their life may have a negative impact on their health and contribute to their migraine attacks. This leads to discussions aimed at finding attainable ways in which the patient can improve, and eventually, the establishment of a management plan.

"Looking at the possibility of hormonal imbalance, maybe they might have to do a little bit of work themselves and change their diet or they might need to do a little bit of work and find out if they have got triggers – dietary triggers; so, you know, that takes a little bit of energy and effort on their behalf, to do things like that (Part. E, Stat. 933-935)"

These management plans are, like manual treatment, unique and tailored to individuals, based on their circumstances, motivation and abilities. This initial plan may develop over several treatments and may evolve over time. It is also during the management plan development process that osteopaths may decide to refer the patient, or propose an alternative plan in case the osteopathy alone does not bear sufficient results.

Ultimately, the goal of the osteopath’s management plan is to provide PwEM the tools to manage their condition themselves, with minimal help from the osteopath in the long term. This illustrates the importance of active participation of PwEM in this process. For the participants, a successful outcome involved PwEM seeking osteopathic treatment only during periods of worsening, and then requiring only a few treatments to return to the improved state achieved in the first succession of treatments.
If they’re, you know, busy and interested in diet and exercise and how to manage it, then I don’t necessarily ask them back [...] but I’d just say well, you know what I do, I do this and explain why I do it and if you get to the point where you feel that like things aren’t – you’re not coping with the pain and you’re trying all sorts of other things, then come back and have a little session. I just try to get that point. (Part. B.277)

This, of course, does not represent all cases, and should only be viewed as a pattern that has emerged from the subjective personal recounting of five osteopaths. The participants interviewed also mentioned cases where the PwEM ceased having migraines completely, continued receiving regular maintenance treatment long term, or were referred to another type of practitioner.

All osteopaths interviewed called attention to the importance of a tailored management plan in the treatment of PwEM. From the participants’ point of view, management plans that identify aspects of the patient’s health which can be improved upon and promote lifestyle changes accordingly allow PwEM to take control of their condition. In some cases, this results in patients coping without regular osteopathic treatments to an extent which could not be achieved with manual therapy alone. Handing to PwEM management tools and advice to promote patient empowerment as well as offering relief appears to be a key role osteopaths play in the care of these patients.

In conclusion to these results, it appears clear that the challenge of treating PwEM experienced as an osteopath is a key characteristic of the phenomenon. To answer this challenge, the osteopaths take on multiple roles to offer PwEM the best care they can, and help them cope with the condition. The osteopaths use all the tools they have access to when treating PwEM, including multidisciplinary referrals, and a wide range of techniques and approaches. No one treatment approach was identified as best for this group of patients. The participants relied on both manual and non-manual approaches to treatment. From the information gathered in the five interviews, it appears that the role of osteopaths in the care of PwEM in New Zealand involves providing connections to multiple health practitioners; offering individualised, whole-body care; treating musculoskeletal structures to promote health, decrease pain, and improve well-being; providing care and support; offering advice and empowering change for better health.

~ 111 ~
Chapter VI: Discussion & Conclusion
Chapter Introduction

This chapter is composed of two sections. The first, entitled ‘Discussion’, proposes some context in which to consider the results presented in Chapter Five: ‘Results’. It also provides a discussion surrounding the clinical applications and implications of the results, as well as suggestions for future research in this field. The limitations of this study are then examined. The first section is followed by a conclusion, which provides an end to this chapter and this thesis.

Discussion

This study set out to answer the following research question: What is the role of osteopaths in caring for PwEM in New Zealand? Through a descriptive phenomenological approach, in-depth interviews with five osteopaths were conducted and analysed. This resulted in a very rich description of the multiple facets of the condition that make it difficult to treat. The many approaches used by osteopaths to address these issues and help PwEM despite the complexity of the condition were presented in Chapter Five: ‘Results’. Osteopaths, when involved in the care of PwEM, play a multifaceted role to offer holistic, individualised healthcare and support. In this discussion, the wider context surrounding the key themes found in this study is explored, followed by a comparison of these results with those put forward by Michal (2009). Michal (2009), an Austrian thesis project, is the only other study to have investigated osteopaths’ treatment of PwEM and thus provides the best point of comparison.

Context of the results

First, the key findings of this study, referred to as the main themes in Chapter Five, must be highlighted and placed in the context of the greater literature. The most prevalent characteristic of migraine described by all participants is its complex nature and uncertain aetiology. This strong theme echoes the complex pathophysiology and unknown mechanism of origin described in the first chapter of this thesis. The difficulty of treating PwEM was also expressed by all participants, as no single treatment, medical or otherwise, is successful in helping all PwEM. Consequently, PwEM often fail to see their needs met by conventional medical approaches. The result is a heavy individual, social, and economic burden. The first overarching theme, ‘The Migraine Challenge’, described these issues from the participants’ point of view. The second overarching theme, ‘The Role of Osteopaths in the Care of PwEM’, described the osteopaths’ responses to these difficulties. To provide care for these
patients, all five osteopaths interviewed took on multiple roles as health professionals. These roles reflected the holistic philosophy of osteopathy, which attempts to care for patients in all aspects of health, requiring a multifaceted approach to treatment. Four main themes, making up the overarching theme ‘The Role of Osteopaths in the Care of PwEM’ were described in Chapter Five, and are further discussed below.

**Multidisciplinary care**

One of the main themes found in this study relates to multidisciplinary care and the role of referrer that osteopaths play when finding the most appropriate treatment modality for PwEM (p. 97). All osteopaths interviewed were very much aware of the limitations of their profession, and fully made use of their ability to refer patients to other professionals. Interestingly, these referrals occurred on both sides of the therapeutic spectrum, both toward conventional and alternative practitioners, depending on the patient’s situation. Most notably, the use of naturopathy and acupuncture, sometimes in combination with osteopathy, was mentioned by the participants. As discussed in Chapter Two, acupuncture shows benefits for PwEM; unfortunately, the evidence in favour of naturopathy remains ambiguous. In the interviews, referrals to naturopathy often appeared motivated by the need to address hormonal issues in PwEM. While it certainly is known that hormonal imbalances can play a role in migraine, especially menstrual migraine, there is insufficient evidence that naturopathy can affect hormonal balance in a meaningful manner. In both naturopathy and acupuncture, more research is needed, and studies combining osteopathy with these modalities would be valuable to better understand how osteopaths can maximise the usefulness of the referrals they make.

The osteopaths’ referrals to medical professionals played an important role in ensuring safety for PwEM. While these referrals sometimes were motivated by a need for the prescription of medication, they often took place to reassure the osteopath and the patient that other causes of headache could be ruled out. Because of this, osteopaths partake in their role of primary health practitioners responsibly, and play a role in ensuring the safety of PwEM. This aspect of osteopathic practice reflects the unique position of osteopaths in the New Zealand healthcare system, in an area between what would be considered alternative medicine and conventional.

Because of the range of referrals osteopaths make for PwEM, it can be concluded that osteopaths, when treating PwEM, can be a central character in forming bridges to other health
services, and ensuring the patient receives the best possible care. When expressing their thoughts on the role of osteopathy, the participants described themselves as providing only one of the many tools PwEM can use, and were aware of their own limitations.

