The Attitudes and Self-reported Practices of New Zealand Osteopaths to Exercise Consultation and its use within Osteopathy

Ritisha Mistry

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Declaration

Name of candidate: Ritisha Mistry

This Research Project entitled

"The Attitudes and Self-reported Practices of New Zealand Osteopaths to Exercise Consultation and its use within Osteopathy" is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Osteopathy.

Candidate's Declaration

I confirm that:

- This 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: 2010-1139

Candidate Signature: Date:

Student number: 1272517

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Introduction to the Thesis

There is a large body of research evidence that shows a wide range of health benefits associated with exercise. These benefits include the prevention of many lifestyle diseases, maintaining and improving function of the cardiovascular system and prolonging the clinical manifestation of certain illnesses (Goldberg and Elliot 1994). More recently, exercise has been shown to improve mood, self-esteem and general wellbeing, allowing practitioners to potentially address many dimensions contributing to the health of patients (Keller 2006). Additionally, research has also shown that the use of exercise as an adjunct to manual therapy treatment for specific musculoskeletal dysfunctions can decrease pain and improve function (Geisser, Wiggert et al. 2005; Hayden, van Tulder et al. 2005).

According to the Osteopathic Council of New Zealand osteopaths are primary healthcare providers who facilitate healing through osteopathic assessment, clinical differential diagnosis and treat dysfunctions of the whole body (Osteopathic Council New Zealand 2009). A responsibility of primary healthcare providers is to promote health and wellbeing and base treatment on best possible evidence available (Zamani, Vogel et al. 2007). Therefore the therapeutic effects of exercise and its potential for utilisation is a relevant issue for osteopaths.

Despite the large amount of literature identifying the application of therapeutic exercise in many modalities of manual therapy (Zamani, Vogel et al. 2008), there appears to be no literature identifying whether osteopaths actually provide exercise advice and prescription and if so, how it is being utilised in clinical practice in New Zealand. The research within this thesis investigates the attitudes and practices of New Zealand osteopaths regarding exercise consultation and its utilisation within osteopathic clinical practice.

This thesis is divided into three sections: Section 1 is a literature review focusing on the evidence relating to the use of exercise consultation in healthcare, the definition of

exercise, factors influencing the effectiveness of exercise and the role of exercise in osteopathy. Section 2 is a manuscript outlining the study conducted as part of this thesis, laid out in a format specified for submission to the *International Journal of Osteopathic Medicine.* Section 3 includes Appendices including confirmation of ethics approval, participant information pages and consent form, followed by data collection forms and other material relating to the thesis.

Section 1: Literature Review

Introduction

The utilisation of exercise consultation within clinical management plans has always been of interest within the field of manual therapy (Howard and Gosling 2008). Research highlights the many benefits associated with exercise in the context of both general health and wellbeing and also specific medical conditions. For instance, exercise reduces morbidity and mortality by decreasing the risks of chronic diseases such as cardiovascular diseases, stroke and osteoporosis; therefore improving general health and wellbeing (Warburton, Nicol et al. 2006). In specific conditions such as chronic lower back pain (LBP) exercise has been found to be moderately effective in decreasing pain and improving function amongst health care populations (Hayden, van Tulder et al. 2005).

There is an opportunity for primary health care providers to give advice regarding appropriate levels of physical activity and exercise as a component of patient management. The Ministry of Health (2003) has identified that primary health care providers such as physiotherapists, occupational therapists and other allied professionals have an important role in supporting people with disabilities and chronic health conditions to remain physically active. In addition to their role, primary health care providers may also be in an appropriate position in society to provide information and encouragement to their patients regarding participation in physical activity and exercise (Hayden, van Tulder et al. 2005; Zamani, Vogel et al. 2007; Taylor 2010).

Exercise has been found to be effective in the management of osteoarthritis (OA) of the knee, (Taylor, Dodd et al. 2007), mechanical neck disorders (Sihawong, Janwantanakul et al. 2011) subacromial impingement syndrome (Hanratty, McVeigh et al. 2012) and temporomandibular joint (TMJ) disorders when applied in conjunction to manual therapy (Taylor, Dodd et al. 2007; Tuncer, Ergun et al. 2012). However, exercise interventions utilised within the management of acute LBP have been largely ineffective and there is little evidence for its use in this group (Hayden, van Tulder et al. 2005; Taylor, Dodd et al. 2007). This is reflected by clinical guidelines of 11 countries including New Zealand's Accident and Compensation Corporation (ACC) for managing

acute LBP which states that there is no clinical benefit following use of specific back pain exercises (Accident Compensation Corporation 2004; Penney 2009). Rather than specific back exercise, remaining physically active has been found to be beneficial in the general management of acute LBP even though some activity modification may be required (Accident Compensation Corporation 2004; Penney 2009). Research investigating the effectiveness of exercise as an intervention has identified that clinical outcomes that are achieved through exercise may be influenced by various extrinsic factors including patient adherence to exercise programmes (Schneiders, Zusman et al. 1998; Howard and Gosling 2008), patient's level of pain, practitioner education and level of clinical experience (Keller 2006).

The majority of literature investigating exercise as an intervention supports that exercise consultation is an expected modality of treatment for several primary health professions, for example in physiotherapy, chiropractic (Zamani, Vogel et al. 2008) and occupational therapy (Kerr 1999). Osteopaths are also classified as primary health practitioners by the Osteopathic Council of New Zealand (OCNZ) which is legislated under the Health Practitioners Competence Assurance Act (2003) (Osteopathic Council New Zealand 2009). However due to insufficient research in this area, it is unclear whether osteopaths believe that they should be providing exercise consultation to their patients, whether they actually provide it, and if so, how it is being utilised within a clinical context.

The purpose of this review is to outline and discuss the evidence regarding the use of exercise consultation in healthcare. This will be achieved by exploring the efficacy of exercise consultation (in the context of general health and specific medical conditions), current practices of exercise consultation (in relation to advice and prescription), the effectiveness of exercise consultation in a clinical setting and barriers influencing this, and finally the literature relating to exercise within osteopathy practice itself.

Efficacy of Exercise Consultation

Exercise Consultation for General Health

Approximately 60% of deaths world-wide can be attributed to preventable chronic diseases as a result of changes in global dietary patterns and inactive lifestyles (World Health Organisation 2010). In New Zealand, physical inactivity is a contributing factor in 8% of all deaths, accounting for 2600 deaths per year (Ministry of Health 2003; Sport and Recreation New Zealand 2005). Moderate intensity physical activity performed regularly has been found to reduce the risks of chronic diseases such as cardiovascular diseases, stroke, chronic obstructive respiratory disease (CORD), adult onset asthma, non-insulin dependent diabetes mellitus (NIDDM), osteoarthritis (OA), osteoporosis and certain cancers (colon and breast specifically) thereby improving general health (Ministry of Health 2003; Warburton, Nicol et al. 2006; The National Heart Foundation 2009).

Other benefits of physical activity are psychological such as reduced risk of depression, increased self-esteem, cognitive function and coping skills; and a reduction in stress and anxiety leading to improved mood (Ministry of Health 2003; Sport and Recreation New Zealand 2005; Warburton, Nicol et al. 2006). Physical activity is also a major determinant of energy expenditure and therefore a vital component in the prevention of obesity and obesity-related conditions such as Type 2 diabetes and cardiovascular diseases (Ministry of Health 2003; Sport and Recreation New Zealand 2005; Warburton, Nicol et al. 2006; Ministry of Health 2008).

Preventable chronic conditions deplete health resources and continue to cost the public health system millions of dollars each year (Sport and Recreation New Zealand 2005). According to health expenditure trends reported by the Ministry of Health, the total estimated amount spent on healthcare in New Zealand in 2009 was 10.3% of Gross Domestic Product (GDP), which is slightly higher than the Organisation for Economic Co-Operation and Development (OECD) average of 9.8% for 2009 (Ministry of Health 2012). A majority of NZ health expenditure was publically funded (80.5%) with the remaining amount (19.5%) funded privately (Ministry of Health 2012).

Research identifying that physical inactivity is the second most modifiable risk factor (after smoking) for mortality and morbidity, has led to the development of physical activity guidelines and a more preventative approach to healthcare throughout the world (Ministry of Health 2003; Sport and Recreation New Zealand 2005; World Health Organisation 2010). Accordingly, a number of government campaigns and initiatives have been developed such as the Physical Activity Toolkit for District Health boards developed in 2003 to promote physical activity and improve general health amongst those at risk of physically inactivity (Ministry of Health 2003; Sport and Recreation New Zealand 2005). Individuals identified at risk of being physically inactive include the elderly, children, adolescents, pregnant women, women with children, and those at risk or suffering from chronic diseases (Ministry of Health 2003; Sport and Recreation New Zealand 2005). These initiatives have been delivered throughout the country by Sport New Zealand (formerly Sport and Recreation New Zealand), public health units, primary and secondary care services and via government contracts with non-government organisations and providers (Ministry of Health 2003).

Exercise Consultation for Specific Medical Conditions

The utilisation of exercise-based interventions as an adjunct to hands-on manual therapy treatment is common practice in various disciplines of manual therapy for the rehabilitation of musculoskeletal disorders (Kerr 1999; Zamani, Vogel et al. 2008). Several systematic reviews focussing on exercise-based interventions in conjunction with manual therapy have been undertaken and have identified benefits in improving the clinical outcomes of patients with various musculoskeletal disorders (Hayden, van Tulder et al. 2005; Taylor, Dodd et al. 2007; Lewis, Morris et al. 2008; Miller, Gross et al. 2010). For instance, therapeutic exercise combined with mobilisation and manipulation have been found to be beneficial for treating spinal pain such as sub-acute/chronic neck pain (Gross, Miller et al. 2010) and chronic lower back pain (Bronfort, Maiers et al. 2011).

Manual therapy interventions are often used with and without therapeutic exercises to treat mechanical neck pain (D'Sylva, Miller et al. 2010), which is a common condition affecting an estimated 70% of persons at some point in their lives (Bronfort,

Evans et al. 2012). A systemic review by D'Sylva, Miller et al. (2010) investigated the effects of manual therapy interventions in adults with neck pain. Nineteen relevant studies consisting of randomised controlled trials (RCT) and quasi-RCTs met the methodological standards and were included in this review; of which seven were considered to have a low risk of bias. According to the GRADE approach used in this review to assess the quality of included trials, low risk bias was defined as meeting all six criteria for methodological quality: study design, consistent findings, generalisability, narrow confidence intervals (sufficient data), low risk of publication bias (Furlan, Pennick et al. 2009). Methodological weaknesses identified included failure to describe or use appropriate concealment of allocation (10/19 studies) and lack of effective blinding procedures (observer 14/19, patient 19/19, health care provider 19/19).

Although blinding is difficult to achieve in studies which use self-reported measures, lack of blinding can result in biased outcomes through the exaggeration of effect sizes (Hróbjartsson, Thomsen et al. 2012). This review found moderate evidence to suggest that mobilisation, manipulation and soft tissue techniques produce similar improvements in pain and function in patients with acute neck pain. However, when mobilisation, manipulation and soft tissue techniques are applied in conjunction with exercise and advice, greater improvements are produced in global perceived effects, patient satisfaction and quality of life in patients with acute neck pain (D'Sylva, Miller et al. 2010). Similarly another review of 17 RCTs by Miller et al. (2010) found evidence from three trials defined as high quality suggesting that in the context of chronic neck pain, manual therapy combined with exercise in the short-term produces greater improvements in pain and function in addition to patient satisfaction and quality of life, however no long-term differences were observed (Miller, Gross et al. 2010).

Two RCTs investigating the effectiveness of strengthening exercises for the treatment of women with chronic neck pain found non-significant results (Häkkinen, Kautiainen et al. 2008; Jull, Falla et al. 2009). Hakkinen et al. (2008) randomised participants (n = 101) to receive 10 sessions of supported low-load strength training and stretching or one supported session of stretching only; both groups then completed a home-based

programme with a one year follow up (Häkkinen, Kautiainen et al. 2008). Jull et al. (2009) randomised participants (n = 46) to receive six supported sessions of either low-load or high-load strengthening exercises over six weeks; participant were also asked to perform their exercises at home twice a day during the six week period (Jull, Falla et al. 2009). Hakkinen et al. (2008) found no significant differences in neck pain and disability between both training groups. Mean ± SD reduction in pain was from 64 ± 17mm to 37mm (95% CI 44 to 30mm) in the strength training group and from 60 ± 17mm to 32 mm (95% CI 39 to 25) in the stretching group. There were insignificant changes in neck strength and mobility; however improvements in disability for each group were significant between pre and post treatment ($p < 0.001$) (Häkkinen, Kautiainen et al. 2008). Similarly, Jull et al. (2009) found no significant group differences between pre and post interventions for high-load strength training, although low-load strength training did change activation of deep neck flexor muscles ($p < 0.05$). Both training groups did however demonstrate significant reductions in average pain (low-load exercise group, $p < 0.001$; high-load exercise group, $p < 0.05$) and disability (low-load, $p < 0.001$; high-load, $p < 0.001$) (Jull, Falla et al. 2009).

Jull et al. (2009) suggests further research to investigate whether increased training duration would increase changes in deep neck flexor muscle activation. Hakkinen et al. (2008) used an elastic band as the low-load training equipment which reduces costs however this may have been a disadvantage as the level of resistance cannot be controlled. It was suggested that the level of spontaneous recovery may also have influenced results, although the authors stated that this was not possible to measure due to the study setting. Additionally both studies also lacked a control group.

One sizeable RCT (n = 191) featuring in both reviews, conducted by Bronfort, Evans et al (2001) investigated the efficacy of rehabilitative neck exercises and spinal manipulation for the management of patients with chronic neck pain of mechanical origin. Patients were randomised to receive 20 sessions of either spinal manipulation combined with rehabilitative neck exercises, supervised rehabilitative neck exercises or spinal manipulation alone. Main outcome measures included patient-rated neck pain, neck disability, functional health status, global improvement, patient satisfaction and

medication use. Range of motion (ROM), muscle strength and muscle endurance were assessed by examiners blinded to the patient's treatment assignment. Results showed mean differences in pain reduction effect sizes between the supervised exercise group compared with the spinal manipulation group to be 0.41 (95% CI 0.03 to 0.78) and between the supervised exercise plus spinal manipulation group compared with the spinal manipulation group to be 0.44 (95% CI 0.06 to 0.83) at ($p < 0.05$). These results suggest that after one year, neck strengthening exercises applied as a supervised exercise programme or in adjunct to spinal manipulation is more beneficial than spinal manipulation alone; however further research is required to determine the optimal dose response (Bronfort, Evans et al. 2001).

Lower back pain (LBP) is another prevalent condition and also a major cost driver in terms of medical treatment and long term disability in developed countries (Keller 2006). Manual therapy and exercise-based interventions are expected modalities of treatment for LBP however; most systematic reviews support the use of therapeutic exercises for the treatment of chronic, rather than acute LBP (Geisser, Wiggert et al. 2005; Hayden, van Tulder et al. 2005; Keller 2006; Penney 2009; van Middelkoop, Rubinstein et al. 2010). The efficacy of exercise-based interventions for acute, sub-acute and chronic LBP is discussed in more detail in the following sections.

Acute and Sub-acute low back pain

Acute pain is usually defined in clinical research studies as pain that has been present for less than 6 weeks, and sub-acute is pain that has been present for 7-12 weeks (Bekkering, Hendriks et al. 2003). A systematic review by Hayden et al. (2005) included 17 RCTs investigating the efficacy of exercise therapy for both acute (n = 11) and sub-acute (n = 6) LBP. All of the RCTs included in this review found therapeutic exercise to be effective as either no treatment or other conservative interventions for the treatment of acute LBP. In the context of sub-acute pain there is some evidence which suggests a graded-activity exercise programme in occupational settings is effective (Lindstrom, Ohlund et al. 1992; Staal, Hlobil et al. 2004), although the effectiveness for other types of therapeutic exercise amongst other populations remains unclear (Hayden, van Tulder et al. 2005).

Results from the review by Hayden et al. (2005) appear to reflect the guidelines of 11 countries for managing acute LBP which state there is no clinical benefit for the use of therapeutic exercises in these patients (Bekkering, Hendriks et al. 2003; Accident Compensation Corporation 2004; Penney 2009). Guidelines suggest however, that remaining physically active with the modification of some activities is beneficial in the general management of acute LBP and can improve clinical outcomes (Bekkering, Hendriks et al. 2003; Accident Compensation Corporation 2004; Moffett and Mannion 2005; Penney 2009). Some of these improved outcomes include faster return to work (Eek, Fordyce et al. 1992; Indahl, Velund et al. 1995; Malmivaara, Hakkinen et al. 1995) and fewer recurrent problems (Eek, Fordyce et al. 1992; Linton, Hellsing et al. 1993) and therefore advice to remain active can also be useful in the management of sub-acute LBP (Bekkering, Hendriks et al. 2003; Moffett and Mannion 2005).

Dutch physiotherapy guidelines also state that there is strong evidence that therapeutic exercise is equally effective compared with physiotherapy modalities such as heat packs, massage, traction, mobilisation, shortwave therapy, ultrasound, stretching exercises, mobilisation exercises, improving co-ordination and electrotherapy and more effective than the standard care provided by general practitioners (GPs) (Bekkering, Hendriks et al. 2003)

Chronic pain

Chronic pain is defined as pain that has been present for more than 12 weeks (Bekkering, Hendriks et al. 2003). For patients experiencing chronic LBP, conservative treatment involving active patient participation has been emphasised by providers in order to prevent over-dependence on healthcare practitioners, reduce costs and encourage self-care techniques (Kerr 1999). A vast number of reviews conclude that therapeutic exercise is beneficial in the management of chronic LBP, however with limited research investigating the optimal dose, frequency, intensity and duration of therapeutic exercises, parameters for the best clinical approach remains unclear (Geisser, Wiggert et al. 2005; Hayden, van Tulder et al. 2005; Moffett and Mannion 2005; Keller 2006; Mayer, Mooney et al. 2008).

Hayden et al. (2005) investigated different therapeutic exercise strategies to improve clinical outcomes in patients with chronic LBP through a systemic review of 43 RCTs. Characteristics of exercise interventions were identified such as the design of an exercise programme, delivery of the exercise, dose and type and whether other additional interventions were provided. Outcome measures assessed were pain, function, return to work, absenteeism and global improvements. Of the 43 RCTs included in this study, only 6 were rated as high quality based on the authors' 4 internal validity criteria: low rated studies were found to have publication bias potentially causing an overestimation in the effectiveness of therapeutic exercise amongst the remaining 37 studies. Results suggest that the most effective exercise strategies include individualised exercise programmes delivered in a closely supervised format (for instance, home exercises with regular therapist follow-up and encouragement) to encourage patient adherence and achieve high dosage. Improvements in pain and function outcomes specifically are achieved when exercise interventions are provided in conjunction with other conservative treatments, such as advice to stay active, non-steroid anti-inflammatory medication (NSAIDs) and manual therapy. Stretching and muscle-strengthening exercises were also found to improve outcomes in pain and function (Hayden, van Tulder et al. 2005).

One RCT by Geisser et al. (2005) investigating the effectiveness of manual therapy and specific adjunct exercises for the treatment of chronic LBP and disability also found evidence to support the use of exercise as an adjunct to manual therapy. Participants (n = 72) were randomised into two initial groups: the first group received a specific prescribed exercise programme; the second group received a non-specific programme of general stretching and aerobic conditioning. These two groups were further divided so that participants of the first and second group each received either manual therapy or a sham therapy in addition to their allocated exercise programme. Participants were seen for one session per week over a six week period and asked to perform their programme twice daily. Outcome measures included the McGill pain questionnaire, patient-rated pain, disability, treatment satisfaction and manual therapy screening. Results from this study suggest that specific exercise in addition to manual therapy is

beneficial in the treatment of chronic LBP, with improvements in average pain (from 4.45mm (±2.3) to 2.40mm (±2.0), $p < 0.05$). Overall perceived function however did not improve (36.05 (±20.8) to 31.05 (±19.1)). Limitations of this study included the lack of double blinding and lack of assessing the long-term effects of these interventions to see if results are maintained. The authors discussed that participants' who were more inclined to drop-out appeared to have significantly higher levels of pain and disability, were more likely to be receiving compensation and were more likely to be male. It was suggested that results of this study may therefore be not applicable to patients who demonstrate high levels of pain and disability who are receiving compensation (Geisser, Wiggert et al. 2005).