*The role of osteopaths in the treatment of PwEM*

The second main theme related to the osteopathic treatment of PwEM provided insight into the treatment principles osteopaths turn to for guidance (p. 101). Unsurprisingly, general osteopathic principles, such as the individuality of treatment and treating the whole body, were very strong themes across all five interviews. The uniqueness of each PwEM and their individualised treatment was the strongest theme that emerged from the interviews. The osteopaths sought to treat PwEM individually, not only in manual treatment, but in referral, advice, support, and all other aspects of care. For this reason, no single treatment regimen to treat PwEM was emphasised by the participants, which contributes to the broadness of the results presented in this thesis. One unexpected finding, however, was discovered. A key principle of osteopathy is to treat the cause of the disease or condition, not its symptoms. Despite this, it was found that because the exact origin of migraine is unknown, and osteopaths cannot directly affect its cause, they find themselves adhering to the inverse of this principle. Although very little research has been done on the topic, it can be hypothesised that treating around the cause of a disease plays a substantial role in the management of any other non-musculoskeletal conditions encountered in the osteopathic clinic. In contrast to the commonly publicised osteopathic approach of ‘treating the cause, not the symptoms’, osteopaths often see patients who have co-morbidities and may find themselves applying the opposite principle. Osteopaths may seek to indirectly help patients with these conditions by promoting overall health, reducing musculoskeletal symptoms of the condition, and treating related musculoskeletal structures. This aspect of osteopathy should be further explored to determine the value of osteopathy in ‘supportive care’ for non-musculoskeletal conditions other than migraine.

*Specific treatment strategies*

The third main theme, entitled ‘Specific treatment strategies’ highlighted specific manual treatment strategies found to be recurrent in the interviews. Although no single technique, treatment, or approach to treat PwEM was used by the osteopaths, four common targets for manual treatment were found. These included breathing, the autonomic nervous system, fluid movement, and the cervical spine. These approaches to treatment are discussed below.
Breathing

No study published to date has explored the role of osteopaths in implementing breathing retraining protocols, nor the use of manual therapy techniques to improve breathing. However, there are several studies showing the influence of breathing exercises on autonomic nervous system function (Mourya, Mahajan, Singh, & Jain, 2009; Pal & Velkumary, 2004). Additionally, one study showed that a six-month long practice of diaphragmatic breathing, assisted by biofeedback resulted in better long-term outcomes for PwEM compared to propranolol (Kaushik, Kaushik, Mahajan, & Rajesh, 2005). These studies support the line of clinical reasoning osteopaths follow when aiming to improve breathing in PwEM. This potentially beneficial approach should be further studied and developed as part of osteopathic practice.

Autonomic balance

The goal of optimising the autonomic system balance, beyond using breathing mechanisms, was another recurrent specific treatment strategy found in the interviews. Very little research has been done on this subject in the context of manual therapy. Rib raising and cervical myofascial release have been investigated in relation to autonomic system activity, with mainly positive results, although limited to short term effects (Henderson et al., 2010; Henley et al., 2008). A 2007 New Zealand study found no correlation between a cranial technique and alterations in autonomic system function (Milnes & Moran, 2007). These studies are the few that make up the osteopathic research literature on this subject, and are not sufficient to establish the effectiveness of osteopathy for positive long-term autonomic effects aimed at PwEM. The lack of research in this area is typical of the osteopathic literature at large, but provides an opportunity for studies to be conducted.

Fluid motion

The topic of fluid motion remained vague in the interviews. It refers to the osteopathic principle of optimising vascular and lymphatic supply and drainage through tissues that need healing. In the context of migraine, this may also describe a broader goal of optimising circulatory health throughout the whole body. The relevance of this topic may only be related to the potential implication of vascular factors in migraine. No specific techniques were mentioned by the participants, but this subject was broadly addressed when referring to the goals of treatment or as indirect effects of techniques. Specific manual therapy techniques to improve lymphatic drainage can be found in textbooks (Stahel, 1999), and a few studies have shown that these techniques can be effective (Knott, Tune, Stoll, & Downey, 2005; Tan et al.,
2011; Vairo, Miller, Rier, & Uckley, 2009). These, however, represent only a small body of limited quality evidence. The role of these techniques in the osteopathic treatment of PwEM appears minimal but worth mentioning as one of the few approaches recurrent in the interviews.

**Upper cervical spine**
Finally, the last specific treatment strategy identified in the interviews was the upper cervical spine. This was the only part of the body that all participants singled out as being particularly relevant for migraine. Chapter One described the ways in which this area presents anatomical connections to the structures involved in migraine. Treating the cervical spine may be the most direct way of influencing these structures. This area has been well studied (Robertson & Morris, 2008), and the correlation of upper cervical spine dysfunction with migraine has been well demonstrated (Calhoun et al., 2010; Carvalho et al., 2014; Gonçalves et al., 2015; Tali et al., 2014). However, the effectiveness of applying this concept in a clinical setting is still undetermined. Most manual therapy studies focusing on migraine have come from the chiropractic profession, and have heavily focused on the use of spinal manipulative techniques. However, as described in Chapter Two, these have been found to have very little impact on PwEM (Chaibi et al., 2017) (p. 40). Nonetheless, the application of other types of manual therapy techniques to the cervical spine has been left mostly unexplored by the osteopathic profession. Such studies would be highly valuable as the treatment of the cervical spine appears to be an important and promising topic in the treatment of PwEM.

**Beyond the treatment table**
The fourth main theme contributing to the overarching theme ‘The role of the osteopath in the care of PwEM’ related to treatment strategies used outside of manual therapy. This main theme was titled ‘Beyond the treatment table’ in Chapter Five. Migraine, as seen throughout this thesis, is a complex condition difficult to treat. Therefore, there is an inherent value in addressing all possible aspects of health, beyond a strictly manual treatment. Providing education, advice, co-created management plans and mental-health support through extensive communication is an important part of the care osteopaths provide to PwEM. This type of non-manual treatment is an integral part of osteopathy, especially in the treatment of PwEM. The consultation time of osteopaths, often 30 minutes or more, allows time for communication, and plays a role in defining the osteopath as a holistic practitioner. This characteristic is often sought by PwEM who have had contrasting experiences in the conventional healthcare model and want more integrated, personalised care. Developing a
management plan, where the needs, triggers, and goals of PwEM are identified and addressed formed an essential part of the treatment of PwEM for the osteopaths interviewed. These aspects of care are recognised by some medical guidelines as an essential part of migraine management (Mueller, 2007; Silberstein, 2000). The osteopaths’ emphasis on this aspect of treatment highlights the role they can play in providing an encompassing model of care for PwEM.

A closer look at Michal (2009)

This study has investigated the role of osteopaths in caring for PwEM in New Zealand. This a subject previously left unexplored, with the exception of Michal (2009), who conducted a series of interviews with seven osteopaths in Austria about the treatment of PwEM. No equivalent studies in the osteopathic literature examining other conditions could be found for further comparison. Michal (2009) is also a thesis, and provides the only other study comparable to the present one. While it corroborates multiple key findings, it also offers contrasting insights which can be used to refine the current understanding of the role of osteopaths in treating PwEM. This section discusses the parallels and differences between the findings of this study and Michal (2009).

Firstly, it is important to point out the two most important ways in which Michal (2009) differs from this study. To begin with, it was conducted in Austria. This inevitably affects the approach of the osteopaths, if only by their differing education and background to the osteopaths who participated in this New Zealand study. Thus, it is difficult to ascertain how transferable each study is between the two countries. As much as osteopathic philosophy may function to serve a universal, unifying profession; socio-economic differences, cultural factors, and health systems can be widely different across countries. This affects the role osteopaths play in treating PwEM in New Zealand or Austria.

Additionally, Michal (2009) placed more emphasis on the treatment approaches and techniques used by the participants compared to this study. In this study, it was decided early on to explore the entire therapeutic encounter, and treatment techniques are only broadly described. As a result, Michal (2009) should not be considered as a study serving the same purpose as this one, limiting the parallels that can be drawn between the two. Nonetheless, this methodological difference means that this study offers a wider therapeutic context in which to consider findings put forward by Michal (2009).
Several findings presented in Michal (2009) parallel those found in this study. Michal’s (2009) findings that osteopaths place great importance on the individualisation of treatment and treating the whole body is supported by the similar results described in this thesis. This study’s and Michal’s findings on osteopathic principles contribute to the understanding of osteopathy’s core philosophy and how it is applied to PwEM’s care. Another commonality involves specific treatment strategies. Michal (2009) points out the recurrence of themes pertaining to the treatment of the upper cervical spine. This area was also highlighted as a target for treatment in this study, and suggests the relevance of these structures in migraine. Lastly, a similarity between Michal (2009) and this study is the underlying assumption that osteopaths prefer treating PwEM using a cranial approach. This was Michal’s (2009) hypothesis before conducting the study, but was not confirmed by the findings. In this study, there was an assumption, written in the journal before data gathering, that a gentle approach targeting cranial structures and possibly influencing the nervous system would be favourable to treat PwEM. This study also found such an assumption to be false. The participants of Michal (2009) used a wide range of techniques, each osteopath using cranial, biodynamic, visceral or structural treatments in different proportions. The wide range of approaches used was also identified in this study. Michal (2009) found that no single treatment technique predominated, which is also congruent with the results of this study. A difference emerges, however, as Michal (2009) reports an emphasis on biodynamic work which was not found in this study. In this project, only one participant was an experienced user of biodynamic osteopathy but did not use it exclusively. In contrast, all of Michal’s participants practiced biodynamic osteopathy, indicating that this approach may have been predominant mainly because of preferences characteristic of the participant sample. The use of a biodynamic approach, however, may be a valuable subject for further exploration in the context of migraine management.

There are other contrasting findings between those from Michal (2009) and this study. Most significantly, the osteopaths in both groups of participants all felt that they could decrease the frequency of attacks in PwEM. However, the Austrian osteopaths appeared much more optimistic about their abilities. Michal (2009) reports that most participants believed that migraine attacks can completely disappear. Only one participant thought that this condition could be alleviated but not cured. On the other hand, this study challenges such a belief. Beliefs within the profession are important because they guide the claims osteopaths make. These have many implications for osteopaths such as clinical outcomes, outside perceptions.
of the profession, and adherence to evidence-based practice. In this study, all osteopaths interviewed believed that migraines cannot be cured, only helped, but that they may disappear on their own due to hormonal changes. While making clear that their work was valuable, the New Zealand osteopaths emphasised their experiences with the limitations and difficulties involved in treating PwEM over claims about their successes. This difference may come from a different line of questioning. In this study, osteopaths were asked very general questions about treatment, and more importance was placed on the process of migraine management and their experience of the phenomenon.

Overall, Michal differs from this study by its focus on treatment techniques, and the new findings shown in this study offer a wider context in which to consider Michal’s (2009) results. Important similarities include the individualised treatment of PwEM and the wide range of techniques and approaches used by osteopaths. The idea of a whole-body, or holistic approach to treatment that Michal (2009) describes, is refined in this study. These recurrent concepts show that osteopaths, whether in Austria or New Zealand, subscribe to the same basic osteopathic philosophy. Two studies, however, cannot provide a complete picture of the role of osteopaths in either of these countries and more research in this field would be greatly valuable.

**Importance and implications**

This exploratory study provides insight into a vastly unknown subject. From the findings shown in Chapter Five: ‘Results’, three key concepts can be drawn. The importance and relevance of these findings are provided here, and the implications of these for the osteopathic profession are discussed.

Firstly, the complexity of the nature of migraine and the difficulties health professionals, including the osteopaths interviewed, encounter in treating PwEM have been thoroughly demonstrated throughout this thesis. These difficulties need to be addressed, as this translates in the challenge many PwEM have in finding relief. In the medical field, migraine research is a dynamic area of study. Research in the field of osteopathy, in contrast, is clearly lacking, as shown in Chapter Two. In addition, manual therapy resources for osteopaths to improve their knowledge of this condition and develop their clinical skills are scarce. This is particularly problematic in a profession which often claims the ability to help PwEM. To date, no specific resources for osteopaths to achieve this goal could be found. None of the participants interviewed in this study had come across any continuing professional development (CPD)
courses for osteopaths focusing on migraine. Combined with the rarity of PwEM in osteopathic clinics, this lack of resources hinders the learning and improvement of osteopaths like participant D, who are particularly interested in treating PwEM.

The second and third implications of the results come from the improved understanding of the role of the profession in New Zealand gained from this study. The results successfully answered the research question posed at the beginning of this study. Osteopaths play a multifaceted and complex role in the healthcare landscape, and exist at the intersection of alternative and conventional healthcare. This makes osteopaths well suited to implement a multidisciplinary approach for PwEM by using referrals to either side of the healthcare world. Overall, the osteopaths interviewed used precise scientific language to talk about migraine and based their clinical reasoning on their knowledge of anatomy and physiology. This can be characterised as an empirical approach to healthcare, suggestive of conventional medical care. The osteopaths’ alternative healthcare approach, however, is apparent in the holistic care they provide to PwEM. The theorisation of treatment mechanisms yet to be demonstrated also accounts for osteopathy’s place on the CAM spectrum. Most notably, the belief that mechanical application of manual therapy on a structure can influence the function of other connected structures relies solely on clinical experience and expert opinion. This reflects a need for research to understand the effects manual techniques can have on body systems, including those involved in migraine.

The insight into the role of osteopaths in treating PwEM provided by this study also suggests that osteopaths are in a potentially valuable position to provide care for PwEM. The placement of the profession between traditional and alternative health care models allows a widely encompassing role suitable for the multidisciplinary management of PwEM. Moreover, the holistic and individualised aspects of osteopathic treatment can provide a multifaceted level of care appropriate for such a complex condition. However, there appears to be a lack of awareness in the population that osteopaths treat PwEM. It is seen in this study as the rarity of PwEM in the osteopathic clinics reported by the participants. If osteopathy is to contribute to the care for PwEM, an increase in public consciousness is needed. Thus, population-based research is necessary to establish the awareness of osteopathy and the pattern of usage within the population of PwEM. This would permit the establishment of promotion strategies to increase the involvement of the osteopathic profession in the care of PwEM.
The third key idea drawn from the results of this study is the importance of the use of multidisciplinary care by osteopaths. The use of multidisciplinary care centres, specialised in treating PwEM has been shown, in the few instances that exist, to be highly beneficial (see p. 52). Trials involving multidisciplinary programs that include osteopathic care would be highly valuable in understanding how osteopaths can contribute to the care of PwEM and the extent of the benefits they provide to patients. Such a facility in New Zealand does not exist, unfortunately. The development of a multidisciplinary care centre for migraine would not only help the large segment of the population living with this condition, but also provide a valuable environment for research.