Clinical Practice of Exercise Consultation

Defining Exercise

The terms *'physical activity'* and *'exercise'* are often used interchangeably however it is important to note that, especially for the purpose of this research, that they are not synonymous (American College of Sports Medicine 2010).

Physical Activity and Advice for General Health

Physical activity is defined by the American College of Sports Medicine (2010, p. 2) as "any bodily movement produced by the contraction of skeletal muscle that results in a substantial increase over resting energy expenditure." The term 'physical activity' is therefore very broad and can range from structured or unstructured recreational activities such as swimming, yoga and cycling; to activities of daily living which may include vacuuming, climbing stairs and gardening.

The American College of Sports Medicine and in NZ the Ministry of Health and the National Heart Foundation have provided guidelines for the recommended levels of physical activity to achieve the associated health-related benefits. These guidelines recommend that healthy adults under the age of 65 years should participate in 30 minutes of moderate intensity physical activity on most, if not all days of the week, or 20 minutes of vigorous activity, three days per week (Ministry of Health 2001; The National Heart Foundation 2009; American College of Sports Medicine 2010).

Moderate intensity activity is defined as an activity that causes a slight, yet noticeable increase in heart rate and respiration but does not restrict the ability to hold a conversation (Ministry of Health 2001; American College of Sports Medicine 2010).

In the clinical context, consultation about physical activity is characterised by *non-specific exercise advice* with the intention of promoting wellbeing and prevention of chronic diseases (Warburton, Nicol et al. 2006).

Exercise and Prescription for Specific Medical Conditions

Exercise is defined by the American College of Sports Medicine (2010, p. 2) as "planned, structured and repetitive bodily movements that improve or maintain one or more components of physical fitness." These components of physical fitness include cardiovascular endurance, muscle resistance, muscle endurance, flexibility or range of motion (ROM) and body composition (American College of Sports Medicine 2010).

Exercise could be considered to fall into two broad categories which include recreational exercise and therapeutic exercise. Therapeutic exercise is typically applied in a clinical context and can be defined as "the prescription of a physical activity programme that involves the client undertaking voluntary muscle contraction and/or body movement with the aim of relieving symptoms, improving function, or improving, retaining or slowing the deterioration of health" (Taylor, Dodd, Shields & Bruder, 2007, p. 7). Kerr (1999, p. 114) describes the purpose of therapeutic exercise as "preventing, limiting or reversing the effects of inactivity, injury or disease processes while returning individuals to a level of activity as close as possible to their former pre-injury/pre-pathology status".

The consultation of therapeutic exercise is characterised by specific exercise prescription or prescribed exercises. Prescribed exercises are defined by the presence of specific information on all four constituents of 'FITT' – the acronym commonly employed to describe frequency, intensity, type (mode) and time (duration) (American College of Sports Medicine 2010). Clinical consultation about exercise which falls short of this tight definition might be better termed as 'exercise advice'. The scope of therapeutic exercise is vast and may encompass the rehabilitation or management of

patients with a wide range of disorders (Speed 2009), for example neurological, cardiovascular, respiratory, neuromuscular and musculoskeletal disorders (Kerr 1999; Taylor, Dodd et al. 2007).

Types of Exercise

There are many types of exercise which address components of fitness that health practitioners may utilise in therapy, the most commonly applied categories include aerobic, strengthening, balance and flexibility exercises (American College of Sports Medicine 2010). Applied regularly, exercise as an intervention can be utilised to improve musculoskeletal fitness, which is necessary to maintain structure and function (Warburton, Nicol et al. 2006). Skeletal muscles like connective tissue (Mackey, Donnelly et al. 2005), adipose (Little, Safdar et al. 2011) and bone (Daly, Saxon et al. 2004) are modifiable tissues that will adapt in response to specific stimuli, to meet the functional and metabolic demands placed upon them (Ball and Herrington 1998). Depending on the stimulus (e.g. strength or resistance training), skeletal muscles can increase in size (hypertrophy), alter fiber-type composition (Type I: Slow-Oxidative or Type II: Fast subtypes), alter levels of enzymatic activity and modify muscle activation (Ball and Herrington 1998; Ross and Leveritt 2001; Bogdanis 2012). With improvements in musculoskeletal fitness, the potential for delaying or eliminating the onset of disability, dependence and chronic disease is immense (Warburton, Nicol et al. 2006). However these adaptations are not permanent and can reverse following periods of physical inactivity and disuse, resulting in skeletal muscles and other tissues to regress back into its former pre-training state (Ball and Herrington 1998; Daly, Saxon et al. 2004; Mackey, Donnelly et al. 2005; Little, Safdar et al. 2011).Exercise-induced skeletal muscle size in addition to the influence of independent factors has been found to result in a proportional adaptation of bone mass, size and strength (Daly, Saxon et al. 2004). In a clinical context these adaptations may benefit patient with osteoarthritis of the knee. A systematic review by Pelland et al. (2004) investigated the efficacy of strengthening exercises for patients with osteoarthritis. Twenty-one RCTs utilising various forms of strengthening exercises (e.g. isometric, isotonic, isokinetic, concentric, concentric/eccentric and dynamic) as an intervention to treat patients with OA were included in this review. The exercises were carried out in a clinical facility, at home, or

in a combination of both environments and were implemented either in stand-alone format or in addition to other forms of exercise such as stretching, ROM, general fitness and balance.

Three of the 21 trials included in this review that investigated different forms of strength training are discussed in more detail. Gur et al. (2002) compared the effects of concentric extension and flexion exercises of the knee, performed either independently or in combination, over a period of 8-weeks to a no treatment control group of patients with OA of the knee. Overall results showed strength exercises provided clinically important benefits to pain management ($p < 0.001$) with improvements of over 80% on measures of pain at night (from 4.4 to 1.5), at rest/seated (from 3.4 to 0.9), and on stair climbing (from 5.8 to 1.7) out of a 10-point NRS pain scale (0 = no pain, 10 = unbearable pain). The combination of eccentric and concentric strengthening exercises was also found to improve functional capacity ($p < 0.001$) compared to the control (Gür, Cakin et al. 2002). Shashika et al. (1996) compared the effects of low-resistance isometric training of the hip abductor muscles to combined isometric and eccentric strength training of hip abductor muscles and a no treatment control group. Results showed that at the end of the 6-week training period, both the isometric and the combined isometric/eccentric programmes did not produce any significant improvements in hip flexion range of motion (ROM) or maximum hip abductor torque outcome measures. However the combination of isometric/eccentric strengthening did produce clinically important improvements in strength by 35% ($p < 0.01$). Topp et al. (2002) compared isometric strengthening exercises performed over all three joints of the lower limb to dynamic exercises applied across a functional ROM and a no treatment control group. Participants were instructed to perform their leg strengthening exercises three times a week (once supervised, twice home-based) over four months. Pre-post mean ± SEM scores for both the isometric (from 11.75 ±0.57 to 10.38 ±0.56) and dynamic (from 12.40 ±0.54 to 10.71 ±0.53) groups showed decreases in knee pain while performing functional tasks by 28-58%. The isometric group had improvements in performing all four timed functional tasks including getting down to the floor (from 5.56 ±0.58 to 4.31 ±0.64),

getting up off the floor (from 8.26 ±1.24 to 6.37 ±1.06), ascending 27 stairs (from 17.99 ±1.42 to 15.15 ±1.24), descending 27 stairs (from 16.86 ±1.69 to 13.95 ±1.21); by 16-23%. The dynamic group improved time to descend (from 18.85 ±1.35 to 16.33 ±1.19) and ascend stairs (from 19.29 ±1.61 to 15.96 ±1.15) by 13-17% (Topp, Woolley et al. 2002).

Results suggest that there is evidence for the benefits of strengthening exercises for improving pain, ROM, strength and functional status in patients with OA of the knee, and to a lesser extent the hip and hand. However, no evidence favours the use of one type of strengthening programme over another (i.e. isometric, isotonic and isokinetic). Moderate evidence suggests that components of general exercise programmes may have a determinant effect on measured outcomes in OA. These include the combination of joint-specific strengthening with general strength, flexibility and functional exercises, progression of the exercise programme and level of patient compliance to continue the programme at home. This review was unable to define optimal parameters of repetitions, duration and intensity of exercises due to the lack of detail in the reporting of experimental procedures and methods by which each intervention was undertaken. Another limitation included the lack of assessor blinding, potentially affecting the validity of results (Pelland, Brosseau et al. 2004).

In contrast to studies exploring the effects of an individual specific type of therapeutic exercise, one RCT by Goren et al (2010) investigated the efficacy of a therapeutic exercise programme incorporating stretching, aerobic and strengthening exercises and the use of ultrasound in patients with lumbar spine stenosis. Patients (n = 45) presenting with neurological claudication and MRI-proven lumbar spine stenosis, were randomised into three even groups: ultrasound plus exercise (group 1), sham ultrasound plus exercise (group 2) and no exercise no treatment group (control group). In both groups exercise interventions consisted of stretching of the iliopsoas, hamstrings, quadriceps and lumbar paraspinal muscles; strengthening of the abdominal muscles using a posterior pelvic tilt exercise for 20 minutes; and low-intensity aerobic exercise through stationary cycling at 60% of age predicted maximal heart rate (50-60 cycles per minute) for 15 minutes. Five minutes of warm-up and cool-

down cycling exercises with minimal resistance was completed with each session of the exercise programme; the exercise programme was carried out five days per week over duration of three weeks. The main findings were that after a three week treatment period, leg pain decreased in group 1 from 5.80mm (±2.90) to 4.33mm (±2.99) and group 2 from 6.33mm (±3.33) to 3.86mm (±3.02) compared to the control group at ($p < 0.05$). Mean disability scores decreased in both groups 1 (from 25.46 ±7.70 to 21.50 ±9.30) and group 2 (from 26.90 ±10.19 to 19.10 ±8.00) compared to the control group ($p < 0.05$). There was no statistical significance found between groups 1 and 2 ($p < 0.05$). Additionally, the amount of analgesics taken was significantly lower in the exercise plus ultrasound group, than the control ($p < 0.05$). Results of this study support the conclusion that both exercise alone and in combination with ultrasound are equally effective for the treatment of lumbar spine stenosis in reducing leg pain, LBP, and disability. (Goren, Yildiz et al. 2010).

Literature indicates that there are benefits of utilising therapeutic exercise as an adjunct to other forms of conservative treatment. These benefits include reductions in pain, disability, amount of medication (e.g. analgesics and anti-inflammatories); improvements in function, ROM and quality of life (Bekkering, Hendriks et al. 2003; Pelland, Brosseau et al. 2004; Warburton, Nicol et al. 2006; Goren, Yildiz et al. 2010). A major limitation in many studies investigating the efficacy of therapeutic exercises amongst various populations, identified by numerous researchers (Geisser, Wiggert et al. 2005; Hayden, van Tulder et al. 2005; Moffett and Mannion 2005; Keller 2006; Mayer, Mooney et al. 2008) is the lack of detail describing the parameters (frequency, intensity, duration and type) of exercise interventions utilised, thereby making these results difficult to replicate in a clinical environment.

Mode of Delivery and Level of Supervision

Exercise interventions employed by healthcare practitioners as part of clinical consultation vary greatly in the mode of delivery, level of supervision and intensity of contact (Foley, Maddidon et al. 2011), and level of patient compliance and adherence (Dziedzic, Jordan et al. 2008). A patient's compliance and adherence with treatment is important because it can have an influence on the treatment outcome (Hayden, van

Tulder et al. 2005).

Adherence can be defined as the extent to which a person's behaviour, for instance taking medication, following a diet, and/or executing lifestyle changes, corresponds with the recommendations of a health care provider (World Health Organisation 2003). Adherence is commonly mistaken for compliance; compliance can be defined as the act of complying with a demand or proposal in order to fulfil a requirement (Milroy and O'Neil 2000).

There has been a substantial body of research that has sought to identify which methods used to communicate exercise interventions are most likely to improve patient compliance and adherence, and thereby improve the effectiveness of the intervention (Friedrich, Cermak et al. 1996; Schneiders, Zusman et al. 1998; Weeks, Brubaker et al. 2002; Schoo and Morris 2003; Reo and Mercer 2004; Dziedzic, Jordan et al. 2008; Foley, Maddidon et al. 2011).

Literature suggests that the prescription of exercise through verbal instructions alone without any motivational incentives, supervision or follow-up has been associated with lower levels of patient compliance and reduced efficacy in achieving clinical outcomes (Schneiders, Zusman et al. 1998; Howard and Gosling 2008). Schneiders et al. (1998) investigated the short-term compliance of patients with acute LBP to home-based exercises, using an educational strategy of written and illustrated reinforcements. Patients (n=96) were randomised into study or control groups, with the study group receiving verbal and written exercise instructions and the control group verbal instructions alone. Results showed that patients who received written and illustrated exercise instructions as reinforcement had substantially higher mean compliance (77%) than those who received verbal instructions alone (38%). These results indicate that the inclusion of additional written and illustrated exercise instructions is a simple and effective educational strategy which improves patient compliance. Research suggests that in a clinical situation, reasons for low compliance and efficacy may be that prescribed exercises often consists of a complex sequence of unaccustomed actions, behaviours and events that may be difficult to remember, especially when exercise programmes are intended to be home-based. Educational strategies such as written

instructions with illustrations may overcome low compliance/efficacy by increasing patient understanding and enhancing information recall resulting in better communication between the practitioner and patient (Ley 1988; Schneiders, Zusman et al. 1998).

In addition to verbal or visual methods, exercise can be communicated through technological aids such as videoed instructions or computer-aided information; however in the past the potential costs and availability of resources to support these methods may have proved difficult for practitioners working in private practice (Weeks, Brubaker et al. 2002).

A study by Weeks et al. (2002) found that participants who received written exercise instructions alone (n=10) exhibited poorer performance accuracy than those who received video-taped exercise demonstrations and instructions (n=10). Additionally the total numbers of exercises performed incorrectly were doubled for the written instruction group compared to the video group (Weeks, Brubaker et al. 2002). In a clinical context, incorrectly performed exercise may negatively influence the potential effectiveness of the exercise as an intervention; however the results of this study are limited by asymptomatic individuals and may not applicable to patients treated by practitioners in a clinical environment. Another study by Schoo et al. (2005) investigated the effectiveness of different modes of exercise instructions on compliance with an 8-week home-based exercise programme in patients with osteoarthritis. Participants (n = 115) were randomised to receive verbal exercise instructions in addition to: written instructions (group 1), written and audio instructions (group 2), written and video-taped instructions (group 3). Schoo et al. (2005) found that the majority of exercises (between 79% and 91%) were performed correctly and that there were no significant differences between each group for patient compliance; suggesting verbal instructions in addition to written exercise instructions are just as effective as audio or video-taped instructions in encouraging and maintaining the correct performance of exercises in older osteoarthritic patients.

Recently, advancements in technology and the internet have resulted to the developments of smart phones, i-pads and interactive social media thereby allowing

ease of accessibility to online resources. Online social networks such as Facebook™ are readily accessible, and could be used as a platform for delivering physical activity interventions and enhancing social support (Cavallo, Tate et al. 2012) which can have an impact on improving adherence and motivation (Foster, Linehan et al. 2010). Cavello et al. (2012) investigated the efficacy of a social media based physical activity intervention on asymptomatic female students (n = 134). Participants were randomised to receive access to either a physical activity focussed website (control, n = 67), or to the same website with physical activity self-monitoring and enrolment in a Facebook™ group (intervention, n = 67). Results showed that participants experienced significant increases in social support and physical activity over time, but no significant differences were found between both groups. Although, 66% of the intervention group indicated they would recommend this programme to friend. Participant satisfaction with the Facebook™ group suggests that the use of online social networks to deliver exercise interventions is a potentially feasible method amongst young adults. Limitations to this study included the use of self-reported physical activity and the narrow demographic of the study participants (all young females), limiting generalisability. The authors suggest that future studies should include additional objective measures and a larger more diverse sample (Cavallo, Tate et al. 2012).

The amount of feedback and levels of supervision can differ amongst practitioners who provide exercise interventions to their patients (Keller 2006). This may be because supervised exercises require more patient attendance and a greater commitment from practitioners; whereas non-supervised exercise requires a greater commitment from the patient. In the context of unsupervised home-based exercise programmes, supportive written, illustrated or video-taped educational reinforcements have been found to be beneficial in improving patient compliance (Schneiders, Zusman et al. 1998; Weeks, Brubaker et al. 2002; Reo and Mercer 2004).

Specific research in therapeutic exercise has found an association between the level of practitioner involvement, feedback and supervision with patient adherence (Hayden, van Tulder et al. 2005). Nicolai et al. (2009) investigated the effects of supervised exercises compared with non-supervised exercises for reducing weight in obese adults.

Participants were randomised into a supervised exercise group (n=17) or a control group (n=17). The control group received verbal advice to increase physical activity at their convenience, the supervised group received a two hour exercise session twice a week with a qualified fitness instructor. None of the groups received dietary advice and both had the same access to exercise facilities. Results suggest that after four months non-supervised exercise therapy seems to be considerably effective for reducing total body mass, with a mean ± SD reduction of 2.8 kg (±4.2), (from 104.6 to 101.8 kg, p =0.04). Supervised exercise therapy proved to be superior with a mean reduction in body mass of 8 kg (±6.2), (from 112.8 to 104.8 kg, p <0.001). It is appears that supervision improves motivation, which is supported by the fact that the supervised group maintained compliance and continued their programme after four months whereas all participants in the control group stopped at four months (Nicolaï, Kruidenier et al. 2009). All participants that volunteered to take part in this study were motivated to lose weight and were permitted to choose their own exercises or classes which may explain why the overall weight loss is higher in this study compared with other literature as suggested by the authors. These participants are also most likely to be more motivated than the average patient practitioners see in clinical practice with musculoskeletal injuries; therefore limiting generalisability of these results to the wider population (Friedrich, Cermak et al. 1996; Nicolaï, Kruidenier et al. 2009).

Barriers Associated with Exercise Consultation

Research in both physiotherapy (Schneiders, Zusman et al. 1998) and osteopathy (Howard and Gosling 2008) settings has identified various barriers that may influence the extent to which exercise interventions are utilised in clinical practice and their level of effectiveness. A common barrier that practitioners face in practice is the failure of patients to adhere to exercises that have been advised/prescribed, and this can limit the recovery and rehabilitation of injuries (Milroy and O'Neil 2000; Howard and Gosling 2008).

Knowledge that non-adherence to home-based exercise programmes reduces the likelihood of successful outcomes from therapeutic interventions, has led to the

further investigation of patient characteristics to identify those at risk of non-adherence (Milroy and O'Neil 2000; Wheller, Gosling et al. 2006).

A review of chiropractic literature found that adherence rates varied from “poor to average” with a range of 30-51% with further decreases in adherence as time progressed (Schneiders, Zusman et al. 1998; Milroy and O'Neil 2000). Howard et al (2008) found similar results from their survey developed to identify patient characteristics that influence compliance and adherence to prescribed exercises provided in an Australian osteopathic student clinic. Participants (n=200) included patients who routinely received treatment from the clinic, of whom 73% were prescribed exercise and 27% were not. Results from this study demonstrate an adherence rate of 52% which is comparable with previous chiropractic research (Milroy and O'Neil 2000). Findings also support the hypothesis that patients who have a positive attitude towards health behaviours, higher educational qualifications and more positive experiences in relation to health, sport and exercise are more likely to be adherent to rehabilitative exercises (Howard and Gosling 2008). However these results are limited as the data collection process relied on participant self-report therefore adherence rates may not accurately represent actual patient adherence. This study was also limited to one osteopathy tertiary teaching clinic in Australia and further research investigating patient adherence, attitudes and practices of exercise consultation within the wider osteopathic community is yet to be investigated.

Physiotherapists have also found the lack of patient compliance and adherence to exercise interventions to be an important problem in supporting the effectiveness of their treatment modalities. Middleton et al. (2004) reviewed literature investigating adherence with physiotherapy advice and exercise, perceived barriers and motivation in patients with chronic LBP. Findings demonstrate that lack of time is a commonly reported reason for patients to lack adherence, along with failure to recall the details of advice. Other factors found to influence adherence include patient’s attitudes and beliefs towards health behaviours, past history of exercise participation, motivation, stage of change, self-efficacy, locus of control, pain levels and psychosocial factors (Middleton 2004). Additionally, positive feedback, the presence of supervision,

collaborative goal setting between patient and practitioner, identification of personal barriers, patient-practitioner rapport and consideration of patient's underlying level of fitness have been identified to improve motivation, patient satisfaction, perceived ability and attitudes towards exercise interventions (Kerr 1999; Middleton 2004; Howard and Gosling 2008).

Similarly, another review of literature investigating adherence to chiropractic home-based prescribed exercises by Milroy et al. (2000) identified specific personal and environmental factors related to adherence. Personal factors include past programme participation in exercise, perceived levels of health and self-motivation; environmental factors include amount of spousal support, perceived availability of time and ease of access to facilities or equipment. Of these personal factors, self-motivation is a strong indicator of adherence as it can be greatly influenced by the environmental factors listed previously (Milroy and O'Neil 2000). This is especially relevant for patients that present with a negative attitude and low self-motivation to exercise, who are likely to require extra encouragement and support from practitioners in order to achieve clinical outcomes (Howard and Gosling 2008).

Although a large amount of research relating to therapeutic exercise is focussed on the patients, the extent to which exercise is utilised in clinical practice and its effectiveness can also be influenced by practitioner-related factors such as professional orientation, training and individual clinical experiences (Keller 2006). Attitudes, beliefs and communication skills of health care practitioners are also believed to influence the types of treatments that they provide and their effectiveness in achieving positive clinical outcomes (Houben, Gijsen et al. 2005; Moffett and Mannion 2005; Keller 2006).

Osteopathy and Exercise Consultation

To date, there is currently little research investigating therapeutic exercise within the field osteopathy. Five studies (Wheller, Gosling et al. 2006; Zamani, Vogel et al. 2007; Howard and Gosling 2008; Zamani, Vogel et al. 2008; Mckay-Watts 2010) have been identified of which one is an unpublished masters thesis (Mckay-Watts 2010).

Zamani et al. (2007) used content analysis of curriculum documents to assess the level of exercise training provided in the undergraduate curriculum of seven osteopathic institutions in the United Kingdom (UK). Findings of this study identified that exercise is taught to some extent within undergraduate osteopathic education however the content and nature is variable and driven by the individual institution providing the curricular. Exercise in relation to the physiology of movement and the muscular system was evident in all curricular. Some theoretical exercise in relation to sports and treating associated injuries was apparent; however exercise in the context of promoting general health was not specifically outlined (with the exception of one institution). The majority of institutions advocated stretching as a therapeutic modality, and to a lesser extent strengthening, range of motion, general advice and aerobic conditioning. Not all institutions addressed the use of exercise consultation within osteopathic practice, and it was suggested by the authors that curricula may potentially reflect the views and interest of the academics or clinicians developing the course. Additionally, little guidance or regulation is provided by the UK general osteopathic council in relation to exercise and other peripheral aspects of osteopathy, which is also the case in NZ. Some of these findings may also be comparable to the osteopathic curricula provided in NZ, but this speculation is difficult to prove due to lack of evidence from literature and differences in the way curricular is laid out between both the UK and NZ. For instance the UK osteopathic course consists of 4 years undergraduate, where as the NZ osteopathic curricular is broken down into 3 years undergraduate and 2 years postgraduate. A limiting factor of this study is that no supportive subjective or objective information was gathered from the students of these institutions (Zamani, Vogel et al. 2007). Therefore it was not possible to determine if osteopathic students feel they are being adequately prepared to work within a dynamic healthcare system. Further research to determine if osteopathic education actually reflects current practices and attitudes of UK osteopaths is also necessary.

Although exercise does appear as a therapeutic modality to some extent within the undergraduate curriculum in UK osteopathy educational institutions (Zamani, Vogel et

al. 2007), only a small amount of evidence suggests that osteopaths actually utilise exercise interventions in clinical practice. Two Australian studies conducted in a university osteopathy teaching clinic have been undertaken to investigate aspects of therapeutic exercise use. One study investigated patient compliance to exercise prescription (Wheller, Gosling et al. 2006) and the other investigated patient characteristics associated with higher levels of compliance with prescribed rehabilitative exercises (Howard and Gosling 2008). Both studies provide evidence of osteopathic student clinicians providing exercise-based interventions despite the fact that their primary therapeutic approach is not the provision of exercise. However caution should be taken when interpreting findings as these results are limited to an osteopathic clinical teaching environment and may not reflect actual practices of Australian osteopathic practitioners (Wheller, Gosling et al. 2006; Howard and Gosling 2008). Of the 94 patient participants included in the study conducted by Wheller et al. (2006), 77% were prescribed home-based exercise by osteopathic students (Wheller, Gosling et al. 2006). Howard et al. (2008) included 200 participants of whom a similar proportion (73%) received rehabilitative home-based exercises provided by student osteopaths (Howard and Gosling 2008). The types of exercise prescribed in both these studies are not documented as they were left to the discretion of the student osteopaths and their supervisors. Two methods were used in the study by Wheller et al. (2008) to communicate exercise including verbal instructions (80%) and illustrations (15%). Illustrations achieved a higher compliance than verbal instructions with a rate of 61% when compared to 56% achieved through verbal instructions (Wheller, Gosling et al. 2006). Results demonstrate that around three quarters of patients may receive exercise consultation from students working in an Australian osteopathic teaching clinic (Wheller, Gosling et al. 2006; Howard and Gosling 2008).

In the UK, Zamani et al. (2008) interviewed 15 osteopaths about their use of therapeutic exercise in osteopathic practice. In contrast to the Australian results from teaching institutions, this study found evidence that the practice of exercise consultation is not consistently used within osteopathy. Osteopaths who reported providing exercise consultation were more comfortable giving general advice than

specific prescriptions. Exercise taught within undergraduate osteopathic education did not appear to be consistent with actual clinical practices (Zamani, Vogel et al. 2007). For instance, many practitioners reported providing 'core stability' exercise, which is found more commonly in manual therapy (Bjerkefors, Ekblom et al. 2010). The authors conclude that apparently low levels of exercise consultation utilisation may be linked to low-levels of exercise training in osteopathic education, associating therapeutic exercise as a speciality of other manual therapy disciplines such as physiotherapy. Also, that continued professional development (CPD) courses are commonly provided by experts from various disciplines which may also explain why undergraduate education of osteopaths may not reflect actual practices. Although this study provides evidence of minimal exercise utilisation within UK osteopathic practices, findings must be interpreted carefully until these preliminary findings have been investigated amongst a larger sample of practising UK osteopaths (Zamani, Vogel et al. 2008).

Following on from these studies Mckay-Watts (2010) conducted a preliminary study to investigate the attitudes of NZ osteopaths regarding the use of exercise within osteopathy. The study was broken down in to two parts: Part one of the study used qualitative methodology through an interpretive descriptive design in order to identify and develop themes that would form the basis of preliminary questionnaire items. The data from each draft themes identified was generated by face-to-face interviews of five NZ osteopaths and one final year Unitec Master of Osteopathy student. Part two of the study utilised quantitative survey research methods to translate the identified theme clusters (from the first part) into items that would make up a structured preliminary questionnaire. These items were grouped into three sections that made up the preliminary questionnaire: Demographics, Physical Exercise and Therapeutic Exercise. Five-point Likert-scales were used to measure the extent of agreement to each item. Once a draft preliminary questionnaire was complete, it was uploaded onto an online survey tool for pilot testing. Pilot testing involved two rounds, the first focussed on assessing face validity and usability, the second for the purposes of content analysis through expert review. Participants involved in the pilot testing included 2nd year Master of Osteopathy students, NZ osteopaths and experts in the

fields of exercise (academic) and osteopathy (clinical). Following the results obtained from pilot testing, items were once again reviewed with the aim of improving face validity and a final preliminary questionnaire was developed (Mckay-Watts 2010).

The primary focus of the Mckay-Watts (2010) study was to develop a preliminary questionnaire that would be ready for use. A limitation of this study is that items of the preliminary questionnaire are restricted to only attitudes and do not include investigate self-reported practices. For data collection purposes following on from this study, the addition of self-reported practice items to the attitudes questionnaire is relevant as the practices of exercise consultation amongst NZ osteopaths is currently unknown and requires further research. Future research investigating both attitudes and practices of NZ osteopaths to exercise consultation will facilitate a complete understanding of the role that exercise consultation has within NZ osteopathic practice.

Conclusion

Research shows that there are many health benefits when exercise is applied in a clinical context. Prescribed exercises reduce pain, improve function and assist in the rehabilitation of specific medical conditions. Whereas more general exercise advice is associated with reducing morbidity, mortality and risks associated with specific chronic diseases, thereby improving general health and wellbeing. The Ministry of Health has identified that primary health providers play an important role in promoting health and supporting people with chronic conditions to remain physically active. OCNZ defines osteopaths as primary health practitioners who whilst respecting the uniqueness of each patient, “should seek to apply evidence-based approaches to practice as appropriate to the patient’s needs” (Osteopathic Council New Zealand 2013). Osteopaths are in a position to potentially incorporate exercise into the treatment and management of their patients, and according to preliminary research and anecdotal evidence some may be already doing this, although the extent of exercise use within NZ osteopathic practice and practitioner attitudes to exercise are not known. Three studies of osteopathic practice provide limited evidence identifying actual practices of exercise consultation in the UK (Zamani, Vogel et al. 2008) and in an

osteopathic student clinic in Australia (Wheller, Gosling et al. 2006; Howard and Gosling 2008). However not all osteopaths may hold the view that consulting exercise is part of their role, and currently there is no research identifying exercise consultation use or attitudes amongst osteopaths in NZ. For this reason a study investigating the attitudes and practices of NZ osteopaths to exercise consultation is relevant.

References

Accident Compensation Corporation. (2004). "New Zealand acute lower back pain guide." Retrieved 9th July, 2012, from http://www.acc.co.nz/searchresults/index.htm?ssUserText=lower+back+pain.

American College of Sports Medicine (2010). ACSM's Guidelines for exercise testing and prescription, Philadelphia : Wolters Kluwer Health/Lippincott Williams & Wilkins. .

Ball, D. and L. Herrington (1998). "Training and overload: adaptation and failure in the musculoskeletal system." J Bodyw Movement Ther **2**(3): 161-67.

Bekkering, G. E., H. J. M. Hendriks, et al. (2003). "Dutch Physiotherapy Guidelines for Low Back Pain." Physiotherapy **89**(2): 82-96.

Bjerkefors, A., M. M. Ekblom, et al. (2010). "Deep and superficial abdominal muscle activation during trunk stabilization exercises with and without instruction to hollow." Man Ther **15**(5): 502-7.

Bogdanis, G. C. (2012). "Effects of physical activity and inactivity on muscle fatigue." Front Physiol **3**:142.

Bronfort, G., R. Evans, et al. (2012). "Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain: a randomized trial." Ann Intern Med **156**(1 Pt 1): 1-10.

Bronfort, G., R. Evans, et al. (2001). "A randomized clinical trial of exercise and spinal manipulation for patients with chronic neck pain." Spine **26**(7): 788-97.

Bronfort, G., M. J. Maiers, et al. (2011). "Supervised exercise, spinal manipulation, and home exercise for chronic low back pain: a randomized clinical trial." Spine J **11**(7): 585-98.

Cavallo, D. N., D. F. Tate, et al. (2012). "A Social Media–Based Physical Activity Intervention: A Randomized Controlled Trial." Am J Prev Med **43**(5): 527-32.

D'Sylva, J., J. Miller, et al. (2010). "Manual therapy with or without physical medicine modalities for neck pain: a systematic review." Man Ther **15**(5): 415-33.

Daly, R. M., L. Saxon, et al. (2004). "The relationship between muscle size and bone geometry during growth and in response to exercise." Bone **34**(2): 281-87.

Dziedzic, K., J. L. Jordan, et al. (2008). "Land- and water-based exercise therapies for musculoskeletal conditions." Best Pract Res Clin Rheumatol **22**(3): 407-18.

Eek, C., W. E. Fordyce, et al. (1992). The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioral approach. Physical Therapy. **72:** 279.

Foley, L., R. Maddidon, et al. (2011). "Comparison of two modes of delivery of an exercise prescription scheme. N Z Med J **124**(1338): 44-54.

Foster, D., C. Linehan, et al. (2010). "Motivating physical activity at work: using persuasive social media extensions for simple mobile devices."*University of Lincoln*.

Friedrich, M., T. Cermak, et al. (1996). "The effect of brochure use versus therapist teaching on patients performing therapeutic exercise and on changes in impairment status." Physical Therapy **76**(10): 1082-88.

Furlan, A. D., V. Pennick, et al. (2009). "2009 updated method guidelines for systematic reviews in the Cochrane Back Review Group." Spine **34**(18): 1929-41.

Geisser, M. E., E. A. Wiggert, et al. (2005). "A randomized, controlled trial of manual therapy and specific adjuvant exercise for chronic low back pain." Clin J Pain **21**(6): 463-70.

Goldberg, L. and D. L. Elliot (1994). Exercise for prevention and treatment of illness, F. A. Davis Company.

Goren, A., N. Yildiz, et al. (2010). "Efficacy of exercise and ultrasound in patients with lumbar spinal stenosis: a prospective randomized controlled trial." Clin Rehabil **24**(7): 623-31.

Gross, A., J. Miller, et al. (2010). "Manipulation or mobilisation for neck pain: A Cochrane Review." Man Ther **15**(4): 315-33.
Gür, H., N. Cakin, et al. (2002). "Concentric versus combined concentric-eccentric isokinetic training: effects on functional capacity and symptoms in patients with osteoarthritis of the knee." Arch Phys Med Rehabil **83**(3): 308-16.
Häkkinen, A., H. Kautiainen, et al. (2008). "Strength training and stretching versus stretching only in the treatment of patients with chronic neck pain: a randomized one-year follow-up study." Clin Rehabil **22**(7): 592-600.
Hanratty, C. E., J. G. McVeigh, et al. (2012). "The Effectiveness of Physiotherapy Exercises in Subacromial Impingement Syndrome: A Systematic Review and Meta-Analysis." Semin Arthritis Rheum **42**(3): 297-316.
Hayden, J. A., M. W. van Tulder, et al. (2005). "Meta-analysis: exercise therapy for nonspecific low back pain." Ann Int Med **142**(9): 765-75.
Hayden, J. A., M. W. van Tulder, et al. (2005). "Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain." Ann Int Med **142**(9): 776-85.
Houben, R. M. A., A. Gijsen, et al. (2005). "Do health care providers' attitudes towards back pain predict their treatment recommendations? Differential predictive validity of implicit and explicit attitude measures." Pain **114**(3): 491-98.
Howard, D. B. and C. M. Gosling (2008). "A short questionnaire to identify patient characteristics indicating improved compliance to exercise rehabilitation programs: A pilot investigation." Int J OsteopathMed **11**(1): 7-15.
Hróbjartsson, A., A. S. S. Thomsen, et al. (2012). "Observer bias in randomised clinical trials with binary outcomes: systematic review of trials with both blinded and non-blinded outcome assessors." BMJ **344**.
Indahl, A., L. Velund, et al. (1995). "Good prognosis for low back pain when left untampered: a randomized clinical trial." Spine **20**(4): 473-77.
Jull, G. A., D. Falla, et al. (2009). "The effect of therapeutic exercise on activation of the deep cervical flexor muscles in people with chronic neck pain." Man Ther **14**(6): 696-701.
Keller, K. (2006). "Exercise therapy for low back pain: a narrative review of the literature." J Chiroprac Med **5**(1): 38-42.
Kerr, K. (1999). "Exercise - no easy option." Physiotherapy **85**(3): 114.
Lewis, A., M. E. Morris, et al. (2008). "Are physiotherapy exercises effective in reducing chronic low back pain?" Phys Ther Rev **13**(1): 37-44.
Ley, P. (1988). Communicating with patients: improving communication, satisfaction and compliance. New York, Croome Helm.
Lindstrom, I., C. Ohlund, et al. (1992). "The effect of graded activity on patients with subacute low back pain: a randomized prospective clinical study with an operant-conditioning behavioral approach... including commentary by Nelson RM with author response." Physical Therapy **72**(4): 279-93.
Linton, S. J., A. L. Hellsing, et al. (1993). "A controlled study of the effects of an early intervention on acute musculoskeletal pain problems." Pain **54**(3): 353-59.
Little, J. P., A. Safdar, et al. (2011). "Skeletal muscle and beyond: the role of exercise as a mediator of systemic mitochondrial biogenesis." Appl Physiol Nutr Metab **36**(5): 598-607.
Mackey, A. L., A. E. Donnelly, et al. (2005). "Muscle connective tissue content of endurance-trained and inactive individuals." Scand J Med Sci Sports **15**(6): 402-8.
Malmivaara, A., U. Hakkinen, et al. (1995). "The treatment of acute low back pain -- bed rest, exercises, or ordinary activity?" N Engl J Med **332**(6): 351-55.
Mayer, J., V. Mooney, et al. (2008). "Evidence-informed management of chronic low back pain with lumbar extensor strengthening exercises " Spine J **8**(1): 96-113.

Mckay-Watts, R. (2010). "Development of a preliminary questionnaire to investigate the attitudes of NZ osteopaths regarding the use of exercise in osteopathy." Unpublished Masters thesis. Unitec.
Middleton, A. (2004). "Chronic low back pain: patient compliance with physiotherapy advice and exercise, perceived barriers and motivation." Phys Ther Rev **9**(3): 153-160.
Miller, J., A. Gross, et al. (2010). "Manual therapy and exercise for neck pain: A systematic review." Man Ther **15**(4): 334-54.
Milroy, P. and G. O'Neil (2000). "Factors affecting compliance to chiropractic prescribed home exercise: a review of the literature." J Can Chiropr Association **44**(3): 141-48.
Ministry of Health. (2001, July 27 2010). "New Zealand physical activity guidlines." Retrieved September 11, 2010, from http://www.moh.govt.nz/moh.nsf/indexmh/activity-guidelines.
Ministry of Health. (2003). "Physical activity DHB toolkit." Retrieved September 11 2010.
Ministry of Health. (2008). "Healthy Eating – Healthy Action Oranga Kai – Oranga Pumau: Progress on Implementing the HEHA Strategy 2008." Retrieved February 20th, 2013, from http://www.health.govt.nz/publication/healthy-eating-healthy-action-oranga-kai-oranga-pumau-progress-implementing-heha-strategy-2008.
Ministry of Health. (2012). "Health expenditure trends in New Zealand 2000-2010." Retrieved September 24th, 2012, from http://www.health.govt.nz/publication/health-expenditure-trends-new-zealand-2000-2010.
Moffett, J. K. and A. F. Mannion (2005). "What is the value of physical therapies for back pain?" Best Best Pract Res Clin Rheumatol **19**(4): 623-38.
Nicolaï, S. P. A., L. M. Kruidenier, et al. (2009). "Supervised exercise versus non-supervised exercise for reducing weight in obese adults." J Sports Med Phys Fitness **49**(1): 85-90.
Osteopathic Council New Zealand. (2009). "New Zealand Gazette." Retrieved August 15 2010, from http://www.osteopathiccouncil.org.nz/images/stories/pdf/Gazette-Notice-Issue140_7880-September-2009.pdf.
Osteopathic Council New Zealand. (2013). "Osteopathic Scope of Practice Schema and Related Qualifications Prescribed by the Osteopathic Council." from http://www.osteopathiccouncil.org.nz/scopes-of-practice.
Pelland, L., L. Brosseau, et al. (2004). "Efficacy of strengthening exercises for osteoarthritis (Part I): A meta-analysis." Phys Ther Rev **9**(2): 77-108.
Penney, J. N. (2009). "A comparison of Australian and European evidence-based guidelines for intervention in acute, non-specific low back pain." I J Osteopath Med **12**(2): 63-8.
Reo, J. A. and V. S. Mercer (2004). "Effects of Live, Videotaped, or Written Instruction on Learning an Upper-Extremity Exercise Program." Phys Ther **84**(7): 622-33.
Ross, A. and M. Leveritt (2001). "Long-term metabolic and skeletal muscle adaptations to short-sprint training: implications for sprint training and tapering. / Adaptations a long-terme du metabolisme et du muscle squelettique a un entrainement de sprint court: consequences pour l ' entrainement du sprint et pour la phase d ' affutage." Sports Med **31**(15): 1063-82.
Schneiders, A. G., M. Zusman, et al. (1998). "Exercise therapy compliance in acute low back pain patients." ManTher **3**(3): 147-152.
Schoo, A. and M. E. Morris (2003). "The effects of mode of exercise instruction on correctness of home exercise performance and adherence." Physiotherapy Singapore **6**(2): 36-43.
Sihawong, R., P. Janwantanakul, et al. (2011). "Exercise Therapy for Office Workers With Nonspecific Neck Pain: A Systematic Review." J Manipulative and Physiol Ther **34**(1): 62-71.
Speed, C. (2009). "What is sport and exercise medicine?" Br J Hosp Med (London, England: 2005) **70**(11): 620-23.