**Limitations of this study**

This section examines the ways in which the answer to the research question was limited. Firstly, all five osteopaths, although chosen to represent a varied sample from different New Zealand towns, all practised only in the North Island, within 300km of each other. While this study subscribes to the qualitative paradigm and the participants’ experiences cannot be generalised to every osteopath in New Zealand, a larger sample showing greater geographical variety could have resulted in a greater transferability of the results.

Secondly, the exploratory nature of this enquiry means it can only produce broad results, with a limited level of depth. Very limited focus was placed on the actual techniques used for treating PwEM. While a general model of treatment approach has been revealed, no single modality or technique that could be shared with the rest of the profession could be identified. Although it may be a characteristic of the osteopathic treatment, as suggested by Michal, (2009), this cannot be sure. The lack of specificity limits the usefulness of these results for clinical practice.

Lastly, and most importantly, this study’s research question was only answered by members of the osteopathic profession. This greatly limits the point of view of this study. A larger study, with additional interviews of other types of health professionals, would have revealed the perception of osteopaths outside of the profession and expand the understanding of its role in New Zealand. In a similar way, the question of the role of osteopaths in the care of PwEM could have been answered by PwEM themselves. Not only is the experiences of these patients a subject worth studying on its own, but the absence of patient voices in this field of research contradicts the idea of patient-centred care. Furthermore, because only osteopaths were interviewed in this study, all information concerning PwEM and their experience was
subjective and came from a second-hand account from the practitioners’ perspective. Because of this, initial themes that only related to the portrayal of these patients were not included in the results of this study.

**Directions for future research**

The goal of migraine research in the field of osteopathy is to improve the clinical encounter through a greater understanding of the mechanisms of action involved in osteopathy and how these can affect migraine. High-quality trials to ascertain the value of osteopathy for PwEM are also necessary. However, other steps can be accomplished first to build directly upon this study. Two main directions for research can be identified.

First, a greater understanding of the role of osteopaths, from the point of view of other practitioners, patients, and the public would extend the knowledge gathered in this study. This goal can be achieved through qualitative interviewing, as well as large-scale surveys.

Second, research into understanding the mechanisms of osteopathy and the assessment of osteopathic treatment for migraine can be achieved by following the key areas of treatment identified in this study. This is a big task and a vast area of enquiry. Because of this, separate areas of research should be studied in-depth separately. This project has identified breathing, the nervous system, fluid motion, and the cervical spine as potential subjects for study. The treatment of the upper cervical spine is the subject of most existing research, and shows the most direct evidence for connections with migraine. Consequently, the effects of upper cervical spine treatment on sensitivity of the trigeminal system is the most promising area of research to be undertaken and should be pursued first. Through the investigation of specific aspects of osteopathic treatment, an understanding of osteopathic migraine management and avenues for improvement in clinical practice can be gained.

**Conclusion**

The aims of this study were to explore the role of osteopaths in the care of PwEM in New Zealand and to provide directions for future research. Analysis of five interviews of New Zealand osteopaths revealed a vast amount of information, highlighting multiples areas requiring a greater depth of research. Some findings, such as the application of osteopathic principles to guide treatment, support conclusions of the previous study on the subject (Michal, 2009). Additional new information has come to light; such as the emphasis placed
by osteopaths on non-manual aspects of treatment. Overall, the results of this study show the challenge osteopaths face in treating PwEM and the many strategies they employ to help these patients nonetheless. It appears that in doing so, osteopaths take on multiple roles, as they provide much more than manual treatment. Osteopaths act as referrers, to both traditional and alternative practitioners, to facilitate a multidisciplinary approach to care when needed. They provide enough time in consultations to provide support, reassurance, and care to PwEM. Finally, osteopaths place great importance in co-creating a management plan with PwEM, fully exploring all aspects of health, and providing advice. This holistic approach to health can be valuable to PwEM who feel disheartened by conventional medical care.

In addition to revealing the role osteopaths play in the care of PwEM, and the value osteopathy could contribute to a multidisciplinary approach to migraine, this study provides a clear view of future directions in this field of research. Two areas for future exploration are suggested in this thesis. These are the continued investigation on the role of osteopaths in the care of migraine from other individual points of view; and the specific study of certain aspects of manual treatment. Manual treatment approaches such as the treatment of the upper cervical spine, as well as treatment aimed at improving breathing, optimising autonomic balance, and fluid movement is proposed. Only through such research can the osteopathic profession advance, and osteopaths as individuals can learn and improve their practice for PwEM. In doing so, osteopathy can establish itself as a valuable modality contributing to the care of PwEM.
References


Albertson, P. (2011). *What are the factors that guide an osteopath during the process of technique choice?* Unitec Institute of Technology.


Ernst, E. (2013). Osteopathy is based on excellent evidence (No, not really, I was just joking). Retrieved from http://edzardernst.com/2013/06/osteopathy-is-based-on-excellent-evidence-no-not-really-i-was-just-joking/


~ 129 ~


~ 130 ~


~ 131 ~


~ 133 ~


~ 135 ~


Schumacher, G., & Wolff, H. (1941). Experimental studies on headache: A Contrast of histamine headache with the headache of migraine and that associated with

~ 137 ~


Jefferson University Press.

https://doi.org/10.1007/s00415-016-8126-z

https://doi.org/10.1016/j.jbmt.2014.01.006

https://doi.org/10.1016/j.apmr.2010.12.027

https://doi.org/10.1016/j.jmpt.2010.01.005


https://doi.org/10.2165/00003495-200060060-00003

https://doi.org/10.1097/01.tp.0000399132.51747.71


~ 139 ~
qualitative research: Developing a research proposal. *Nurse Researcher, 14*(3), 60–73. https://doi.org/10.7748/nr2007.04.14.3.60.c6033


~ 140 ~

Appendices
Appendix A: Osteopathic principles

The set of revised principles of osteopathic philosophy as developed by Paulus (2013) is shown here.

‘1. Human beings function holistically in a dynamic state of connected oneness’ (p. 12)

‘2. The body and psyche have the ability to self-heal, or to adapt, in the presence of disease or injury. Respecting this natural law forms the foundation of all treatment.’ (p. 12)

‘3. The relationship between structure and function impacts the overall health of the entire body. Structure (anatomy) and function (physiology) are interconnected and inseparable in disease and health.’ (p. 13)

‘4. A precise anatomic diagnosis is made using hands-on palpation of the body. Once a diagnosis is made, a patient-specific dynamic Osteopathic treatment plan may then be implemented.’ (p. 13)

‘5. The musculoskeletal system (bones, muscles, and connective tissues) has a unique structure and function that impacts the overall health of the entire organism. When the musculoskeletal system fails to perform normally, the entire organism may suffer a localised or generalised disorder.’ (p. 13)

‘6. Structural or functional disturbances of the musculoskeletal system, as well as any of the other systems of the body are treated by the application of an individualised Osteopathic Manipulative Treatment.’ (p. 13)

‘7. The goal of an Osteopathic Manipulative Treatment is to restore the natural ability to self-heal -or to creatively compensate- by augmenting the local and global health of the body and by removing obstructions to proper blood flow, fluid flow, or nerve function allowing for the restoration of motion.’ (p. 14)

‘8. Osteopathy is a health care system based upon finding and treating the causes of a disease or injury rather than only attempting to address symptoms. Pain is a symptom, not a disease. If pain is exclusively treated, and there is a failure to arrive at the origins of what is causing pain, then the therapeutic actions are limited. The causes of pain are often distant from the symptoms.’ (p. 14)
'9. There are two distinct and interrelated ways of perceiving during Osteopathic diagnosis and treatment. The material field is tangible and contains the biomechanical elements that are formed by the palpable anatomy and physical functions that are objective and can be measured. The non-material field is invisible and refers to the subjective bioenergetic elements that underlie the material form. The non-material field is the expression of subtle functions or inherent forces. The material and non-material fields coexist simultaneously and are unified in a dynamic state of connected oneness.’ (p. 15)

‘10. The foundation stone of the Osteopathic system of health care is based upon trusting the unnamed forces of healing, which are concordant with Nature. Each Osteopath cultivates a personal self-reflective practice and draws upon this inner work to provide an intimately interconnected Osteopathic Treatment.’ (p. 15)
Appendix B: Extract of reflection on and correction of positive phrases

are her favorite condition to last. So ended, participant D seemed to better emotionally involved with her PEP, saying several times that she would try her very best to help them. This instilled in me a sense of greater effort towards treating of PEP from participant D and influenced the wording of my T.H. to reflect that.

I have recorded these T.H. attempts to make them more neutral in language. This does not affect the rest of my analysis.

The list of T.H. that were rectified are:

- 541. "good Dr skills" remove "good"
- 552. "very successfully" remove "very"
- 562, 563: "high empathy" remove "high"
- 581, 582: "fully empathize" remove "fully"
- 587: "skilled in coping" changed into "able to cope"
- 592: "high empathic ability" remove "high"
- 665: "very empathetic" remove "very"
- 670: "very comfortable" change to "quite comfortable"
- 714, 715: "very strong sense" remove "very"
- 731: "maximum comfort" changed remove "maximum"
- 752: "thoroughly investigated" remove "thoroughly"
- 768: "very sensitive" change to "conscious"
- 782: "move" change to "move"
- 783: "sensitive" change to "conscious"
- 785: "skilled clinical reasoning" change remove "skilled"
- 786: "a thorough investigation" remove thorough
- 791: "significant role" changed to "expected or helpful"

Now of these changes seem to change of overall meaning.
Appendix C: Example of a reflection journal entry for bracketing pre-interview

9th July 2015
Reflection before 3rd interview

Preconceived ideas:
- That the participant will not have a lot of time, impatient.
- That the participant will be stressed, preoccupied, difficulty concentrating, accounting for less deep answers, less developed arguments.
- It will be more difficult to ask personal questions, or ask to elaborate.

This is because the participant has been very busy and it has been difficult to organize the interview time.

Preconceived ideas about participant C's style of treatment:
- "Standard IV" - similar to ESD.
- Under mostly structural with a mix of cranial/functional.
- Not a lot of manipulation.

Wandering about referral and multi-disciplinary approaches to difficult because of clinic location in very small town - difficult to other towns?

Still a bit nervous, but I feel relatively unprepared.
I will use the little bit of confidence I have gained to feel more relaxed and help the participant relax too.
Appendix D1: Extract of method notes written for the audit trail

12.2.16

Method notes - Step 3 - Formulated meanings

The list of numbered extracted statements are collated on one side of a column of a table, on the other column to the right, I write the formulated meanings.

Some significant statements have several meanings, which I decide using a letter.

Example:

185 [Collated significant statement] - A war of some aspect of the current state of research on migraines, knowledge of the role of the hypothalamus in migraine pathogenesis.

- Formulated meaning:
  x 185a. An osteopath is aware of some aspects of current research on migraines.
  x 185b. An osteopath has an understanding of basic neuroendocriology and their own clinical experience to draw their own understanding of migraines.

It is important that these formulated meanings represent what the participant has said, so I then checking them, I have gone back to the transcript to ensure the context and best representation of the meaning. In some cases like this example, the formulated meaning doesn't seem that accurate representation of the statement, but it is of the transcript.
Appendix D2: Extract of method notes written for the audit trail, continued

12.2.16. Method notes - continued

1. Formulated meanings:

- This is a better example.

- 187. I personally work on the hypothalamus; as being where things come from, so in my treatment that's always a major factor.

- Formulated meaning:

  - 187a. An osteopath's practice is informed by their knowledge on migraine research and anatomy.
  
  - 187b. An osteopath targets the hypothalamus in their treatment.

This usually occurs when the statement tells me something about the person who said it (perspective) and what that personally cared for (disciplinary).

Conversely, sometimes several significant statements are redundant and can be collated into one, at which point, the individuals are grouped together - like an early start in step 4.

- Example:

  - 227. I try to encourage them to explore that a bit more by trying to get them to look around the fact that it isn't recovery just one thing that's going on.

  - 229. [Related] Encourage patients to think of what other triggers factors might be triggers that have occurred and built up to the twitch.

- PFM - 227, 229. An osteopath encourages PnEM to consider all aspects of their lads which may have contributed to a migraine attack.
Appendix E: Ethics Committee approval

Madeleine Kaspare Chelse
23A Willowbrook Place
Titirangi
Auckland

23.4.15

Dear Madeleine,

Your file number for this application: **2015-1011**

Title: **Caring for migraine sufferers: New Zealand osteopaths’ approaches and experiences.**

Your application for ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

**Start date: 23.4.15**

**Finish date: 23.4.16**

Please note that:

1. The above dates must be referred to on the information AND consent forms given to all participants.

2. You must inform UREC, in advance, of any ethically relevant deviation in the project. This may require additional approval.

You may now commence your research according to the protocols approved by UREC.

We wish you every success with your project.

Yours sincerely,

[Signed]

Sara Donaghey
Deputy Chair, UREC

[cc] Elizabeth Niven
Cynthia Almada
Information sheet

Project title: Caring for patients who experience migraines: New Zealand osteopaths’ approaches and experiences

What this project is about

Migraine headaches are a very common disorder which is often misdiagnosed or inadequately managed. Anecdotally, osteopaths are known to treat people who experience migraines, but very little research has been carried out to understand the extent of the benefits osteopathy can offer to these patients. Similarly, no published research undertaken has attempted to explore how osteopaths treat patients with migraines. This project is part of a Master’s thesis which aims at gaining a first insight into this issue by asking: How do osteopaths provide care to migraine patients in New Zealand?

This question can only be answered by osteopaths themselves. To achieve this, face-to-face interviews will be carried out with five participating osteopaths to explore their approaches to and experiences of caring for patients with migraines.

Do you have an interest in treating patients who have migraines and have experience that you would like to share? If so, you are the person we are looking for, providing you fit these criteria:

- Currently working in New Zealand as a registered osteopath
  AND
- Have at least five years of working as an osteopath
  AND
- Speak English fluently and comfortably

AND

- NOT a tutor in the Master of Osteopathy program at Unitec or involved in any administrative positions at Unitec

If you fit these criteria, you are eligible to become a participant if you wish. Participation is completely voluntary and you may withdraw your participation and the data you have given, up to two weeks following reception of the transcripts.

If you know anyone else who might fit these criteria or be interested in participating in this project, please feel free to share my contact details and give them a copy of this information sheet.

What it will mean for you

Participation in this project is will first involve you to partake in a phone or face-to-face interview with me to check you are within the inclusion criteria and discuss the details involved in your participation. This is an opportunity to ask any questions about the project or raise any concerns you may have.