Sport and Recreation New Zealand. (2005). "Guidelines for promoting physical activity to adults." Retrieved July 22nd, 2012, from http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions/green-prescription-resources-health-professionals.

Staal, J. B., H. Hlobil, et al. (2004). "Graded activity for low back pain in occupational health care: a randomized, controlled trial." Ann Int Med **140**(2): 77.

Taylor, J. (2010). "The Role of Complementary Alternative Medicine in Physical Activity and Sport." WellSpring **21**(3): A1-A4.

Taylor, N. F., K. J. Dodd, et al. (2007). "Therapeutic exercise in physiotherapy practice is beneficial: a summary of systematic reviews 2002-2005." Aust J Physiother **53**(1): 7-16.

The National Heart Foundation. (2009). "Physical Activity." Retrieved July 23rd, 2012, from http://www.heartfoundation.org.nz/uploads/A5%20Physical%20Activity%2008%2006%281%29.pdf.

Topp, R., S. Woolley, et al. (2002). "The effect of dynamic versus isometric resistance training on pain and functioning among adults with osteoarthritis of the knee." Arch Phys Med Rehabil **83**(9): 1187-95.

Tuncer, A. B., N. Ergun, et al. (2012). "Effectiveness of manual therapy and home physical therapy in patients with temporomandibular disorders: A randomized controlled trial." J Bodyw Mov Ther(0).

van Middelkoop, M., S. M. Rubinstein, et al. (2010). "Exercise therapy for chronic nonspecific low-back pain." Best Pract Res Clin Rheumatol **24**(2): 193-204.

Warburton, D. E. R., C. W. Nicol, et al. (2006). "Health benefits of physical activity: the evidence." CMAJ: Canadian Medical Association Journal = Journal De L'association Medicale Canadienne **174**(6): 801-9.

Weeks, D. L., J. Brubaker, et al. (2002). "Videotape instruction versus illustrations for influencing quality of performance, motivation, and confidence to perform simple and complex exercises in healthy subjects." Physio Theory Pract **18**(2): 65-73.

Wheller, R., C. Gosling, et al. (2006). "ICAOR 2006: patient compliance to exercise prescription at the Victoria University Osteopathic Medicine Clinic." I J Osteopath Med **9**(1): 29.

World Health Organisation (2003). Adherence to Long Term Therapies - Evidence for Action. Geneva, Switzerland, World Health Organisation.

World Health Organisation. (2010). "Global recommendations on physical activity for health." Retrieved July 22, 2012, from http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf.

Zamani, J., S. Vogel, et al. (2007). "Analysis of exercise content in undergraduate osteopathic education - A content analysis of UK curricula." I J Osteopath Med **10**(4): 97-103.

Zamani, J., S. Vogel, et al. (2008). "Exploring the use of exercise therapy in UK osteopathic practice." I J Osteopath Med**11**(4): 164.

Section 2: Manuscript

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The Attitudes and Self-reported Practices of New Zealand Osteopaths to Exercise Consultation and its use within Osteopathy

The Attitudes and Self-reported Practices of New Zealand Osteopaths to Exercise Consultation and its use within Osteopathy

Author:	Ritisha Mistry
Affiliation:	Department of Osteopathy Unitec New Zealand Private Bag 92025 Auckland New Zealand
Contact: Email:	m_ritisha@windowslive.com Tel: +64 21 2390 617

ABSTRACT

Background: Exercise-based interventions are commonly utilised within many healthcare modalities, although their role in New Zealand osteopathy is unclear.

Objectives: Investigate osteopaths' attitudes and practices of exercise consultation, in the context of general health (GH) and specific medical conditions (SMC); identify factors associated with these practices and attitudes.

Methods: Descriptive survey design. New Zealand osteopaths with a current annual practicing certificate were sent an online or printed questionnaire.

Results: Response rate was 38% (n=125/332). Degree of positive attitude towards advice for general health (GH) =75±9%; and prescription for specific medical conditions (SMC) =73±6% were similar. The most commonly reported exercise consultation provided was advice for SMC (75±24%), followed by advice for GH (63±30%), prescription for SMC (63±30%) and GH (52±32%). Associations with each of these practices were analysed by ANOVA, and were associated with positive attitudes towards exercise consultation ($p<0.05$ for all). Training institution was associated with attitudes towards exercise prescription ($p=0.03$). Increased personal exercise duration was weakly predictive of positive attitudes towards exercise advice ($r^2= 0.04$ for regression model) and associated with practice of advice for GH ($p=0.01$). Level of academic qualification was associated with practice of advice for SMC ($p<0.001$). Practice style was associated with practice of prescription for SMC ($p=0.03$). Common forms of exercise delivery by osteopaths included verbal instructions (87%) and physical demonstration of exercises by the practitioner (73%) or by the patient (62%).

Conclusions: These data suggest most NZ osteopaths have a positive attitude towards exercise consultation and incorporate exercise within clinical practice through various methods.

Keywords: *Exercise, Attitudes, Practice, Survey, Questionnaire, New Zealand, Osteopathy*

INTRODUCTION

Physical activity has become an important tool in reducing the prevalence and burden of many chronic diseases.[1] Many epidemiological studies provide direct support for recommendations that resistance training and flexibility exercises performed regularly maintain functional capacity, promote lifelong physical activity and enhance overall quality of life.[2] As a result, a range of public health initiatives have been developed to promote and encourage physical activity and exercise.[1, 3, 4]

In the context of general health and wellbeing, 30-minutes of moderate intensity physical activity performed regularly has been identified to reduce the risks of cardiovascular diseases, stroke, adult onset asthma, non-insulin dependent diabetes mellitus, osteoarthritis, osteoporosis, depression and other specific non-communicable diseases.[1, 2, 5, 6] In the context of specific medical conditions such as lower back pain (LBP), exercise based interventions when applied in conjunction with manual therapy have been found to be effective in decreasing pain and improving function in those with chronic pain.[4, 7]

Exercise based interventions have been investigated within various manual therapy disciplines, however, little data exists in relation to the use of exercise based interventions within osteopathic clinical practice.[8] Zamani et al interviewed UK osteopaths (n=15) about the use of therapeutic exercise in osteopathic practice and suggest that practitioners appear more comfortable providing general advice about physical activity rather than specific therapeutic exercises.[8] Zamani et al.[8] reason that this may be a result of low-levels of therapeutic exercise training during osteopathic

education, or that osteopaths conceptualise therapeutic exercises as a speciality associated with other disciplines of manual therapy such as physiotherapy. However with a limited number of participants it is not possible to generalise these findings and wider survey of osteopaths is required.

Factors that have been identified to influence the extent to which exercise is utilised in clinical practice are discipline of practice, educational and clinical training and individual clinical experiences.[9] Attitudes, beliefs and communication skills of health care practitioners are also believed to strongly influence the types of treatments that they provide and their effectiveness in achieving positive clinical outcomes.[9-11]

Until now, the role of therapeutic exercise within osteopathy and its potential for use within osteopathic clinical practice has not been thoroughly investigated, despite the development of a preliminary questionnaire in 2010. There were two aims of this study: 1) To survey New Zealand osteopaths to investigate the attitude towards exercise consultation in the context of both general health and specific medical conditions; and 2) To determine the proportion of osteopaths that practice exercise consultation for general health and specific medical conditions and identify variables which influence these attitudes and practices.

METHODS

Participants

The population included all NZ resident osteopaths currently registered under the HPCA Act (2003)[12] who held a current annual practising certificate as of April 2011. A list of all NZ osteopaths, as of 16th April, 2011, was identified using the online public register from the OCNZ website. The register included details of each osteopaths most recent work address, whether they held a current Annual Practicing Certificate, and if they were actively practicing. This information enabled the researcher to identify and exclude any osteopaths who were listed as not currently practicing and allowed an accurate estimation of the total size of the target population. Email addresses of eligible osteopaths were obtained from public databases, websites and online directories.

Data Collection

The research survey was approved by the Unitec Research Ethics Committee (2010-1139) and recruitment and data collection was undertaken between 14/03/2012 and 28/04/2012. Eligible osteopaths with valid email addresses were offered the option of completing the questionnaire online or in print. Those choosing online completion, received a personalised invitation summarising information about the study which contained a hyperlink to an online consent form and questionnaire [Appendix B – E] using a commercially available online service (http://www.surveymonkey.com) Remaining eligible osteopaths were sent an invitation, consent forms, and a printed copy of the questionnaire with a pre-addressed return envelope to a postage paid address.

Each eligible osteopath was allocated an identification number before data collection commenced in order to track responses while maintaining anonymity, and to help ensure each osteopath completed the survey only once.

Osteopaths were given the option of identifying themselves for the purposes of clarifying any responses and/or for entry into a prize draw. A reminder was sent four weeks (via email and mail) and six weeks (via email only) following the initial invitation to osteopaths who had not yet responded or who had responded anonymously.

Questionnaire Design and Testing

The final structure of the questionnaire consisted of three sections: Demographics (including actual practice and methods of exercise consultation); Attitudes towards Exercise Advice Consultation (for general health and wellbeing); Attitudes towards Exercise Prescription (for prevention of specific medical condition). The two latter sections were adapted from the Physical Exercise and Specific Therapeutic Exercise sections of a preliminary survey developed in 2010 [13] (Appendix F). One item (Q40) from the original survey was deleted from the 'Attitudes towards Exercise Prescription' section as it did not address any research questions and therefore was not required.

For the present study, the demographic section of the preliminary questionnaire was adapted to include additional independent variables such as: smoking status, whether a practitioner practises exercise consultation, what methods of exercise consultation are being utilised; and questions about frequency of osteopathic technique use to assist in identifying 'practice style'.[14]

Questions regarding the current practice of exercise consultation, methods of exercise consultation utilised and osteopathic practice style; were measured using a 5-point scale. The 5-points of the scale included the ranges: 'Most of my patients', '75%', '50%', '25%' and 'None, or Hardly any', to measure the extent of exercise that was consulted, and which osteopathic techniques were utilised by participants. A simple 'yes' or 'no' tick box was used to record the smoking questions with a space to provide the number of cigarettes smoked per week.

Terms originally used in the preliminary survey were also replaced to be consistent with the terms and definitions of exercise chosen specifically for this study. For example 'physical exercise' and 'specific therapeutic exercise' were replaced with 'exercise advice' and 'exercise prescription' throughout the questionnaire to improve clarity.

A draft of the questionnaire was constructed and piloted online amongst a convenience sample of osteopaths for general feedback before being finalised and distributed to all NZ registered osteopaths (See Appendix E).

Data Analysis

All data obtained from printed questionnaires were manually tabulated and online responses were exported to spreadsheets. Analysis was undertaken using SPSS v18.0 (SPSS Inc., Chicago, IL) statistical software.

Two attitude scores were calculated from the different items within the final two sections of the questionnaire, reflecting those towards 'advice for general health' and those towards 'prescription for specific medical conditions'. Each item was scored

according to the Likert-scale (1='Strongly Disagree' to '5= Strongly Agree'). The valence of each item was determined to be 'positive' if it supported exercise consultation or 'negative' if it did not. So that all scores reflected positive attitudes towards exercise consultation, the scoring of the scale was reversed for questions defined as negative (Q5, Q7 and Q16 for exercise advice and Q1-4, Q8, Q10-13, Q26, Q28-31, Q34-35 for exercise prescription). Attitude scores for all items in each section (advice n=18, prescription n=40) were summed and expressed as a percentage of the total number of items.

In addition to attitudes, four practice scores were analysed for each type of exercise consultation practiced, consisting of exercise advice and prescription in the context of both specific medical conditions and general health. Practice was determined by asking practitioners to estimate the proportion of patients in the last 12-months to whom these interventions were applied. Options provided were: 'None or hardly any of my patients', 'About 25% of my patients', 'About 50% of my patients' 'About 75% of my patients' and 'All or most of my patients'.

Practice style groups were based on unpublished research conducted by Wittwer Blaser[14] who, using principle-components analysis, identified two main styles of practice amongst NZ osteopaths; 'practice style 1' (structural) and 'practice style 2' (non-structural). The frequency scores for six osteopathic techniques; operationally defined as 'practice style 1' (high-velocity low-amplitude manipulation, muscle energy technique, articulation) and three operationally defined as 'practice style 2' (visceral technique, osteopathy in the cranial field, balance-ligamentous tension) were summed to create two variable scores out of 15. Structural practice scores were scored out of

+15, and non-structural practice scores scored out of -15. Practice style was re-defined to create a single variable defined as 'structural practice score' minus 'non-structural practice score' and named 'preferred practice score' in all subsequent use.

Associations between attitudes towards, and practices of, exercise consultation were analysed using one-way analysis of variance (ANOVA) and post-hoc LSD tests. Associations between independent variables and attitudes and practices were identified using backward stepwise regression [15] and ANOVA models. Level of significance was set at $p < 0.05$ throughout, including for entry and removal from regression models. Data are expressed as (mean ± SD) for descriptive data or as (mean; [95% CIs]) unless otherwise stated. Effect sizes of univariate correlations and group differences were also reported using descriptors of scale of magnitude suggested by Hopkins. [16]

RESULTS

Survey Response

From the 332 NZ registered osteopaths, contact details were invalid for 17 (5%) (n = 9 email, n = 8 postal). Of the remaining 315, a total of 130 (41%) osteopaths responded. Data from a further five questionnaires were removed from analysis because of the extent of omitted responses, caused by technical errors with the online survey. This resulted in a total of 125 valid returns and an overall response of 38% of all eligible NZ osteopaths. A total of 81 respondents completed the survey online, from 217 who were emailed this link (37%) and 44 of 115 respondents who were posted paper questionnaires (38%) returned these by mail.

Respondent Characteristics

The representation of gender amongst the 125 respondents was not evenly balanced with 43% female (n = 54) and 57% male (n = 71), which is less representative of the population of NZ osteopaths (48% female, n = 158 and 52% male, n = 174). Respondents gained their osteopathic qualification from a variety of institutions predominantly located in Europe and Australasia (see Table 1).

The highest qualification for 95% (n = 119) of respondents was the osteopathy qualification awarded by their institution (see Table 2), however 5%, (n = 6) of respondents had been awarded a higher qualification in another field: including 2% (n = 2) of respondents who held a doctoral degree in an unspecified field.

One third of respondents (n = 40 of 122 valid responses) reported having a tertiary or postgraduate qualification in therapeutic exercise which ranged from certificates (n =

12) (in exercise therapy, sports massage, fitness management, personal training, rehabilitation pilates); to diplomas (n = 7) (in fitness training, sports therapy, sports, personal training, sports science) and undergraduate degrees (n = 11) (in exercise physiology, exercise prescription, physical education, physical therapy, sport and recreation, occupation therapy and sports science). Respondents also reported other exercise training which included being a qualified instructor of Pilates (n = 3), Yoga (n = 4) or Tai Chi (n = 1), (see Table 1).

When investigating which age groups were typically treated by osteopaths, all 125 surveyed osteopaths reported treating adults aged 21 – 65 years. Over half of the osteopaths stated that they treat infants under 3 months (54%) and/or infants aged 4 months to 2 years (51%). Approximately 66% (n) of osteopaths reported treating children aged 3 to 13 years, 79% treat adolescents aged 14 to 20 years and 77% treat adults over 66 years (see Table 2).

Six osteopaths (5%) reported both regular smoking for a period of at least 6 months and current smoking of 1.5 ± 13 cigarettes per week (see Table 1).

[Insert Tables 1 and 2]

Attitudes to Exercise Consultation

Total combined attitudes scores of respondents (n = 125) towards the practice of exercise advice and exercise prescription were 75 ± 9% (range 46-96%) and 73 ± 6.3% (52-88%) of maximum “positive attitude” respectively (Fig. 1 and 2).

[Insert Figures 1 and 2]

Sixteen of 18 items in the exercise advice for general health section and 30/40 items in the prescription for specific medical conditions reflected attitudes in favour of exercise consultation. Only one item in each of these two sections elicited attitudes against exercise consultation. A number of items (4/18) in the advice for general health section and (9/40) in the prescription for specific medical conditions section demonstrated mixed or paradoxical views, as shown in Tables 4 and 5.

The majority of respondents (61-67%) generally disagreed with items (#21, #22 and #23) which stated that their thoughts on exercise prescription are influenced by 'general societal attitudes', 'opinions of teachers' or the 'curriculum of institution'. Respondents held stronger views against the use of exercise prescription for specific medical conditions in the treatment of acute pain (#32), than persistent pain (#33). For instance 75% of respondents disagreed or strongly disagreed with the statement that providing exercise prescription for people with acute pain is more important to the patient's recovery than osteopathic manual therapy (OMT). When the same statement was applied in the context of persistent pain, 49% of respondents disagreed or strongly disagreed, with 38% remaining neutral and 16% agreeing or strongly agreeing.

[Insert Table 5]

Two pairs of items (#4, #8) and (#11, #12) demonstrated inconsistent or contrasting l views in the exercise advice for general health section. The majority (66%) of respondents agreed or strongly agreed that they provided exercise advice to all their patients (#4), which was discordant considering 67% of respondents also disagreed or strongly disagreed with the item stating that patients overall followed advice regarding

physical exercises (#8). Similarly, respondents expressed differing views about the therapeutic role of exercise advice in the context of persistent versus acute pain. Although respondents mostly agreed or strongly agreed (59%) that therapeutic outcomes of patients with persistent pain were determined by the patient's adherence to exercise advice (#11); this was not the case in context of acute pain (#12). Fifty percent of respondents disagreed or strongly disagreed with the item (#12) stating that therapeutic outcomes are determined by a patient's adherence to exercise advice in patients with acute pain.

[Insert Table 4]

Four items (#1, #2, #3 and #20) in the exercise prescription for specific medical conditions section elicited a mixture of attitudes. These items covered topics regarding the undertaking of appropriate education before prescribing exercise, whether advice is more important than prescription for treating specific conditions, if other health practitioners are better placed to prescribe exercise and if clinical experience is the foundation by which exercise knowledge is based (Table 5).

Practice of Exercise Consultation

Respondents were asked to report which of the four categories of exercise consultation (Exercise Prescription for Specific Medical Conditions, Exercise Prescription for General Health, Exercise Advice for Specific Medical Conditions, and Exercise Advice for General Health) they had utilised in the last 12 months for the proportion of their patients to whom they had provided these interventions at some point during their management.

On average, the most practiced form of exercise consultation reported by osteopaths was exercise advice for specific medical conditions (75 ± 24% of patients receiving any exercise consultation received this). Exercise advice for general health and exercise prescription for specific medical conditions were both equally practiced by respondents (63 ± 30%). The least practiced form of consultation reported was exercise prescription for general health (52 ± 32%).

[Insert Table 3]

The Association between Attitudes and Practices

Association of Attitude with Practice of Exercise Prescription for Specific Medical Conditions

The practice of exercise prescription for specific medical conditions was positively associated with both attitudes towards exercise advice for general health ($p < 0.001$) and prescription for specific medical conditions ($p < 0.001$).

Post-hoc tests showed that respondents who reported providing exercise prescription for specific medical conditions to 75% or more patients had a greater positive attitude to exercise advice for general health (mean % of positive attitudes = 79; 95% CI = [77 to 82%]) compared with those who provided this intervention to 50% or less of their patients (69; [64 to 74%]). A greater positive attitude in favour of exercise advice for general health was also shown between those who provided exercise prescription for specific medical conditions to 50% (66; [57 to 74%]) of their patients, compared with only 5% (72; [69 to 75%]) of their patients.

Respondents who provided exercise prescription for specific medical conditions to 75% or more of their patients had a greater positive attitude towards exercise prescription for specific medical conditions (75; [74 to 77%]), compared with those who provided this intervention to 25% or less of their patients (67; [63 to 71%]). Respondents who provided exercise prescription for specific medical conditions to 50% of patients (71; [69 to 73%]) had a greater positive attitude to prescription for specific medical conditions than those who provided this intervention to 25% or less of their patients (67; [63 to 71%]); and had a lesser positive attitude than those who provided prescription for specific medical conditions to 75% or more of patients (75; [74 to 77%]), (see Figure 3).

[Insert Figure 3]

Association of Attitude with Practice of Exercise Prescription for General Health

The practice of exercise prescription for general health was found to be positively associated with attitudes towards exercise advice for general health ($p = 0.008$) and prescription for specific medical conditions ($p = 0.03$). Post-hoc tests showed that respondents who provided exercise prescription for general health to 5% of their patients (69; [65 to 73%]) had a lesser positive attitude to exercise advice for general health compared with those who provided this intervention to 25% or more of their patients (77; [73 to 80%]).

Respondents who provided exercise prescription for general health to 50% (75; [71 to 79%]) or 95% (75; [72 to 77%]) or their patients had a greater positive attitude in favour of exercise prescription for specific medical conditions, compared with those

who provided this intervention to 25% or less of their patients (71; [68 to 73%]), (see Figure 4).

[Insert Figure 4]

Association of Attitude with Practice of Exercise Advice for Specific Medical Conditions

The practice of exercise advice for specific medical conditions was found to be associated with attitudes towards exercise advice for general health ($p < 0.001$) and prescription for specific medical conditions ($p < 0.001$). Post-hoc tests demonstrated that respondents who provided exercise advice for specific medical conditions to 95% of their patients (79; [77 to 81%]) had greater positive mean attitudes to exercise advice for general health compared with those who applied this intervention to 75% or less of their patients (68; [62 to 74%]).Respondents who provided exercise advice for specific medical conditions to 50% (75; [69 to 80%]) and 75% (75; [73 to 77%]) of patients, also demonstrated greater positive attitudes in favour of exercise advice for general health than those who provided this intervention to 25% or less of their patient's (62; [54 to 70%]). Similar patterns were observed with respect to attitudes to exercise prescription. Respondents who provided exercise advice for specific medical conditions to 95% of their patients (75; [74 to 77%]) had a greater positive mean attitude in favour of exercise prescription for specific medical conditions compared with those who provided this intervention to 75% (72; [71 to 74%]), or less than 25% of their patients (65; [58 to 72%]). Respondents who provided exercise advice for specific medical conditions to only 5% of their patients (63; [54 to 71%]) demonstrated lesser positive attitudes towards exercise prescription for specific medical conditions than

those utilised this intervention with at least 50% or more of their patients (73; [71 to 75%]), (see Figure 5).

[Insert Figure 5]

Association of Attitude with Practice of Exercise Advice for General Health

The practice of exercise advice for general health was found to be associated with attitudes towards exercise advice for general health ($p < 0.001$) and attitudes towards prescription for specific medical conditions ($p = 0.008$). Post-hoc tests indicated that osteopaths who provided exercise advice for general health to 5% of their patients (66; [57 to 75%]) illustrated less positive attitudes towards exercise advice for general health than those who provided this intervention to 50% or more of their patients (77; [74 to 80%]). Similarly, osteopaths who provided exercise advice for general health to 25% of patients (72; [68 to 75%]) also demonstrated a lesser positive attitude to exercise advice for general health than those who provided this intervention to 75% or more of their patients (78; [76 to 81%]).

Osteopath's demonstrated lesser positive attitudes towards exercise prescription for specific medical conditions. This especially applied to those who provided exercise advice for general health to 5% of their patients (67; [61 to 73%]) compared with those who provided this intervention to 50% or more patients (74; [72 to 76%]). Osteopaths who provided exercise advice for general health to 75% of their patients (75;[72 to 77%]) had greater positive attitudes in favour of prescription for specific medical conditions than those who applied this intervention with 25% or less of their patients (69; [64 to 73%]), (see Figure 6).

[Insert Figure 6]

Variables Influencing Attitudes to Exercise Consultation

Since attitude scores were continuous variables, univariate relationships were explored using correlational analysis for continuous independent variables, with Spearman's non-parametric statistics reported, or using t-tests or ANOVA models for categorical independent variables. Relationships between attitudes towards advice for general health, prescription for specific medical conditions and independent variables: age, years of practice and structural minus non-structural practice style showed 'trivial' effect sizes [16] and no statistically significant correlations (Table 6). One exception to this was a 'small' positive correlation between weekly duration of exercise and attitudes to exercise advice for general health ($r = 0.20$, $p = 0.03$; Table 6). Additionally, the institution at which osteopaths obtained their qualification was associated with attitudes to prescription for specific medical conditions ($p = 0.03$) and tended to associated with attitudes to advice for general health ($p = 0.07$). Those who qualified at the British College of Naturopathy and Osteopathy (mean % of positive attitudes = 75, 95% CI [72 to 79], British College of Osteopathic Medicine (74; [70 to 77%]) and Unitec Institute of Technology NZ (74; [72 to 75%]) had more positive attitudes to exercise prescription for specific medical conditions than those who attended the European School of Osteopathy (69; [64 to 73%]). Similar pairwise trends were also observed with attitudes to exercise advice for general health.

No differences in attitudes to advice for general health and prescription for specific medical conditions were shown between genders, by smoking status, or between different levels of academic qualification.

A regression model was calculated, that included all continuous and categorical predictor variables from the univariate analyses using both attitude variables as dependent variables. Only weekly duration of personal exercise entered the model as a significant positive predictor of attitudes to advice for general health, explaining 4% of the variance in attitudes. No variables entered a similar model for attitude to prescription for specific medical conditions.

[Insert Table 6]

Variables Influencing Practices of Exercise Consultation

Scoring of practices of exercise consultation were in categories relating to the proportion of patients who received the specific type of consultation, therefore ANOVA models were applied to analyse their associations with continuous independent variables, with chi-squared analysis for associations with categorical variables, reduced to fewer categories.

Practice of advice for general health was positively associated with personal exercise duration ($p = 0.01$) whilst practice of prescription for specific medical conditions was positively associated with structural minus non-structural practice style ($p = 0.03$) and tended to be positively associated with personal exercise duration ($p = 0.07$). No other continuous variables were associated with these two dependent practice variables,

and none were associated with practices of advice for specific medical conditions or with prescription for general health.

The highest level of qualification was associated with practice of exercise advice for specific medical conditions ($p = 0.001$), although 67% of cells contained an expected count of less than 5, substantially more than the 20% deemed acceptable.[15] In general osteopaths with masters or honours degrees, compared to diploma or undergraduate qualifications, were more highly represented in the more frequent categories of this type of exercise advice. Similar patterns of associations with other forms of exercise consultation were not statistically significant. Training institution was not associated with any practices of exercise consultation.

Methods by which Exercise is Delivered by NZROs

Methods by which exercise advice and prescription has been applied in clinical practice are illustrated on Table 7. The majority of respondents reported providing verbal instructions (87%) and physical demonstrations of exercises by themselves (73%) or by the patient (62%), to at least 75% of their patients who received exercise interventions. Written handouts (6%) with exercise instructions, referrals to an exercise specialist (4%) or website/books (2%) and other (3%) were the least reported forms of exercise consultation provided.

[Insert Table 7]

TABLES AND FIGURES

Table1: ***List of Institutions where participants gained their Osteopathic Qualification and Highest Qualification in any Field***

Institute	Practitioner(n)	Overall %
British School of Osteopathy, UK	8	6%
British College of Naturopathy and Osteopathy, UK	15	12%
British College of Osteopathic Medicine, UK	14	11%
College of Osteopaths, UK	3	2%
European School of Osteopathy	13	10%
Oxford Brookes University, UK	2	2%
London College of Osteopathic Medicine, UK	1	1%
London School of Osteopathy, UK	5	4%
Total UK	**61**	**48.8%**
International College of Osteopathy, Australia	2	2%
Royal Melbourne Institute of Technology (RMIT), Australia	9	7%
South Pacific College of Naturopathy and Osteopathy, NZ	1	1%
Victoria University, Australia	3	2%
Total Australia	**15**	**12%**
Osteopathic College of New Zealand, NZ	11	9%
Unitec Institute of Technology, NZ	34	27%
Total NZ	**45**	**36%**
Other	**4**	**3%**
Total	125	100%
Highest Qualification in any Field		
Diploma	28	22%
Bachelors Degree	16	13%
Honour Degree	29	23%
Masters	45	36%

Table 2: ***Demographic Characteristics of Survey Respondents***

	Mean	SD	Number (Total =125)	Overall %
Age	43.2	10.6	-	-
Institution				
Total UK	-	-	61	49%
Total Australia	-	-	15	12%
Total NZ	-	-	45	36%
Total Other	-	-	4	3%
Years Since Graduation	13.9	9.3	-	-
Total Working Hrs /Wk	32.3	10.3	-	-
Preferred Practice Style				
Practice Style 1 (structural)	10.3	3.0		
Practice Style 2 (non-structural)	6.62	3.6	-	-
Practice 1 – Practice 2	3.7	4.9	-	-
Exercise in Osteopathic Training				
None	-	-	13	11%
Minimal	-	-	74	60%
Adequate	-	-	29	23%
Good	-	-	6	5%
Excellent	-	-	1	1%
Personal Exercise Hrs/Wk	9.0	3.4	-	-
Participation in Competitive Sport				
Yes	-	-	31	25%
No	-	-	92	74%
Location of Practice				
Rural	-	-	8	6%
Small Town (< 10,000)	-	-	14	11%
Large Town (10-20,000)	-	-	14	11%
City (> 20,000)	-	-	89	71%

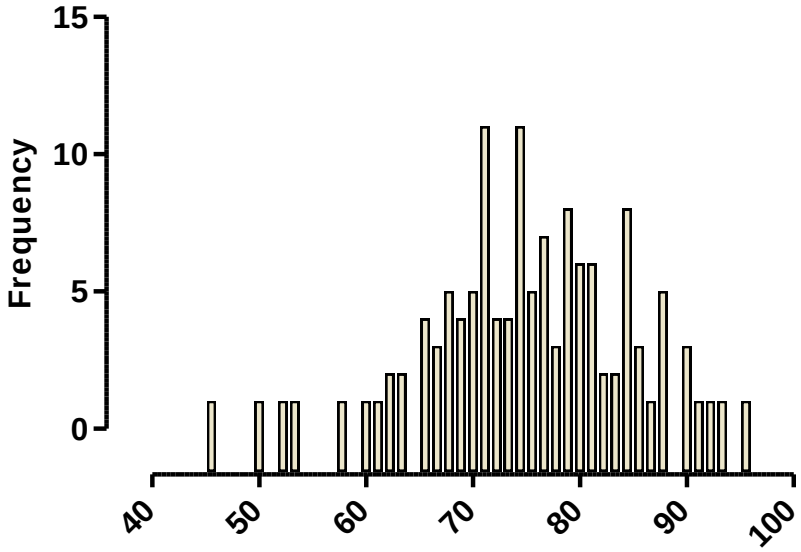

Figure1: Positive Attitudes towards Exercise Advice for General Health (%)

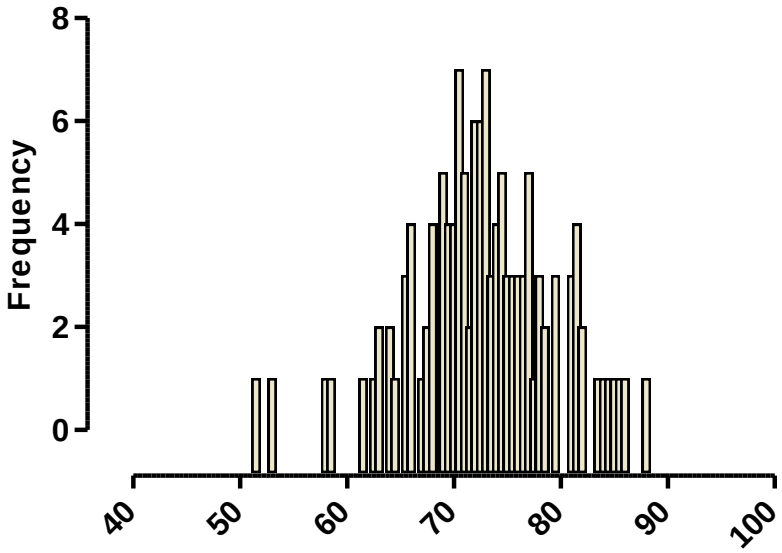

Figure 2: Positive Attitudes towards Exercise Precription for Specific Medical Conditions (%)

Table 3: ***NZRO's self-reported practices of exercise consultation for specific medical conditions and general health***

	None or ≤5% of my pts	About 25% of my pts	About 50% of my pts	About 75% of my pts	All or ≥95% of my pts	Mean	SD
Practice of Exercise Prescription							
To treat or prevent a Specific Medical Condition being treated by you	8%	14%	22%	24%	31%	63%	±30
For General Health and Wellbeing	15%	24%	18%	18%	22%	52%	±32
Practice of Exercise Advice							
To treat or prevent a Specific Medical Condition being treated by you	6%	4%	9%	42%	39%	75%	±24
For General Health and Wellbeing	7%	15%	23%	18%	33%	63%	±30

The data represents responses to the question "In the last 12 months, for what proportion of your patients have you provided (prescription or advice) for (specific medical conditions or general health) at some point during their management?"
Using the scoring system: 1= None or hardly any of my patients (≤ 5%), 2= About 25% of my patients, 3= About 50% of my patients, 4= About 75% of my patients, 5= All of most of my patients (≥ 95%)
Percentages represent mean reported practices of exercise consultation

Table 4: ***NZRO's level of agreement to statements regarding exercise advice for general health***

Items eliciting paradoxical responses	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Typically I provide physical exercise advice to all my patients (#4)	3%	11%	18%	50%	16%
Overall, I have found patients to follow instructions regarding advised physical exercises (#8)	6%	61%	25%	8%	1%
Therapeutic outcomes of osteopathic treatment are mostly dependent on people with acute pain adhering to lifestyle modifications such as physical exercise modifications (#11)	6%	44%	30%	17%	3%
Therapeutic outcomes of osteopathic treatment are mostly dependent on people with persistent pain adhering to lifestyle modifications such as physical exercise modifications (#12)	5%	18%	18%	52%	7%

The data represents responses to the question "please tick the box that best describes your own personal views regarding the following statements" Using the scoring system: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree
Percentages represent mean positive attitudes score towards the practice of Exercise Advice for general health

Table 5: ***NZRO's level of agreement to statements regarding exercise prescription for specific medical conditions***

Items eliciting mixed responses	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Osteopaths should only prescribe exercise if they have undertaken appropriate training (#1)	5%	37%	33%	24%	2%
Exercise advice is more important than exercise prescription for improving function, relieving symptoms, or slowing deterioration of health (#2)	1%	26%	49%	24%	1%
Other health care practitioners are better placed to prescribe exercise than osteopaths (#3)	3%	19%	38%	34%	6%
My knowledge about exercise prescription is based on my empirical clinical experience (#20)	2%	30%	30%	34%	3%
Items eliciting where current attitudes to exercise originated from					
The general societal attitudes to exercise at the time I trained most strongly influence my thinking about exercise prescription (#21)	9%	52%	32%	6%	2%
The opinions of my teachers during my osteopathic training were the strongest influence on my thinking about exercise prescription (#22)	12%	55%	27%	6%	0%
The curriculum of the school at which I studied strongly influenced my thinking about exercise prescription (#23)	9%	52%	21%	18%	0%
Items eliciting paradoxical responses					
Performing exercise prescription for people with acute pain is usually more important to patient's recovery than osteopathic manual therapy (#32)	13%	62%	22%	3%	0%
Performing exercise prescription for people with persistent pain is usually more important to patient's recovery than osteopathic manual therapy (#33)	9%	38%	38%	14%	2%

The data represents responses to the question "please tick the box that best describes your own personal views regarding the following statements" Using the scoring system: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree
Percentages represent mean positive attitudes score towards the practice of Exercise Prescription for specific medical conditions

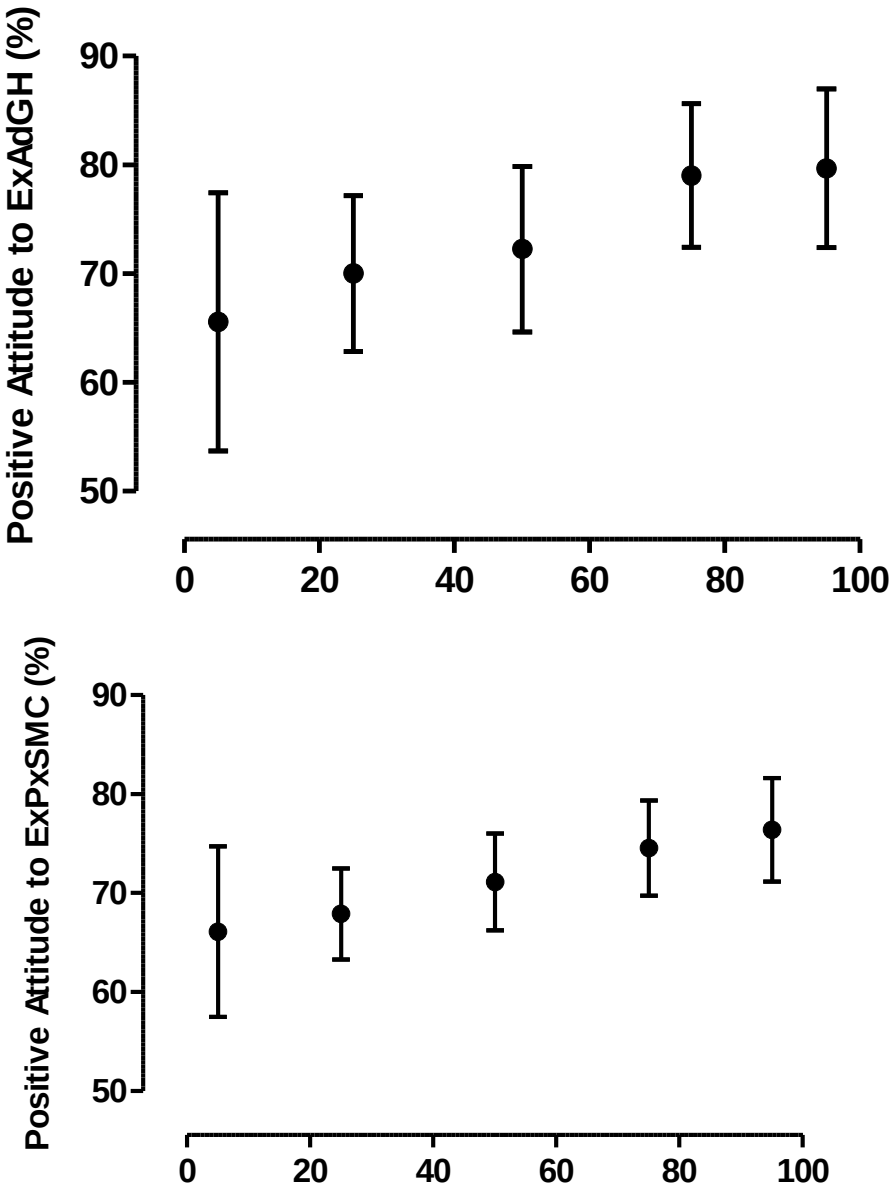

Figure 3: Proportion of Patients Receiving Exercise Prescription for a Specific Medical Condition (%)