If you agree to participate, we will organise a time and place for the recorded interview. This will be mainly be fitted around you, so you can choose the setting in which you are the most comfortable to talk: This can be your osteopathic clinic, your home, or a quiet public place. If you live outside Auckland, I will travel to you, or a skype interview may be set up.

The interview

The interview will be recorded and will probably last 30 to 60 minutes, but this is flexible: if you want to stop sooner, that is absolutely acceptable. If you feel you have a lot to say and want to continue for more than 60 minutes, it is equally suitable. I will then ask you some questions about your approach to treating migraines. Some questions will be very broad, while others might explore specific aspects of care. You are encouraged to elaborate as much as you want and talk in depth about things you want to share. The important aspect of this project, as with all qualititative research, is that you feel comfortable and unhindered, and can speak freely and honestly, without restraint. There is no need to ‘practice’ before the interview, or take notes in advance about what you want to say. You do not need to feel self-
conscious about anything you may say, or feel that you have to conform to the wider osteopathic profession. Keep in mind that everything that you contribute will be completely anonymised.

**Analysis**

After the interview, I will anonymise the recording and delete any potential identifying information. It will then be sent to a professional transcribing service. The transcriptionist will have signed a confidentiality agreement pertaining to the material she will transcribe and will treat any information in complete confidence. This transcription will be combined with the transcripts from the other interviews and analysed. As part of the analysis process, I will send you my findings to ensure that the analysis of your transcript has stayed consistent with what you have said during the interview.

**After completion of the thesis**

Once the thesis is completed (late 2016- early 2017), the findings may be published in a research journal, but your transcript will not be used for anything further than that. You may request your own copy of the published manuscript if you wish. The transcripts and recordings will be kept securely for a period of five years before being destroyed, during which timeframe you are free to access them.

**Your rights as a participant in this study**

Before you decide whether you wish to get involved, it is important that you fully understand what this project is for and what procedures you will partake in. You are welcome to ask any questions to the researcher or her supervisor. If you decide to participate, you must be aware of your rights as a participant, and understand that your involvement is completely voluntary. You may withdraw your participation at any time, or any information that you have contributed by written application within two weeks of the receipt of the transcript from the interview. You may also withdraw during the interview if you wish. Your participation will be confidential, and anonymised. These rights will be discussed with the researcher and are
fully described in the consent form, which must be signed before any participation. This information sheet must also be kept for later reference.

Please do not hesitate to contact me or my supervisor if you need further information.

Yours sincerely,

Madeleine-Kaspara Chaise
Primary researcher & student in the Master of Osteopathy program,
Unitec Institute of technology, 2015
Ph.: 027 304 8689
Email: mkchaise@gmail.com

Research supervisor:
Dr Elizabeth Niven,
Senior Lecturer - Osteopathy
Community and Health Services
Email: eniven@unitec.ac.nz

UREC REGISTRATION NUMBER: 2015-1011
This study has been approved by the UNITEC Research Ethics Committee from 23.4.15 to 23.4.16. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix G: Participant consent form

Participant Consent Form

Project title

_Caring for people who experience migraines: New Zealand osteopaths’ approaches and experiences_

I have read and understand the information sheet given to me and the following information.

I understand that my participation in this research project is voluntary and I may withdraw my involvement (including during the interview) and withdraw the information I have contributed with written application up two weeks following the transcription. I understand that with written application I may withdraw any specific information I have contributed during my participation in the interview within two weeks of its transcription.

I understand that the entirety of my face-to-face interview with the researcher will be recorded and converted to a written transcript by a professional transcription agency (Confidential Transcriptions, Ltd) following the deletion of any personal identifiers.

I understand that all contributions I make throughout this project will be anonymised and any identifiers of myself or others will be deleted immediately.

~ 154 ~
from the recorded material. I understand that the only individuals aware of my personal identity and what I have said will be the researcher and her supervisor. I also understand that all the information from my contribution will be stored securely for a period of five years after which they will be destroyed.

I understand that I have the right to access my contribution, and can request a copy of the finalised research manuscript.

I have had time to consider this and I give my consent to be a part of this project.

Participant Name: ____________________________________________

Participant Signature: _________________________________

Date: ______/_____/_____

Participant Copy/Researcher Copy

UREC REGISTRATION NUMBER: 2015-1011

This study has been approved by the UNITEC Research Ethics Committee from 23.4.15 to 23.4.16. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

~ 155 ~
Appendix H: Confidentiality agreement

CONFIDENTIALITY AGREEMENT

Research Title: Caring for patients who experience migraines: New Zealand osteopaths’ approaches and experiences

Researcher/s Name: Madeleine-Kaspara Chaise
Address: 23A Willowbrook Pl, Titirangi, Auckland

Phone number: 027 304 8689

Email: mkchaise@gmail.com

I ____________________________________________ (full name - please print)
Agree to treat in absolute confidence all information that I become aware of in the course of transcribing the interviews or other material connected with the above research topic. I agree to respect the privacy of the individuals mentioned in the interviews that I am transcribing. I will not pass on in any form information regarding those interviews to any person or institution. On completion of transcription I will not retain or copy any information involving the above project.

I am aware that I can be held legally liable for any breach of this confidentiality agreement, and for any harm incurred by individuals if I disclose identifiable information contained in the audiotapes and/or files to which I will have access.
Signature: .................................................................
Date: .................................................................

UREC REGISTRATION NUMBER: 2015-1011
This study has been approved by the UNITEC Research Ethics Committee from 23.4.2015 to 23.4.2016. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 8551). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix I: Interview guide

There are no right or wrong answers. Questions might be vague. I’m here to talk to you about your personal experience in treating people who experience migraines.

- First to you as an osteopath, what are migraines? What comes to your mind when a patient says to you ‘I have migraines’
- What is a typical patient who experiences migraines like? How common?
- What kind of treatment approach do you use for migraine patients? What is a typical treatment like? Long term? Short term? What about treating migraine attacks while they are occurring?
- What happens when a patient presents with another complaint but they also have migraines?
- Do you give specific advice to patients who have migraines? Other things that add to treatment?
- Tell me about the typical patient-practitioner relationship you have with patients with migraines. What is it like?
- What typically happens to migraine patients who you treat?
- Tell me about your role in diagnosing migraines? How do you diagnose headaches?
- What about other health professions? Do you refer a lot of migraine patients? For treatment or diagnosis? Do you get patients referred to you?
- How do osteopaths fit in the healthcare sector in relation to patients with migraines? What is your role as an osteopath in providing care to these patients?
- Are there any limitations or barriers to treatment of these patients?
- Tell me about your personal experience of treating patients with migraines? What is it like for you?
- Where does the knowledge you have about treating migraines come from?
- Any other relevant information/opinions that the participant wants to add.
Appendix J: Extracting significant statements

This screen capture shows the highlighted significant statements in the full script (on the left-hand side), and the same highlighted phrases copied and numbered on the right hand-side.

Following this step, all significant statements were copied and pasted to another document to create formulated meanings.