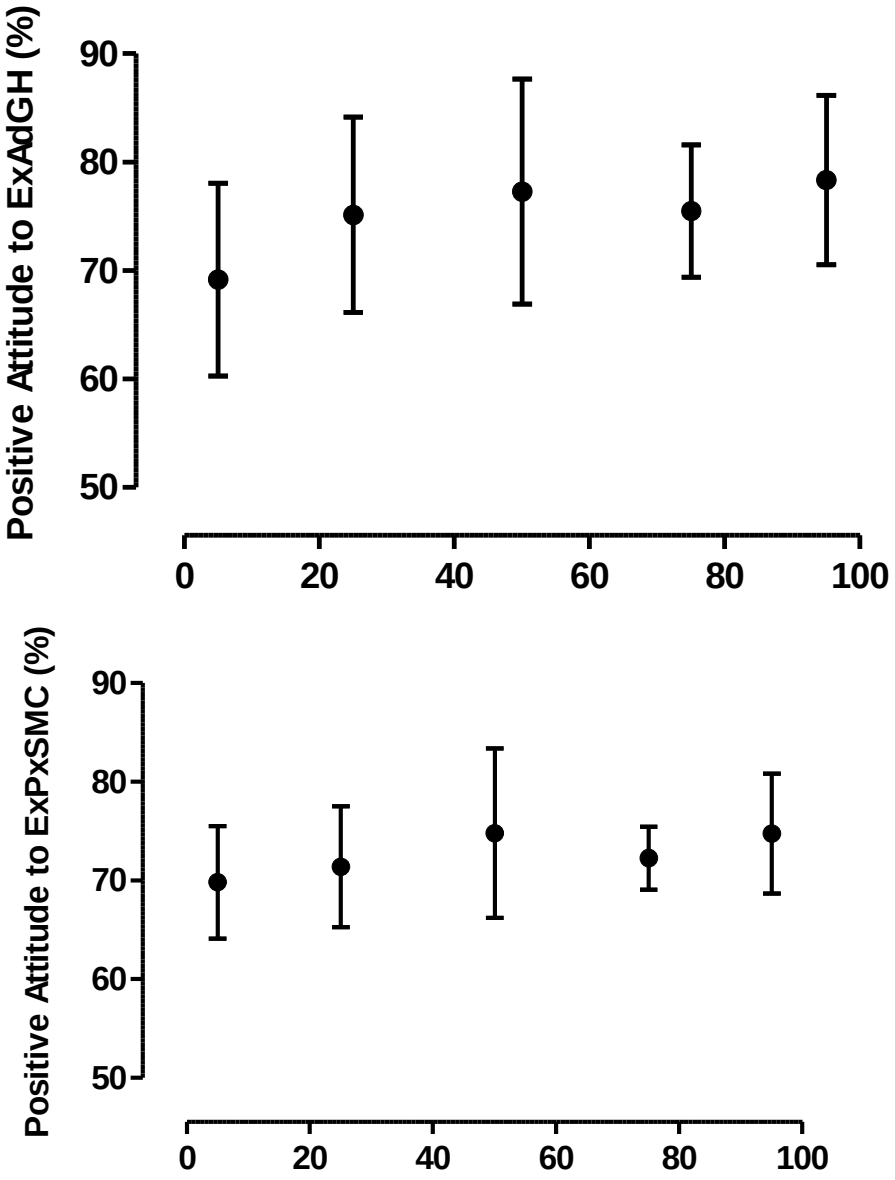

Figure 4: Proportion of Patients Receiving Exercise Prescription for General Health (%)

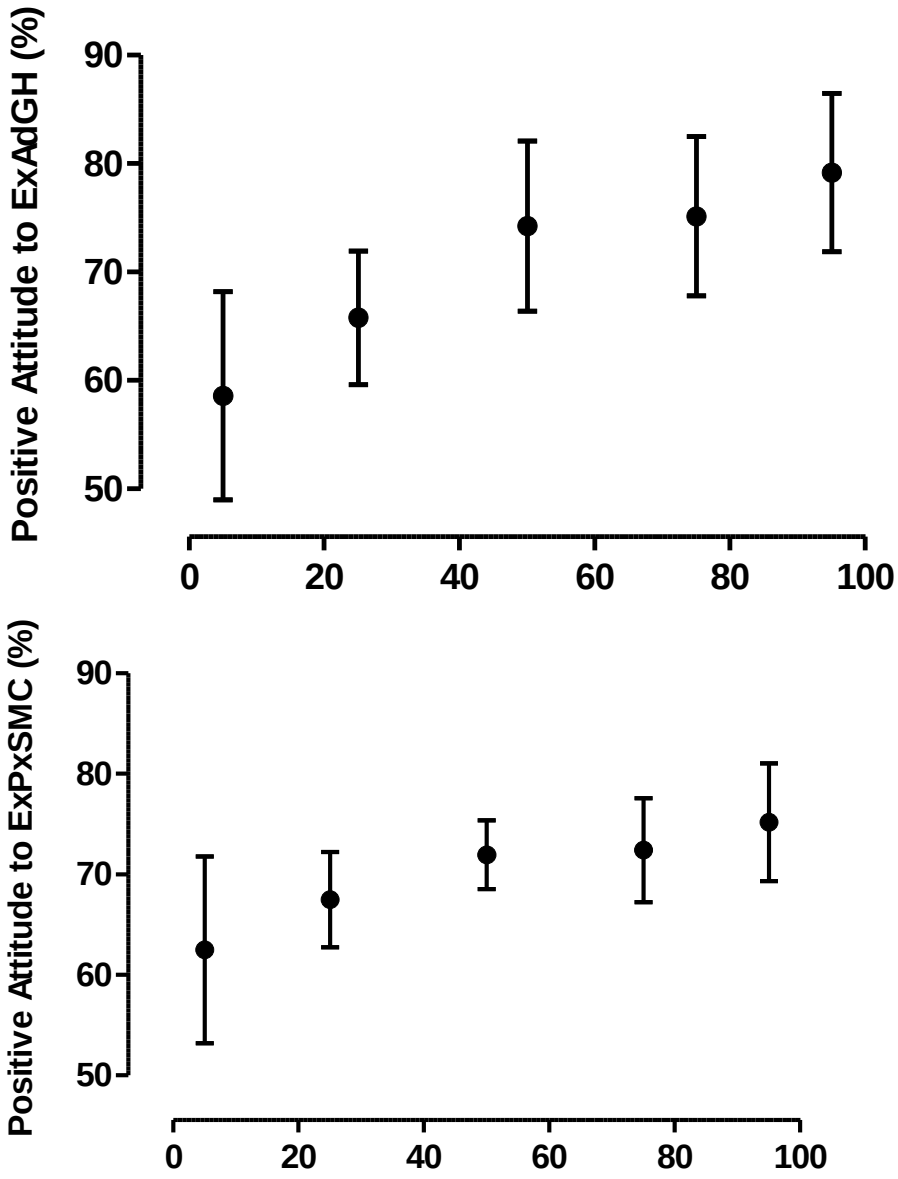

Figure 5: Proportion of Patients Receiving Exercise Advice for a Specific Medical Condition (%)

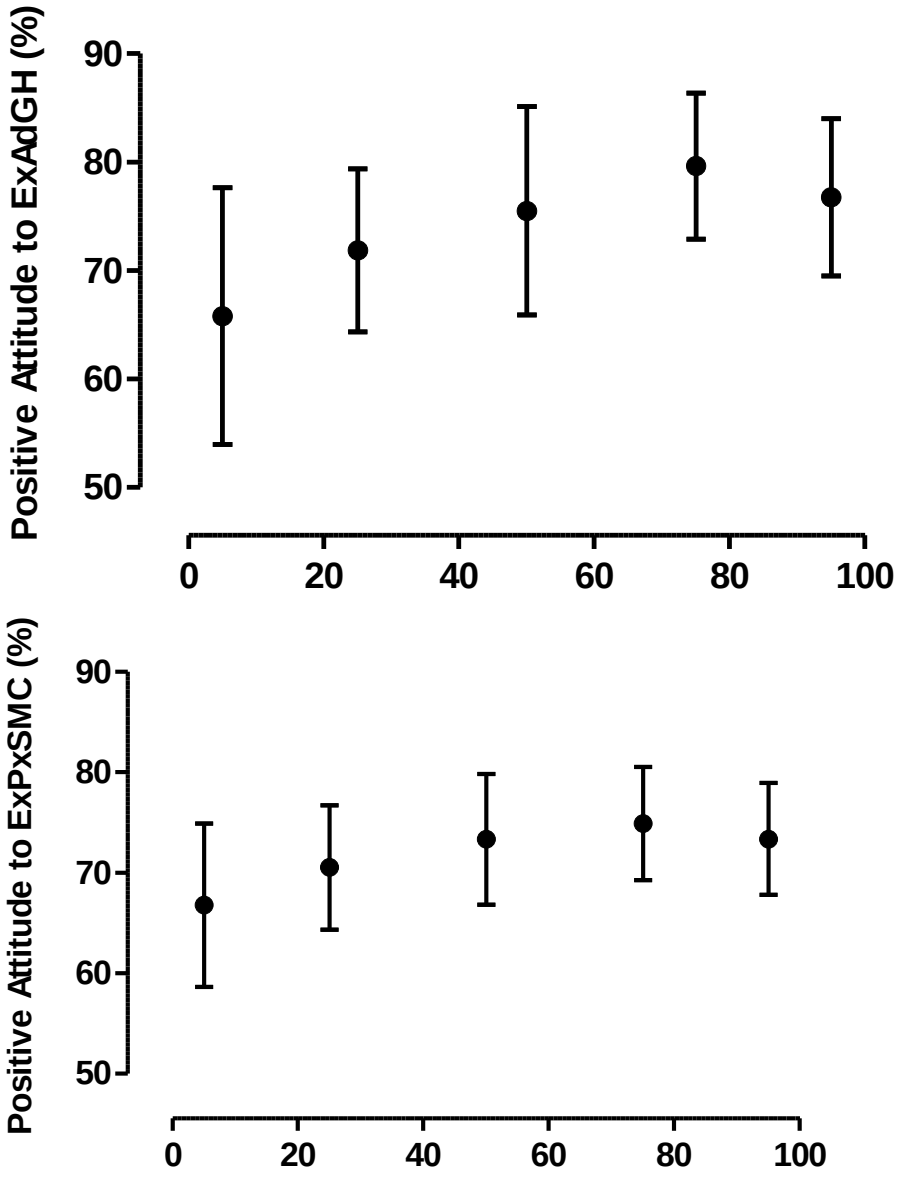

Figure 6: Proportion of Patients Receiving Exercise Advice for General Health (%)

Table 6: ***Correlation of independent variables with attitudes to exercise advice for general health and prescription for a specific medical condition***

Variables	**Number Total (n)=125**	**(r-value)[a]**	**(p-value)[b]**
Attitudes to Exercise Advice for GH			
Age	107	-0.37	0.70
Years of Practice	124	-0.56	0.54
Weekly Duration of Personal Exercise	125	0.20*	0.03
Practice Style	125	-0.001	0.99
Attitudes to Exercise Prescription for SMC			
Age	107	-0.76	0.44
Years of Practice	124	-0.58	0.52
Weekly Duration of Personal Exercise	125	0.67	0.46
Practice Style	125	0.136	0.13

***Weekly duration of personal exercise has a 'small' positive correlation with attitudes to exercise advice for general health (r= 0.20, p= 0.03), at (p <0.05) level (2-tailed)**

[a] Pearson's correlation coefficient

[b] Probability value

Table 7: ***Self-reported Methods of how NZROs practice Exercise Consultation***

Method of Exercise Consultation	**Practitioner (n)[a]**	**Overall % for ≥ 75% of all patients receiving any ex. consultation[b]**
Verbal Instructions	109	87%
Physical demonstration of exercises **by practitioner**	91	73%
Supervised demonstration of exercises **by patient**	78	62%
Exercises **completed under supervision** of practitioner	43	34%
Written handout with **instructions & illustrations**	25	20%
Written handout with **instructions only**	8	6.4%
Referral to exercise specialist	5	4%
Referral to website/books	2	2%
Other	4	3%

[a] (n)= number of respondents who report using specific method of exercise consultation

[b] Total percentage of practitioners who report providing specific methods of exercise consultation to 75% or more of their patients receiving any exercise consultation

DISCUSSION

The main aim of this study was to investigate the attitudes and practices of New Zealand osteopaths to exercise consultation and its use within osteopathy. The results indicate that respondents of this survey generally hold positive attitudes towards exercise consultation; with similar attitudes towards exercise advice for general health and exercise prescription for specific medical conditions. Respondents are also incorporating exercise consultation into their clinical practices, for the purposes of improving general health and specific medical conditions, using various methods of deliverance.

The attitudes of NZ osteopaths regarding physical activity match those of other health practitioners. In this study, respondents appear to agree that physical activity at the recommended levels (30 minutes of moderate intensity exercise, five days per week) is necessary for good health and that people who participate in physical activity at these levels are less likely to have musculoskeletal problems. Similar beliefs have been reported amongst general practitioners [17-19], physiotherapists [20] and chiropractors.[21, 22]

Although health care practitioners agree that physical activity is beneficial to health, it cannot be assumed that all health practitioners believe it is their role to provide exercise consultation and lifestyle modifications. Nevertheless, findings demonstrate that NZ osteopaths do believe that it is part of their professional responsibility to provide lifestyle modifications and exercise consultations; also the osteopathic consultation provides an excellent opportunity to address a patient's lifestyle. The majority of respondents disagreed that other health care practitioners were better

placed to prescribe exercise; and that there is no place for exercise prescription within the osteopathic philosophies and principles; suggesting that exercise consultation is considered a relevant component of osteopathic scope of practice in NZ. Similarly, a survey of US chiropractors attitudes towards health promotion and prevention; Rupert [21] found that although respondents (n = 658) reported spinal manipulation to be an essential component of patient care (97%), they also agreed that exercise (96%), nutrition (93%) and lifestyle advice are equally important therapeutic components of chiropractic care, despite speculations of limited research identifying these components in the past.[21]

Respondents who engaged in more personal exercise time also reported more positive attitudes towards exercise advice and associated with practice of advice for general health; these results are comparable with other literature. A review of literature by Lobelo et al. [23] suggests that personal physical activity habits of health care practitioners influence their attitudes and practices relating to physical activity, and that this association is strong and independent of many demographic, training and practice factors.[23] The personal health of practitioners may be important because they serve as role models who are more likely to counsel their patients about healthy behaviours if they practice good health habits themselves.[24-26]

There were strong associations between respondent's attitudes (towards exercise advice for general health and exercise prescription for specific medical conditions) and reported practices of exercise consultation. It is suggested that osteopaths with stronger positive attitudes in favour of exercise advice for general health and exercise prescription for specific medical conditions; provide all four categories of exercise

consultation to a greater extent in their practice. The four practice categories include: exercise advice for specific medical conditions, advice for general health, prescription for specific medical conditions, and prescription for general health. Bishop et al. [27] investigated the relationship between attitudes and practices of health practitioners treating patients with non-specific LBP; and found that the attitudes of health practitioners (n = 1022) are linked to their clinical practice and the recommendations they provide to their patients. Health practitioners (28%) with stronger attitudes towards specific biomedical causes of LBP and weaker attitudes towards biopsychosocial causes of LBP actually recommended further time off work to patients who had been off work since the onset of their LBP (at least four weeks ago), despite guidelines suggesting patients with non-specific LBP remain at work or return to work if possible.[27, 28]

Practice style of respondents was positively associated with the reported practices of exercise consultation. Although this association is small in magnitude, it appears that osteopaths who provide more 'structural' treatments may be more likely to incorporate exercise prescription for specific medical conditions into their practices. No associations were found between the practice style of osteopaths and their attitudes to exercise consultation; however anecdotal evidence suggests there may indeed be a relationship between these two variables.

A survey of NZ osteopaths (n = 62/250) by Wittwer Blaser [14] provides preliminary evidence of two distinct practice styles amongst osteopaths in NZ; 'practice style 1' and 'practice style 2'. Techniques such as muscle energy technique, articulation and high-velocity low-amplitude (HVLA) manipulations were found to group together

forming a ‘structural’ practice style (practice style 1); whereas functional technique, osteopathy in the cranial field and balance-ligamentous tension appeared to group together to form a ‘non-structural’ practice style (practice style 2). Wittwer Blaser [14] also identified an inverse association between practice style and attitudes; suggesting that practitioners who are more inclined to provide non-structural treatments are less likely to have positive attitudes towards evidence-based practice (EBP). However, no association was identified between structural practice style and attitudes to EBP. [14] Measures of ‘practice style’ in osteopathy are not well validated, and consequently these findings should be interpreted cautiously. Further research to explore different styles of practice in osteopathy and their association with other clinical behaviours or practitioner attitudes should be undertaken.

Practitioners with profession qualifications at the honours or masters level were more likely to practice exercise advice for specific medical conditions than those with a diploma or undergraduate degree. Conversely the number of years spent in practice and the institutions where respondents received their osteopathic training did not appear to significantly influence practices of exercise consultation. Although, observed trends suggest that practitioners who received their osteopathic education from the European School of Osteopathy are less inclined to provide exercise consultation, (especially prescription for specific medical conditions) than those who attended Unitec Institute of Technology NZ, British College of Naturopathy and Osteopathy and British College of Osteopathic Medicine.

No similar studies are available making it difficult to compare these findings. However results from a content analysis of seven osteopathic institutions in the UK investigating

undergraduate exercise training suggest not all osteopathic institutions address exercise consultation as an intervention that can be applied within osteopathic practice, explaining why some practitioners may be less likely to provide exercise interventions.[29] At present a masters degree is the minimum level of academic qualification required to become an osteopath, and in recent years the promotion of physical activity and exercise through health initiatives has substantially increased[1, 3, 4] potentially explaining why osteopaths with higher academic qualifications may be more likely to practice exercise consultation. Additionally, osteopaths who have been in practice longer also have more postgraduate continuing professional development and may therefore have experienced more education about exercise consultation than new graduates.

Results from this study suggest that age, gender and current smoking are not associated with attitudes and practices of exercise consultation. However this may be a result of response bias relating especially to smoking status. In a survey of nurse students' attitudes towards smoking health promotion, McCann et al. [25] found that although smoking status is associated with attitudes to health promotion, gender and age does not appear to have an influence. Nurses that were non-smokers demonstrated consistency between their personal beliefs and professional values and were more likely to have a stronger positive attitude to smoking health promotion than smokers. In contrast smokers demonstrated conflict between their personal and professional beliefs and their role as health practitioner, with a less positive attitude towards smoking health promotion.[25] Frank et al.[30] found non-smoking to be a

predictor of actual health promotion practices, however only female physicians were surveyed and therefore the finding lacks generalisability.[30]

Caution should be taken when interpreting the results of surveys, self-reported measures are always vulnerable to response bias and self-reported behaviours may not accurately represent actual behaviours.[31] A greater number of practitioners reported following a more 'structural' than 'non-structural' practice style; consequently these respondents are likely to have a greater interest in exercise consultation resulting in a potential response bias. An actual response rate of 38% is modest, but somewhat of an improvement compared with previous response rates of this population. Previous surveys of NZ osteopaths have reported lower response rates, with 20% by Friedlander[32] and 25% by Wittwer Blaser.[14] One exception to this is a 46% response rate by Carrington.[33] Some anecdotal feedback from respondents indicated the survey was slightly longer than expected which may have also had a negative impact on the response rate.[31]

For future studies, the questionnaire design should be improved using factor analysis which may result in reducing the number of items. Once this is completed, it can be used to survey the wider osteopathic community, especially osteopaths in Australia since NZ osteopaths can work freely in both countries due to mutual recognition of registration. Following on from this project, an analysis of undergraduate exercise content within NZ osteopathic education would also be relevant.

CONCLUSION

This study has identified that NZ osteopaths generally have a positive attitude towards exercise and are incorporating exercise consultation into their clinical practice using a variety of methods. Although effect sizes are small, it is suggested that NZ osteopaths who spend more time engaging in personal exercise are more likely to have higher positive attitudes towards exercise. Also, practitioners with a higher positive attitude to exercise; higher level of academic qualification; who utilise more structural techniques in practice are more likely to provide exercise-based interventions. Finally, attitudes and practices of respondents to exercise consultation do not appear to be influenced by age, gender, years of practice and smoking. Future research should aim to improve the survey to enable investigation of exercise consultation amongst the wider osteopathic community; an analysis of exercise training within NZ osteopathic education is also recommended.

REFERENCES

1 Ministry of Health. *Physical activity DHB toolkit*, 2003. Available.

2 Warburton DER, Nicol CW, Bredin SSD. Health benefits of physical activity: the evidence. *CMAJ: Canadian Medical Association Journal = Journal De L'association Medicale Canadienne* 2006;**174**:801-9.

3 Sport and Recreation New Zealand. *Guidelines for promoting physical activity to adults* volume 2012, 2005. Available from http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions/green-prescription-resources-health-professionals.

4 Geisser ME, Wiggert EA, Haig AJ, Colwell MO. A randomized, controlled trial of manual therapy and specific adjuvant exercise for chronic low back pain. *Clin J Pain* 2005;**21**:463-70.

5 The National Heart Foundation. *Physical Activity* volume 2012, 2009. Available from http://www.heartfoundation.org.nz/uploads/A5%20Physical%20Activity%2008%2006%281%29.pdf.

6 World Health Organisation. *Global recommendations on physical activity for health* volume 2012, 2010. Available from http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf.

7 Hayden JA, van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Ann Intern Med* 2005;**142**:776-85.

8 Zamani J, Vogel S, Moore A, Lucas K. Exploring the use of exercise therapy in UK osteopathic practice. *Int J Osteopath Med* 2008;**11**:164.

9 Keller K. Exercise therapy for low back pain: a narrative review of the literature. *J Chiropract Med* 2006;**5**:38-42.

10 Moffett JK, Mannion AF. What is the value of physical therapies for back pain? *Best Pract Res Clin Rheumatol* 2005;**19**:623-38.

11 Houben RMA, Gijsen A, Peterson J, de Jong PJ, Vlaeyen JWS. Do health care providers' attitudes towards back pain predict their treatment recommendations? Differential predictive validity of implicit and explicit attitude measures. *Pain* 2005;**114**:491-98.

12 Osteopathic Council New Zealand. *The legislation* volume 2011, n.d. Available from http://www.osteopathiccouncil.org.nz/the-legislation.html.

13 Mckay-Watts R. Development of a preliminary questionnaire to investigate the attitudes of NZ osteopaths regarding the use of exercise in osteopathy. *UnPublished Masters thesis. Unitec* 2010

14 Blaser PRW. New Zealand Osteopaths' Attitudes to 'Evidence-Based Practice'– Development of a Questionnaire and Preliminary Results. *Unpublished Masters Thesis. Unitec* 2009

15 Field A. *Discovering statistics using SPSS*: 3rd Edition: Sage Publications; 2009.

16 Hopkins W. *A scale of magnitudes for effect statistics*. A new view of statistics volume 2012, 2002. Available from http://www.sportsci.org/resource/stats/index.html.

17 Buffart LM, van der Ploeg HP, Smith BJ, Kurko J, King L, Bauman AE. General practitioners' perceptions and practices of physical activity counselling: changes over the past 10 years. *Br J Sports Med* 2009;**43**:1149-53.

18 Phillips EM, Kennedy MA. The Exercise Prescription: A Tool to Improve Physical Activity. *PM R* 2012;**4**:818-25.

19 Frank E, Galuska DA, Elon LK, Wright EH. Personal and clinical exercise-related attitudes and behaviors of freshmen U.S. medical students.(Epidemiology). *Res Q Exerc Sport* 2004;**75**:112-21.
20 Kerr K. Exercise - no easy option. *Physiotherapy* 1999;**85**:114.
21 Rupert RL. A survey of practice patterns and the health promotion and prevention attitudes of US chiropractors, maintenance care: Part I. *J Manipulative Physiol Ther* 2000;**23**:1-9.
22 Hawk C, Long CR, Perillo M, Boulanger KT. A survey of US chiropractors on clinical preventive services. *J Manipulative Physiol Ther* 2004;**27**:287-98.
23 Lobelo F. Physical activity habits of doctors and medical students influence their counselling practices. *Br J Sports Med* 2009;**43**:89-92.
24 Oberg EB, Frank E. Physicians' health practices strongly influence patient health practices. *J R Coll Physicians of Edinb* 2009;**39**
25 McCann TV, Clark E, Rowe K. Undergraduate nursing students' attitudes towards smoking health promotion. *Nurs Health Sci* 2005;**7**:164-74.
26 Shahar DR, Henkin Y, Rozen GS, Adler D, Levy O, Safra C, et al. A controlled intervention study of changing health-providers' attitudes toward personal lifestyle habits and health-promotion skills. *Nutrition* 2009;**25**:532-39.
27 Bishop A, Foster NE, Thomas E, Hay EM. How does the self-reported clinical management of patients with low back pain relate to the attitudes and beliefs of health care practitioners? A survey of UK general practitioners and physiotherapists. *Pain* 2008;**135**:187-95.
28 Penney JN. A comparison of Australian and European evidence-based guidelines for intervention in acute, non-specific low back pain. *Int J Osteopath Med* 2009;**12**:63-8.
29 Zamani J, Vogel S, Moore A, Lucas K. Analysis of exercise content in undergraduate osteopathic education - A content analysis of UK curricula. *Int J Osteopath Med* 2007;**10**:97-103.
30 Frank E, Rothenberg R, Lewis C, Belodoff BF. Correlates of physicians' prevention-related practices. Findings from the Women Physicians' Health Study. *Arch Fam Med* 2000;**9**:359-67.
31 Hicks C. *Research methods for clinical therapists: Applied project design and analysis*: fourth Edition: Churchill Livingstone; 2004.
32 Friedlander T. The role of osteopaths in the recognition of melanoma: Attitudes, knowledge and practices in melanoma screening within the osteopathic community. *Unpublished Masters Thesis. Unitec* 2007
33 Carrington AL. Attitudes and beliefs of New Zealand osteopaths towards chronic pain. *Unpublished Masters Thesis. Unitec* 2009

Section 3: Appendices

Appendix A:

Ethics Approval Letter

Unitec
NEW ZEALAND
Te Whare Wānanga o Wairaka

phone +64 9 849 4180 fax +64 9 815 2901 web www.unitec.ac.nz
address Private Bag 92025, Auckland Mail Centre, Auckland 1142, New Zealand
Mt Albert campus Carrington Rd, Mt Albert, Auckland, New Zealand
Waitakere campus Ratanui St, Henderson, Auckland, New Zealand

Ritisha Mistry
39 Kate Sheppard Avenue
Torbay
Auckland 0630

1 March 2011

Dear Ritisha,

Your file number for this application: 2010-1139
Title: Attitudes and self-reported practices of New Zealand Registered Osteopaths regarding the use of exercise consultation in osteopathic clinical practice

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: 15 February 2011
Finish date: 14 February 2012

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

p.p. K Jones

Lyndon Walker
Deputy Chair, UREC

cc: Catherine Bacon, Osteopathy
Cynthia Almeida

Ritisha Mistry
39 Kate Sheppard Ave
Torbay
Auckland 0630

8.12.2011

Dear Ritista,

Re: Extension request for application 2010-1139

Your application for an extension to ethical approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been **approved** for the following period:

Start date: 8.12.2011
Finish date: 8.12.2012

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,

Scott Wilson
Deputy Chair, UREC

cc: Catherine Bacon
Cynthia Almeida

study@unitec.ac.nz
Tel +64 9 849 4180
Fax +64 9 815 2901
www.unitec.ac.nz

Postal address
Private Bag 92025
Victoria St West
Auckland 1142
New Zealand

Mt Albert campus
139 Carrington Rd
Mt Albert
Auckland 1025
New Zealand

Newmarket campus
277 Broadway
Newmarket
Auckland 1023
New Zealand

Northern campus
10 Rothwell Ave
North Harbour
Auckland 0632
New Zealand

Waitakere campus
5-7 Ratanui St
Henderson
Auckland 0612
New Zealand

Appendix B:

Participant Information Page for Hardcopy Survey

Dear Participant,

Welcome

Hello, my name is Ritisha Mistry. I am a fifth year osteopathic student at Unitec, undertaking my research dissertation as part of my Master of Osteopathy. Along with my supervisors, Catherine Bacon and Rob Moran, I would like to invite you to participate in a study investigating "The attitudes of New Zealand registered osteopaths regarding exercise consultation within osteopathy".

Some background to what we're doing...

Exercise based interventions are commonly used in conjunction with many forms of manual therapy. However, it's not clear whether osteopaths believe that prescribing or advising patients about exercise is part of their role.

This study aims to investigate exercise consultation used within New Zealand osteopathic practice, and attitudes of osteopaths towards exercise consultation.

The questionnaire will be sent to New Zealand registered osteopaths to gather 'YOUR VIEWS' on exercise consultation. There are no right or wrong answers and your responses are confidential. No information that could link you or your practice to your responses will be disclosed.

We might need to contact you...

For the purposes of this study we may need to clarify any responses you have provided in the questionnaire. If you would be happy for us to contact you again for this purpose an option will be available at the end of the survey allowing you to indicate your consent by ticking 'yes' or 'no' with a space to provide your details.

****** Get in the draw to WIN !! ******

To show our appreciation for your participation we will be giving away $200 worth of Westfield or petrol vouchers. If you would like to be entered into the draw to win this prize a similar option will be provided as described above with separate 'yes' or 'no' boxes. The prize will be drawn upon completion of this study.

Before we get started...

We ask that you carefully consider each question and answer. Regardless of what you think about exercise consultation in osteopathy we'd like to hear your views.

On the next page, you'll be invited to tick ‘yes’ under the statement “I have read and understood the information provided and give my consent to be a part of this project”. If you do not wish to proceed simply tick 'no' and return the survey as described below.

Once the survey has been completed please return it to us via the self addressed prepaid envelope provided.

Consent for participation in the study will be taken as granted after submission of the completed questionnaire. It is up to you whether you decide to participate. You have up to two weeks after completion of the questionnaire to withdraw your data from the study.

Contact Us

If you have any questions about the study do not hesitate to contact any of the investigators below:

Ritisha Mistry
021 2390 617
m_ritisha@windowslive.com

Catherine Bacon
cbacon@unitec.ac.nz

Rob Moran
09 815 4321 ext 8197
rmoran@unitec.ac.nz

UREC REGISTRATION NUMBER: (1139)

This study has been approved by the UNITEC Research Ethics Committee from (date) to (date). 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 6162. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix C:

Participant Information Page for Online Survey

Dear Participant,

Welcome

Hello, my name is Ritisha Mistry. I am a fifth year osteopathic student at Unitec, undertaking my research dissertation as part of my Master of Osteopathy. Along with my supervisors, Catherine Bacon and Rob Moran, I would like to invite you to participate in a study investigating "The attitudes of New Zealand registered osteopaths regarding exercise consultation within osteopathy".

Some background to what we're doing...

Exercise based interventions are commonly used in conjunction with many forms of manual therapy. However, it's not clear whether osteopaths believe that prescribing or advising patients about exercise is part of their role.

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The questionnaire will be sent to New Zealand registered osteopaths to gather 'YOUR VIEWS' on exercise consultation. There are no right or wrong answers and your responses are confidential. No information that could link you or your practice to your responses will be disclosed.

We might need to contact you...

For the purposes of this study we may need to clarify any responses you have provided in the questionnaire. If you would be happy for us to contact you again for this purpose an option will be available at the end of the survey allowing you to indicate your consent by ticking 'yes' or 'no' with a space to provide your details.

****** Get in the draw to WIN !! ******

To show our appreciation for your participation we will be giving away $200 worth of Westfield or petrol vouchers. If you would like to be entered into the draw to win this prize a similar option will be provided as described above with separate 'yes' or 'no' boxes. The prize will be drawn upon completion of this study.

Before we get started...

We ask that you carefully consider each question and answer. Regardless of what you think about exercise consultation in osteopathy we'd like to hear your views.

On the next page, you'll be invited to tick ‘yes’ under the statement “I have read and understood the information provided and give my consent to be a part of this project”. If you do not wish to proceed simply tick 'no' and close the window.

Once the survey has been completed please click ‘done' to complete the study.

Consent for participation in the study will be taken as granted after submission of the completed questionnaire. It is up to you whether you decide to participate. You have up to two weeks after completion of the questionnaire to withdraw your data from the study.

Contact Us

If you have any questions about the study do not hesitate to contact any of the investigators below:

Ritisha Mistry
021 2390 617
m_ritisha@windowslive.com

Catherine Bacon
cbacon@unitec.ac.nz

Rob Moran
09 815 4321 ext 8197
rmoran@unitec.ac.nz

UREC REGISTRATION NUMBER: (1139)

This study has been approved by the UNITEC Research Ethics Committee from (date) to (date). 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 6162. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix D:

Participant Consent Form

Participant Consent Form

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

I understand that I don't have to be part of this study if I don't want to and I may withdraw any time within two weeks of submitting the questionnaire.

I understand that my responses are confidential and that none of the personal information I give will identify me in public documents.

I also understand that all the information that I give will only be accessed by authorised researchers and supervisors and after the study is complete will be stored in a secure location.

I understand that at the end of the questionnaire I will have the option of providing my details in order to being contacted again in the future for:

A.Clarification purposes of any of my responses in the survey
B.To enter the prize draw and to claim the prize that will be drawn at the completion of this survey

I understand that I can see the finished research document by contacting Ritisha Mistry m_ritisha@windowslive.com at anytime.

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

- Yes
- No

UREC REGISTRATION NUMBER: (1139)

This study has been approved by the UNITEC Research Ethics Committee from (date) to (date). 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 6162. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix E:

Questionnaire

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

Dear Participant,

Welcome

Hello, my name is Ritisha Mistry. I am a fifth year osteopathic student at Unitec, undertaking my research dissertation as part of my Master of Osteopathy. Along with my supervisors, Catherine Bacon and Rob Moran, I would like to invite you to participate in a study investigating "The attitudes of New Zealand registered osteopaths regarding exercise consultation within osteopathy".

Some background to what we're doing...

Exercise based interventions are commonly used in conjunction with many forms of manual therapy. However, it's not clear whether osteopaths believe that prescribing or advising patients about exercise is part of their role.

This study aims to investigate exercise consultation used within New Zealand osteopathic practice, and attitudes of osteopaths towards exercise consultation.

The questionnaire will be sent to New Zealand registered osteopaths to gather 'YOUR VIEWS' on exercise consultation. There are no right or wrong answers and your responses are confidential. No information that could link you or your practice to your responses will be disclosed.

We might need to contact you...

For the purposes of this study we may need to clarify any responses you have provided in the questionnaire. If you would be happy for us to contact you again for this purpose an option will be available at the end of the survey allowing you to indicate your consent by ticking 'yes' or 'no' with a space to provide your details.

**** **Get in the draw to WIN !!** ****

To show our appreciation for your participation we will be giving away $200 worth of Westfield or petrol vouchers. If you would like to be entered into the draw to win this prize a similar option will be provided as described above with separate 'yes' or 'no' boxes. The prize will be drawn upon completion of this study.

Before we get started...

We ask that you carefully consider each question and answer. Regardless of what you think about exercise consultation in osteopathy we'd like to hear your views.

On the next page, you'll be invited to tick 'yes' under the statement "I have read and understood the information provided and give my consent to be a part of this project". If you do not wish to proceed simply tick 'no' and return the survey as described below.

Once the survey has been completed please return it to us via the self addressed prepaid envelope provided.

Consent for participation in the study will be taken as granted after the return of the completed questionnaire. It is up to you whether you decide to participate. You have up to two weeks after completion of the questionnaire to withdraw your data from the study.

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

Contact Us

If you have any questions about the study do not hesitate to contact any of the investigators below:

Ritisha Mistry
021 2390 617
m_ritisha@windowslive.com

Catherine Bacon
cbacon@unitec.ac.nz

Rob Moran
09 815 4321 ext 8197
rmoran@unitec.ac.nz

Participant Consent

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

I understand that I don't have to be part of this study if I don't want to and I may withdraw any time within two weeks of submitting the questionnaire.

I understand that my responses are confidential and that none of the personal information I give will identify me in public documents.

I also understand that all the information that I give will only be accessed by authorised researchers and supervisors and after the study is complete will be stored in a secure location.

I understand that at the end of the questionnaire I will have the option of providing my details in order to being contacted again in the future for:

A.Clarification purposes of any of my responses in the survey

B.To enter the prize draw and to claim the prize that will be drawn at the completion of this survey

I understand that I can see the finished research document by contacting Ritisha Mistry

m_ritisha@windowslive.com at anytime.

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

- ◯ Yes
- ◯ No

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

Thank you very much for helping us with this survey.

The following questions ask information about your training and yourself.
Please answer all of the questions by marking the relevant option that best describes your situation or view.

2. Gender

- ◯ Male
- ◯ Female

3. Age (in years)

4. From which Institute did you gain your qualification?

- ◯ British School of Osteopathy, United Kingdom
- ◯ British College of Naturopathy and Osteopathy, United Kingdom
- ◯ British College of Osteopathic Medicine, United Kingdom
- ◯ College of Osteopaths, United Kingdom
- ◯ European School of Osteopathy
- ◯ International College of Osteopathy, Australia
- ◯ London College of Osteopathic Medicine, United Kingdom
- ◯ London School of Osteopathy, United Kingdom
- ◯ Osteopathic College of New Zealand, New Zealand
- ◯ Oxford Brookes University, United Kingdom
- ◯ Phillip Institute of Technology, Australia (pre 1993)
- ◯ Royal Melbourne Institute of Technology (RMIT), Australia
- ◯ South Pacific College of Naturopathy and Osteopathy, New Zealand
- ◯ Surrey Institute of Osteopathic Medicine, United Kingdom
- ◯ Sydney College of Osteopathy, Australia
- ◯ UNITEC, New Zealand
- ◯ University of Western Sydney, Australia
- ◯ University of Western Sydney, Australia
- ◯ Victoria University, Australia
- ◯ Windsor College, Australia
- ◯ Other (please specify)

5. For how many years have you been practicing as a fully qualified osteopath?

6. In a typical week how many hours would you work as an osteopath?

7. Which of the following best describes the location of your work?

- ◯ Rural Location
- ◯ Small Town (<10,000)
- ◯ Large Town (10-20,000)
- ◯ City (>20,000)

8. How would you describe your practice style?
Please select a single response per technique that best represents your style

	Most of my patients	75% of my patients	50% of my patients	25% of my patients	Hardly any of my patients	Do not use this technique
High velocity low amplitude (HVLA)	◯	◯	◯	◯	◯	◯
Dry Needling/ Acupuncture	◯	◯	◯	◯	◯	◯
Functional Technique	◯	◯	◯	◯	◯	◯
Muscle energy (MET)	◯	◯	◯	◯	◯	◯
Osteopathy in the cranial field (OCF)	◯	◯	◯	◯	◯	◯
Soft Tissue	◯	◯	◯	◯	◯	◯
Fascial unwinding	◯	◯	◯	◯	◯	◯
Articulation/ Joint Mobilisation (without cavitation)	◯	◯	◯	◯	◯	◯
Visceral	◯	◯	◯	◯	◯	◯
Balance ligamentous tension (BLT)	◯	◯	◯	◯	◯	◯
Strain-counterstrain &/or Positional release	◯	◯	◯	◯	◯	◯
Other Technique	◯	◯	◯	◯	◯	◯

Other Technique (please specify)

9. Which age groups do you typically treat? Please tick all that apply.

- [ ] Babies 0-3 months
- [ ] Infants & Toddlers 4months-2yrs
- [ ] Children 3-13yrs
- [ ] Adolescents 14-20yrs
- [ ] Adults 21-65yrs
- [ ] Older Adults 66yrs +

10. What is your highest qualification in ANY field?

- ◯ Diploma
- ◯ Bachelors Degree
- ◯ Honour Degree
- ◯ Masters Degree
- ◯ PhD or Doctoral Degree
- ◯ Other (please specify)

11. Do you currently smoke? -including cigarettes, roll-your-own, pipe, cigar, other. (If no skip to question 14)

- ◯ Yes
- ◯ No (skip to question 14)

12. Have you ever smoked regularly for a period of six months or more?

- ◯ Yes
- ◯ No

13. Typically, how many cigarettes do you currently smoke?

Per day (OR)

Per week

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

14. What level of education or training did you receive regarding "Therapeutic Exercise" DURING YOUR OSTEOPATHIC EDUCATION?

We're defining "Therapeutic Exercise" as a Prescribed physical activity program that is typically prescribed in terms of: Frequency, Intensity, Time (eg duration), and Type (eg walking).

People doing "Therapeutic Exercise" undertake voluntary muscle contraction and/or body movement with the aim of improving function, relieving symptoms, or slowing deterioration of health.

Therapeutic exercise can take many forms and can include any combination of cardiovascular exercise, strengthening or stretching/mobility exercises

- ◯ No Training
- ◯ Minimal Training
- ◯ Adequate Training
- ◯ Good Training
- ◯ Excellent Training

15. Have you had any tertiary (certificate/diploma/degree) or post graduate education or training in Exercise Therapy/Therapeutic Exercise?

- ◯ Yes
- ◯ No

16. If yes, please specify (name of course, which Institution and year completed)

17. Thinking about the previous 12 months... What proportion of your patients have you provided <u>EXERCISE PRESCRIPTION</u> at some point during their management?

EXERCISE PRESCRIPTION is a <u>PRESCRIBED</u> physical activity programme including all four components of FITT (frequency, intensity, time (duration) and type (mode).

Examples of this include: any combination of aerobic, strengthening or stretching exercises.

	All or Most of my patients	About 75% of my patients	About 50% of my patients	About 25% of my patients	None or Hardly any of my patients
Exercise prescription to treat or prevent SPECIFIC CONDITION(s) being treated by you	◯	◯	◯	◯	◯
Exercise prescription for GENERAL WELLBEING	◯	◯	◯	◯	◯

18. Still thinking about the previous 12 months... What proportion of your patients have you provided <u>EXERCISE ADVICE</u> at some point during their management?