<table>
<thead>
<tr>
<th>95. I don’t manipulate them violently, I give them the positioning first if they feel okay, and I give them a gentle move.</th>
<th>96. They don’t like quick movements in the acute stage, so if they feel like it’s making them nauseous or it’s making them sore, I don’t do that.</th>
</tr>
</thead>
<tbody>
<tr>
<td>97. They tell me.</td>
<td>98. Well that means it’s changing their circulation, changing something, so we won’t… and with the previous question, we know that the drainage—that’s another important thing that osteopathically we’ll—so that may—the first is chemical, the second one is circulation, that improves the drainage and the balance, so that could be again part of the migraine equation.</td>
</tr>
<tr>
<td>99. Drainage—that’s another important thing that osteopathically we’ll—(…): that improves the drainage and the balance, so that could be again part of the migraine equation.</td>
<td>100. In acute stage you go gentle.</td>
</tr>
<tr>
<td>101. But sometimes they come outside of the attack and then you treat them, manipulate them and they get well, so that sometimes happens too, but the day after they sometimes say oh I had the migraine after he treated me last time and that can happen too.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix K: Example of a collated significant statement

Statement number 87 is shown here to represent a larger number of phrases (in bold) in the interview script and was collated (on the right hand-side).
Appendix L: View of the document containing the 960 significant statements and their formulated meanings

The five different colours correspond to the five participants from which the significant statements came from.
Appendix M: Example of one significant statement giving rise to two formulated meanings

Significant statement number 381 (left-hand side) gave rise to formulated meanings 381a and 381b (in bold, on the right-hand side).

---

378. If there’s restrictions sometimes I’ll treat them with functional cranial or sometimes I feel like they need manipulating.
379. I kind of just use all your tools in your toolbox.
380. I found since I’ve done more of the biodynamic work it does definitely help – [what does this say about the role of osteopaths?]...

381a. A still point – rather than finishing the treatment then, that’s a good place to start
382. [still point] that’s when you’ve got the body to a place of whole balance, it’s much easier to then feel what’s really going on underneath, ... it’s almost like getting underneath the noise of everything.
383. In doing the biodynamics, and it’s so helpful because they use an awful lot of research and an awful lot of theory to back up what you’re feeling, and it makes sense, it helps you work out
384. It [biodynamics] works for me and it works for treating people who’ve had chronic problems
385. I feel like I’m working at a deep level with calming the nervous system down, getting a better picture of what the whole is [with biodynamics].
386. If you’ve got an area … it’s been the main problem, that gives me an idea and then I will move...

379. An osteopath uses all the techniques available to them to treat PwEM.
380. An osteopath will explore new avenues for treatment within the realm of osteopathy to create a more comprehensive practice.
381a. Reaching a still point is a good starting point for treating PwEM, as opposed to a finishing point traditionally.
381b. An osteopath will develop individual beliefs and practices over the course of their clinical experience.
382. Merged with 350.
383. Biodynamic osteopathy is based on research and theory which provides a logical framework on which to rely on for guidance.
384. Biodynamics is an well suited modality to treat chronic conditions including migraines
385. Biodynamics influences the nervous system at a deep level and helps the osteopath to grasp the condition of the whole body.
386. An osteopath uses the main area of dysfunction to monitor improvement.
387. An osteopath uses a mixture of different approaches to monitor the patient’s improvement on
Appendix N: Example of two consecutive significant statements giving rise to one formulated meaning

Significant statements number 492 and 493 were consecutive and redundant (left-hand side), thus giving rise to one formulated meaning numbered 492, 493 (right-hand side).

| 487 | they feel like, you know, oh I’ve seen this before or they’re kind of relieved |
| 488 | even if you say I’m not 100% sure but this is what we’ll do |
| 489 | give people a bit of plan, a bit of confidence |
| 490 | you’re keeping an open mind and if it doesn’t help then we do this |
| 491 | I think patient management is quite important rather than just saying come back again and again and again and them... losing faith in what’s going on |
| 492 | I think we can make a difference in that we do make them feel better with the hands-on treatment |
| 493 | it does help them feel more relaxed; it does give them more of a sense of wellbeing |

488a. Osteopaths must provide an honest management plan even if they feel unsure about their ability to help.
488b. Osteopaths are open with PwEM about their limitations.
489. Osteopath’s role is give PwEM confidence in their search for a solution.
490. An osteopath is open to other types of treatments other than osteopathy in reserve
491. Patient management in a way that keeps PwEM engaged is an important aspect of osteopathy.
492, 493. Osteopathy improves PwEM’s sense of physical wellbeing and relaxation.
494. Some PwEM fail to benefit from osteopathy.
495. Osteopathic physical treatment ensures that PwEM are fully cared for on each aspect of their health, which is beneficial in itself.
496. Osteopaths’ role is to take into account all possible factors that can influence migraines and gain an overall perspective of the PwEM’s health.
497. PwEM all have a varying degree of contributions from musculoskeletal factors to their condition.
498. Osteopaths recognise the uniqueness of each PwEM.
Appendix O: Extract from a journal entry written about sorting formulated meanings into initial themes

11.3.2016

I am currently sorting the 960 FM into my initial themes. There have been a few instances where a FM seemed to fit into several categories. My supervisor told me that was fine.

I will refine the themes in my next step anyway. But it does make me ask this question to myself:

"What part of a meaning is the most important?"

"How can I know which is most important?"

For example, [FM 440, 441]

"Osteopaths' role is to improve the physical aspect of the body in order to allow the RWEH to build a stronger adaptive reserve to hormonal changes."

I classified the FM into 2 initial themes:

1. Treating the whole body
   and
2. Osteopaths can diagnose and treat the musculoskeletal component of migraine but not the "1st cause" (ie physiological).

Now that I think about it, the other theme that springs to mind is "initial theme 38 "Migraines have a hormonal component".

I suppose the best there under which to classify this FM will show itself when I refine and group these categories. But the question I need to ask myself in answer to the earlier question is:

"What is most relevant regarding the role of osteopaths in FM of RWEH?"

And my answer is the aim of FM to create a stronger, more resilient whole, which is an osteopathic tenet, and is the approach to treating all conditions which we not purely musculoskeletal.

~ 164 ~
Appendix P: Extract of initial themes with the numerical references of each corresponding formulated meaning

666, 641, 667
46) An osteopath recognises the lack of effectiveness of their treatment to guide what’s best for the patient. Need to accept their own limits.
   119, 154, 499, 506, 620a, 621
47) Importance of creating a management plan (including a back-up plan in case osteopathy doesn’t help)
   158, 211b, 490, 485, 486, 595b, 597, 625
48) Regular review of management
   532, 533, 535, 539, 537
49) Inclusion of other alternative modalities in osteopathic management of PwEM
   83, 49, 155, 176, 178, 235, 236, 237, 238a, 308, 324, 325, 327, 332, 617, 647, 649
50) Osteopathic treatment aimed at improving autonomic balance (including through breathing retraining) and relaxation/relief of tension
   351, 392, 385, 403, 410, 480, 481, 475b
51) The neck (and shoulders) as a common symptomatic area and target for treatment
   200, 203, 205, 224b, 250, 253, 259, 635, 748, 815, 838, 853, 892
52) The osteopath as a health educator
   35b, 56, 42, 451, 503, 938b
53) The osteopath as a health partner / support person for PwEM (PwEM are already educated) and
   294, 595, 595a, 723, 738, 741, 782, 813b
54) Migraines is a difficult condition to treat (both generally and for the osteo during ttt)
   27, 63, 61, 62, 140, 145, 148, 239, 281, 282, 325[2], 347, 552b, 411, 413, 414, 553, 555, 570, 506,
   513, 521, 522, 523, 518, 511, 512, 603a, 605, 663, 654, 790, 805, 813a, 859, 862, 870, 941, 946,
   949
55) Long term osteopathic treatment as a choice coming from the patient
   159, 160, 161, 601b, 687, 688, 695, 688, 689, 691

~ 165 ~
Appendix Q: Example of one formulated meaning (904) categorised under two themes (6 and 43)
Appendix R1: Example of a mind-map drawn for the development of themes
Appendix R2: Example of a mind-map drawn for the development of themes
Appendix S: Color-coded formulated meanings sorted in themes

Here each colour (orange, green, red, blue, and pink) corresponds to the participant from which the formulated meaning come from. The heading in bigger fonts represent the themes under which the formulated meanings are categorised.
Appendix T: Initial results as returned to participants

Dear [name of participant],

Let me start by thanking you again for helping me in my Master’s research by sharing your knowledge on migraines. Thanks to you, I’ve ended up with a lot, and I do mean A LOT of rich data. That’s over 980 statements from the interviews categorised into 89 categories arranged under 20 themes and 4 groups! Which is a lot of information, which I am so grateful for, because I have learnt so much about the osteopathic approach to treating migraines thanks to that! Unfortunately, it would be impossible to write about all of these categories in my thesis, much less in the manuscript; so I have to boil it down to the most important, most relevant ideas, and most common to all of the interviews I had with the five of you. The method that I have been using for this study aims at finding the ‘essential meaning’ behind the research question. This means finding those main ideas that most osteopaths in NZ who treat patients with migraines can relate to.

I would like to present a summary of these key ideas for you to confirm to me that you can indeed relate to and agree with them. This means that it will not include everything you have said, but there should not be anything that you cannot relate to, at least to some extent. Please give me some feedback in the next two weeks if you feel that these ideas misrepresent what you have said, or if you are happy with them, do let me know of your approval to go ahead with writing up the results.

I also include your interview transcript, if you want have a look at the conversation we had which lead to these preliminary results.

- In the osteopathic clinic, it is uncommon for a PwEM to present solely for their migraines.
- There is a lot of misunderstanding of what a migraine is in the public.
- Migraines are difficult to treat because their cause is unknown which stops osteopaths from being able to directly treat the primary cause as they usually would.
- Migraines are elusive and varied in their presentation, and present as a diagnostic challenge.
- They are also unpredictable, and patients’ condition can worsen after having improved from osteopathic treatment. Migraine attacks typically occur in clusters. These periods of worsening are typically the times when PwEM seek osteopathic treatment.
- Migraines are multifactorial, and can be influenced by a combination of lifestyle, mental, and physical factors.
- Migraines rarely disappear completely, but an osteopathic treatment can reduce the frequency and severity of attacks by improving secondary factors that contribute to the
condition and improving symptoms (typically muscle tension) caused as a result of the attacks and stress.

- Osteopaths treat with a variety of techniques, even though participants all use a different proportion of cranial and structural approaches, the principles guiding manual treatment were similar:
  - Treatment is individualised for each patient, and depends on the examination findings, as well as constant feedback during treatment both from the patient and from the tissues being treated. This may involve a component of sensitivity and intuitiveness in some practitioners.
  - Treatment is also delivered with a view of the body as a whole. Osteopathic treatment of PwEM follow general osteopathic tenets of improving drainage and fluid circulation, such that neck, shoulders, and thoracic areas are most typically treated.
  - Treatment also aims at regulating autonomic regulation (i.e. ‘calming things down’). This is especially characteristic of osteopathic treatment of acute migraine attacks, which are very rare in practice, and typically appear similar to non-acute treatments, but gentler, and aiming at symptomatic relief rather than functional changes.
  - Improving breathing mechanics is also a part of both osteopathic treatment and the advice given to PwEM, because of the importance of breathing in autonomic regulation and fluid drainage.

- Lifestyle improvement also plays a major role in the osteopathic management of PwEM. Osteopaths help the patient improve their lifestyle and to reduce migraine triggers and improve general health. Osteopaths may discuss supplements, or give diet advice according to their knowledge of current migraine research, but make a point not to recommend these directly, but leave it in the patient’s hands. However, people who have been experiencing migraines for a long time often already know their triggers and are informed about the lifestyle influences over their condition; in those case, osteopaths provide mostly support. Osteopaths explore with PwEM all other aspects of their lives which may impact their condition, including sleep, posture, work, commuting, physical activities, which can be a long process because every patient is unique.

- This is key to the role of osteopaths in health care, because the profession is unique in the time given to patients which allows thorough exploration and discussion of management with PwEM.

- Osteopaths typically see PwEM as a secondary health care practitioners, because PwEM usually see their GP to get a diagnosis first. Occasionally osteopaths see undiagnosed PwEM, and may
refer them to their GP if there are red flags or if they need medication. Often PwEM have been disappointed by the medical system, and are not finding relief despite medication, or refuse to take medication because of side-effects.

- PwEM typically come to osteopaths after having tried other therapies, and place their hopes on osteopathy. Osteopaths are aware of other health care modalities and alternative therapies (such as naturopathy and acupuncture) and may suggest their use in conjunction of osteopathy or as a reserve solution if osteopathic treatment does not help the patient.

- Osteopaths aim to give PwEM the tools to manage their condition themselves. Osteopaths learn to accept the limitations of their practice, and refer PwEM to another osteopath or other health care provider if they cannot help them further. Osteopaths understand their role as a part of the multidisciplinary care of these patients.

- Osteopaths’ knowledge of anatomy and pathophysiology, as well as research, informs their own understanding of migraines and guides their treatment approach of PwEM. Much of their knowledge comes from clinical experience and self-directed learning rather than specific migraine courses, which are very uncommon. Osteopaths’ practices can also be influenced by other osteopaths they work alongside of, their career or education background, and personal preferences in terms of treatment techniques.
Declaration

Name of candidate: Kaspura Chaise

This Thesis/Dissertation/Research Project entitled: The Role of New Zealand Osteopaths in the Care of People who Experience Migraine: A Qualitative exploration is submitted in partial fulfillment for the requirements for the Unitec degree of Master of Osteopathy.

Principal Supervisor: Dr. Elizabeth Niven

Associate Supervisor/s: Dr. Dianne Roy

CANDIDATE'S DECLARATION

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee. Research Ethics Committee Approval Number: 2015-1011

Candidate Signature: [Signature] Date: 21.6.2017

Student number: 1396574
Full name of author: Madeleine Kaspara Chaise

Full title of thesis/dissertation/research project ('the work'):
The Role of New Zealand Osteopaths in the Care of People who Experience Fibromyalgia: A Qualitative Exploration

Practice Pathway: 

Degree: Master of Osteopathy

Year of presentation: 

Principal Supervisor: Dr. Elizabeth Niven

Associate Supervisor: Dr. Dianne Roy

Permission to make open access
I agree to a digital copy of my final thesis/work being uploaded to the Unitec institutional repository and being made viewable worldwide.

Copyright Rights:
Unless otherwise stated this work is protected by copyright with all rights reserved.
I provide this copy in the expectation that due acknowledgement of its use is made.

AND

Copyright Compliance:
I confirm that I either used no substantial portions of third party copyright material, including charts, diagrams, graphs, photographs or maps in my thesis/work or I have obtained permission for such material to be made accessible worldwide via the Internet.

Signature of author: _____________________________

Date: 21/6/2027