EXERCISE ADVICE is an <u>ADVISED</u> physical activity that does not include a highly specific exercise prescription with all components of FITT (frequency, intensity, time (duration)and type (mode).

Examples include: any recreational sport, going to the gym, running, walking, cycling, yoga, pilates, sailing and so on.

	All or Most of my patients	Around 75% of my patients	Around 50% of my patients	Around 25% of my patients	None or Hardly any of my patients
Exercise advice to treat or prevent SPECIFIC CONDITION(s) being treated by you	◯	◯	◯	◯	◯
Exercise advice for GENERAL WELLBEING	◯	◯	◯	◯	◯

19. Exercise can be communicated in many ways to a patient.

Thinking about the proportion of patients for which you provide exercise consultation, what METHODS do you use? (If method not listed please specify)

	All or Most of my patients	About 75% of my patients	About 50% of my patients	About 25% of my patients	None or Hardly any of my patients
Verbal Instructions	◯	◯	◯	◯	◯
Physical demonstration of exercises by practitioner	◯	◯	◯	◯	◯
Supervised demonstration of exercises by patient	◯	◯	◯	◯	◯
Exercises completed under supervision of practitioner	◯	◯	◯	◯	◯
Written handout with instructions only	◯	◯	◯	◯	◯
Written handout with instructions & illustrations	◯	◯	◯	◯	◯
Referral to exercise specialist	◯	◯	◯	◯	◯
Referral to website/books	◯	◯	◯	◯	◯
Other	◯	◯	◯	◯	◯

Other (please specify)

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

The following questions ask information about **YOUR OWN PERSONAL** participation in physical activities and sports.

Physical exercise –is any physical activity in which bodily movement produced by skeletal muscles results in an expenditure of energy to a level that is sufficient to produce physiological adaptation. (Includes up to three out of four FITT components)

• FITT –frequency, intensity, time (duration), type (mode of exercise)

Please consider physical activity as anything during which you exert yourself outside of normal everyday activities. Examples of this include any recreational sport, gym, running, walking, cycling, swimming, yoga, pilates, boating sports etc.

20. On average, over the last two weeks how many hours have YOU personally spent engaged in PHYSICAL ACTIVITY?

	0.25 hr	0.5 hr	1.0 hr	1.5 hrs	>2 hrs
On a normal **Saturday**	◯	◯	◯	◯	◯
On a normal **Sunday**	◯	◯	◯	◯	◯
On a normal **Weekday**	◯	◯	◯	◯	◯

21. Do you partcipate in competitive sport/s?

◯ Yes

◯ No

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

The following questions relate to the consultation of **Exercise Advice** in order to improve the **General Health and Wellbeing** of patients.

Exercise Advice is an **ADVISED** physical activity that does not include a highly specific exercise prescription with all components of FITT (frequency, intensity, time (duration)and type (mode).

Examples include: any recreational sport, going to the gym, running, walking, cycling, yoga, pilates, sailing and so on.

22. Please tick the box that best describes YOUR OWN PERSONAL views regarding the following statements below.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
As a health practitioner, I have a responsibility to maintain a healthy lifestyle myself including regular physical exercise.	◯	◯	◯	◯	◯
As health practitioners, osteopaths have a professional responsibility to provide lifestyle modification advice.	◯	◯	◯	◯	◯
The osteopathic consultation provides an excellent opportunity to address patients' lifestyles.	◯	◯	◯	◯	◯
Typically I provide physical exercise advice to all my patients.	◯	◯	◯	◯	◯
Osteopaths should not give lifestyle modification such as physical exercise advice because they are not educated adequately in this area.	◯	◯	◯	◯	◯
While symptoms persist patients will follow instructions regarding advised physical exercise.	◯	◯	◯	◯	◯
Overall, patients do not follow instructions regarding advised physical exercise so I don't offer any.	◯	◯	◯	◯	◯
Overall, I have found patients follow advice regarding physical exercise.	◯	◯	◯	◯	◯
The physical exercise activity advice I give is guided by the personality and interests of the patient.	◯	◯	◯	◯	◯
Osteopaths show interest and commitment to patients by giving lifestyle modifications such as advised physical exercise and physical activity modifications as part of osteopathic consultations.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

23. The following questions still relate to the consultation of EXERCISE ADVICE in order to improve HEALTH AND WELLBEING of patients.

Please tick the box which best describes your view regarding the statements below. Please refer to the definitions above if required.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Therapeutic outcomes of osteopathic treatment are mostly dependent in people with acute pain adhering to lifestyle modifications such as physical exercise modifications.	◯	◯	◯	◯	◯
Therapeutic outcomes of osteopathic treatment are mostly dependent on people with persistent pain adhering to lifestyle modifications such as physical exercise modifications.	◯	◯	◯	◯	◯
Osteopathic management of patients is not complete without the inclusion of lifestyle modification such as physical exercise advice.	◯	◯	◯	◯	◯
Performing some form of advised physical exercise at the recommended level (30 minutes of moderate intensity exercise 5 days per week) is necessary for good health.	◯	◯	◯	◯	◯
People who are performing some form of advised physical exercise in a safe way to the recommended level are less likely to develop musculoskeletal problems compared to people who have a sedentary lifestyle.	◯	◯	◯	◯	◯
Patients seek osteopathy to receive osteopathic manual therapy therefore they should not be provided with advised physical exercises.	◯	◯	◯	◯	◯
People who perform some form of advised physical exercise in a safe way to the recommended level have better therapeutic outcomes from osteopathic manual therapy.	◯	◯	◯	◯	◯
People who perform advised physical exercise in a safe way to the recommended level will maintain positive therapeutic benefits gained from osteopathic manual therapy.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

In the last question we talked about the consultation of exercise advice for health and wellbeing.

The following questions now relate to the consultation of **Exercise Prescription for the Prevention of a Specific Medical Condition** being treated by you.

Exercise Prescription is a **PRESCRIBED** physical activity programme including all four components of FITT (frequency, intensity, time (duration) and type (mode).

Examples of this include: any combination of aerobic, strengthening or stretching exercises.

24. Please tick the box below which best describes your view regarding the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Osteopaths should only prescribe exercise if they have undertaken appropriate training.	◯	◯	◯	◯	◯
Exercise ADVICE is more important than exercise PRESCRIPTION for improving function, relieving symptoms, or slowing deterioration of health.	◯	◯	◯	◯	◯
Other health care practitioners are better placed to prescribe exercise than osteopaths.	◯	◯	◯	◯	◯
Overall, patients do not follow instructions regarding prescribed exercise so I don't prescribe any.	◯	◯	◯	◯	◯
People who engage in regular physical exercise are more likely to follow instructions regarding exercise prescription.	◯	◯	◯	◯	◯
Patients who ask for exercises are more likely to follow the exercise prescription provided.	◯	◯	◯	◯	◯
While symptoms persist patients are more likely to carry out a prescribed exercise programme.	◯	◯	◯	◯	◯
Patients only follow instruction regarding exercise prescription for a short time period therefore there is little benefit in prescribing it.	◯	◯	◯	◯	◯
Overall, I have found patients can be encouraged to follow advice regarding exercise prescription.	◯	◯	◯	◯	◯
Patients seek osteopathy to receive osteopathic manual therapy therefore they should not be prescribed exercise.	◯	◯	◯	◯	◯
Prescribing exercise to patients during an osteopathic consultation is integral to osteopathic manual medicine.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

25. The following questions still relate to the consultation of EXERCISE PRESCRIPTION for the PREVENTION of a SPECIFIC MEDICAL CONDITION being treated by you.

Please tick the box which best describes your view regarding the following statements. (Please refer to the definition above if required)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is no place for prescribing exercise to patients within osteopathic philosophies and principles.	◯	◯	◯	◯	◯
I do not prescribe exercise to my patients because I don't have confidence that I have the skill to provide specific therapeutic exercises.	◯	◯	◯	◯	◯
Prescribed exercises that have relevance to one of the patients daily activities increases the likelihood they will follow those instructions.	◯	◯	◯	◯	◯
The exercises I prescribe in clinical practice are based on my anatomical knowledge.	◯	◯	◯	◯	◯
The exercises I prescribe in clinical practice are based on the functional changes I want to make in patients.	◯	◯	◯	◯	◯
The exercises I prescribe in clinical practice have mostly been developed after graduation from my osteopathic training.	◯	◯	◯	◯	◯
Osteopaths should use the best evidence available to guide their prescription of exercise regardless of which discipline it comes from.	◯	◯	◯	◯	◯
I think it is important to keep up to date with research regarding exercise prescription.	◯	◯	◯	◯	◯
My knowledge about exercise prescription is based mainly on my empirical clinical experience.	◯	◯	◯	◯	◯
The general societal attitudes to exercise at the time I trained most strongly influence my thinking about exercise prescription.	◯	◯	◯	◯	◯
The opinions of my teachers during my osteopathic training were the strongest influence on my thinking about exercise prescription.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

The following questions still relate to the consultation of **Exercise Prescription for the Prevention of a Specific Medical Condition** being treated by you.

Exercise Prescription is a **PRESCRIBED** physical activity programme including all four components of FITT (frequency, intensity, time (duration) and type (mode).

Examples of this include: any combination of aerobic, strengthening or stretching exercises.

26. Please tick the box which best describes your view regarding the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The curriculum of the school at which I studied strongly influenced my thinking about exercise prescription.	◯	◯	◯	◯	◯
Many of my patients have benefited from exercise prescription.	◯	◯	◯	◯	◯
I had limited education about exercise prescription during my pre-registration training.	◯	◯	◯	◯	◯
Performing exercise prescription will undo the benefits of receiving osteopathic manual therapy.	◯	◯	◯	◯	◯
Prescribing exercise to patients encourages a sense of ownership over their treatment.	◯	◯	◯	◯	◯
There is no benefit to giving patients prescribed exercises whilst they are receiving osteopathic manual therapy.	◯	◯	◯	◯	◯
Prescribing exercise is very time consuming therefore I do not use it in clinical practice.	◯	◯	◯	◯	◯
My time as an osteopath is better spent treating the patient with osteopathic manual therapy than prescribing exercises.	◯	◯	◯	◯	◯
Osteopathic manual therapy alone is powerful enough that supplementary exercise prescription is unnecessary.	◯	◯	◯	◯	◯
Performing exercise prescription for people with acute pain is usually more important to patient's recovery than osteopathic manual therapy.	◯	◯	◯	◯	◯
Performing exercise prescription for people with persistent pain is usually more important to patient's recovery than osteopathic manual therapy.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

27. The following questions still relate to the consultation of EXERCISE PRESCRIPTION for the PREVENTION of a SPECIFIC MEDICAL CONDITION being treated by you.

Please tick the box which best describes your view regarding the following statements. (Please refer to the definitions above if required)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Prescribing exercise to patients should not be part of osteopathic management.	◯	◯	◯	◯	◯
Therapeutic exercises can be provided by other health care practitioners therefore osteopaths do not need to prescribe exercise.	◯	◯	◯	◯	◯
Prescribing exercise will reduce the number of treatment sessions needed and therefore saves the patient money.	◯	◯	◯	◯	◯
Patients who undertake prescribed exercise will need less osteopathic manual therapy.	◯	◯	◯	◯	◯
I think in the future, funding will be more likely targeted to those therapies that utilise active treatment programmes rather than passive treatment programmes.	◯	◯	◯	◯	◯
I would like to continue further education into exercise prescription if it was available.	◯	◯	◯	◯	◯
The post-graduate education into exercise prescription is not sufficient.	◯	◯	◯	◯	◯

2Attitudes and Self-reported Practices of NZ Registered Osteopaths

Thankyou for taking the time to complete this questionnaire.

For the purposes of **this** study, we may need to contact you again for **Clarification Purposes Only** of any responses you have provided in this survey.

If you consent to this please tick **'YES'** and fill in the boxes.

28. I consent to being contacted for clarification about any of my responses

- ◯ Yes
- ◯ No

29. I would like to be entered into the draw to win upto $200 worth of Westfield or petrol vouchers and consent to being contacted in order to claim the prize

- ◯ Yes
- ◯ No

30. Please provide your full name and details of your preferred method of contact; either an email address, mobile or telephone number.

Name

Contact Details

31. THANKYOU again, for completing this questionnaire. Have a great day!

Please leave any questions or comments you may have for the researcher in the below box and she will get back to you asap.

Appendix F:

Preliminary Questionnaire 2010

Part one: Demographics

1. Institution where you gained your qualification (If you are a practitioner- If you are pre-qualified, please indicate your current institution)
2. How many years have you been practicing as an osteopath
3. What is your age?
4. Gender
5. Are you currently practicing clinical osteopathic medicine?
6. In what kind of area is/are your practice(s) or student clinic located?
7. Do you treat all age groups?
8. If no to question 7, what age groups do you treat (eg. Paediatrics, adults, geriatrics)
9. What is your highest qualification (In any field)?
10. Do you participate in physical exercise? Physical exercise is any physical activity whereby any bodily movement produced by skeletal muscles results in an expenditure of energy to a level that is sufficient to produce physiological adaptation. The recommendation by the Ministry of Health and the American College of Sports Medicine for the appropriate level of physical activity is 30 minutes of moderate intensity activity at least five days per week. Moderate intensity exercise means working hard enough to raise your heart rate and break a sweat but still be able to hold a conversation.
11. If yes, how often and at what intensity do you participate in physical exercise
12. Are you interested in recreational sport/s
13. If yes, how often do you participate in recreational sport/s
14. What, if any education/training have you received about exercise therapy/therapeutic exercise

Part two: Physical exercise

Please answer the following questions about physical exercise. Physical exercise for this section means physical activity where any bodily movement produced by skeletal muscles results in an expenditure of energy to a level that is sufficient to produce physiological adaptation. The recommendation by the Ministry of Health and the American College of Sports Medicine for the appropriate level of physical activity is 30 minutes of moderate intensity activity at least five days per week. Moderate intensity exercise means working hard enough to raise your heart rate and break a sweat but still be able to hold a conversation.

1. As a health practitioner, I have a responsibility to maintain a healthy lifestyle myself including regular physical exercise
2. As health practitioners, osteopaths have a professional responsibility to provide lifestyle modification advice
3. The osteopathic consultation provides an excellent opportunity to address patients' lifestyles
4. Typically I provide physical exercise advice to all my patients

5. Osteopaths should not give lifestyle modification such as physical exercise advice because they are not educated adequately in this area
6. While symptoms persist patients will follow instructions regarding physical exercise
7. Overall, patients do not follow instructions regarding physical exercise so I don't offer any
8. Overall, I have found patients follow advice regarding physical exercise
9. The physical exercise activity advice I give is guided by the personality and interests of the patient
10. Osteopaths show interest and commitment to patients by giving lifestyle modifications such as physical exercise and physical activity modifications as part of osteopathic consultations
11. Therapeutic outcomes of osteopathic treatment are mostly dependent in people with acute pain adhering to lifestyle modifications such as physical exercise modifications
12. Therapeutic outcomes of osteopathic treatment are mostly dependent on people with persistent pain adhering to lifestyle modifications such as physical exercise modifications
13. Osteopathic management of patients is not complete without the inclusion of lifestyle modification such as physical exercise advice
14. Performing some form of physical exercise at the recommended level (30 minutes of moderate intensity exercise 5 days per week) is necessary for good health
15. People who are performing some form of physical exercise in a safe way to the recommended level are less likely to develop **musculoskeletal** problems compared to people who have a sedentary lifestyle
16. Patients seek osteopathy to receive osteopathic manual therapy therefore they should not be provided with physical activity advice
17. People who perform some form of physical exercise in a safe way to the recommended level have better therapeutic outcomes from osteopathic manual therapy
18. People who perform physical exercise in a safe way to the recommended level will maintain positive therapeutic benefits gained from osteopathic manual therapy

Part three: Specific Therapeutic exercise questions

Please answer the following questions regarding therapeutic exercise. Therapeutic exercise for this section is defined as a prescribed physical activity program involving the patient undertaking voluntary muscle contraction and/or body movement with the aim of improving function, relieving symptoms, or slowing deterioration of health. Therapeutic exercise can take many forms and can include any combination of strengthening, or stretching exercises.

1. Osteopaths should only prescribe therapeutic exercise if they have undertaken appropriate training
2. Physical exercise is more important than therapeutic exercise for improving function, relieving symptoms, or slowing deterioration of health

3. Other health care practitioners are better placed to prescribe therapeutic exercise than osteopaths
4. Overall, patients do not follow instructions regarding therapeutic exercise so I don't prescribe any
5. People who engage in regular physical exercise are more likely to follow instructions regarding therapeutic exercise
6. Patients who ask for exercises are more likely to follow the exercise prescription provided
7. While symptoms persist patients are more likely to carry out a therapeutic exercise programme
8. Patients only follow instruction regarding therapeutic exercise for a short time period therefore there is little benefit in prescribing it
9. Overall, I have found patients can be encouraged to follow advice regarding therapeutic exercise
10. Patients seek osteopathy to receive osteopathic manual therapy therefore they should not be prescribed therapeutic exercise
11. Prescribing therapeutic exercise to patients during an osteopathic consultation is integral to osteopathic manual medicine
12. There is no place for prescribing therapeutic exercise to patients within osteopathic philosophies and principles
13. I do not prescribe therapeutic exercise to my patients because I don't have confidence that I have the skill to provide specific therapeutic exercises
14. Therapeutic exercises that have relevance to one of the patients daily activities increases the likelihood they will follow those instructions
15. The therapeutic exercises I prescribe in clinical practice are based on my anatomical knowledge
16. The therapeutic exercises I prescribe in clinical practice are based on the functional changes I want to make in patients
17. The therapeutic exercises I prescribe in clinical practice have mostly been developed after graduation from my osteopathic training
18. Osteopaths should use the best evidence available to guide their prescription of therapeutic exercise regardless of which discipline it comes from
19. I think it is important to keep up to date with research regarding therapeutic exercise
20. My knowledge about therapeutic exercise is based mainly on my empirical clinical experience
21. The general societal attitudes to exercise at the time I trained most strongly influence my thinking about therapeutic exercise
22. The opinions of my teachers during my osteopathic training were the strongest influence on my thinking about therapeutic exercise
23. The curriculum of the school at which I studied strongly influenced my thinking about therapeutic exercise
24. Many of my patients have benefited from therapeutic exercise
25. I had limited education about therapeutic exercise during my pre-registration training

26. Performing prescribed therapeutic exercise will undo the benefits of receiving osteopathic manual therapy
27. Prescribing therapeutic exercises to patients encourages a sense of ownership over their treatment
28. There is no benefit to giving patients therapeutic exercises whilst they are receiving osteopathic manual therapy
29. Prescribing therapeutic exercise is very time consuming therefore I do not use it in clinical practice
30. My time as an osteopath is better spent treating the patient with osteopathic manual therapy than prescribing therapeutic exercises
31. Osteopathic manual therapy alone is powerful enough that supplementary therapeutic exercise is unnecessary
32. Performing therapeutic exercise is usually more important to patients recovery than osteopathic manual therapy for people with acute pain
33. Performing therapeutic exercise is usually more important to patients recovery than osteopathic manual therapy for people with persistent pain
34. Prescribing therapeutic exercise to patients should not be part of osteopathic management
35. Therapeutic exercises can be provided by other health care practitioners therefore osteopaths do not need to prescribe therapeutic exercise
36. Prescribing therapeutic exercise will reduce the number of treatment sessions needed and therefore saves the patient money
37. Patients who undertake therapeutic exercise will need less osteopathic manual therapy
38. I think in the future, funding will be more likely targeted to those therapies that utilise active treatment programmes rather than passive treatment programmes
39. I am cognisant of the research around the effectiveness for treatment outcomes of active versus passive treatment for musculoskeletal conditions in general
40. I would like to continue further education into therapeutic exercise if it was available
41. The post-graduate education into therapeutic education is not sufficient

Appendix G:

IJOM Guidelines

SUBMISSION

Submission to this journal proceeds totally online at (http://ees.elsevier.com/ijom). You will be guided stepwise through the creation and uploading of the various files. The system automatically converts source files to a single Adobe Acrobat PDF version of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF at submission for the review process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor's decision and requests for revision, takes place by e-mail and via the Author's homepage, removing the need for a hard-copy paper trail.

The above represents a very brief outline of this form of submission. It can be advantageous to print this "Guide for Authors" section from the site for reference in the subsequent stages of article preparation.

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the Publisher.

CONTRIBUTIONS

Reviews and Original Articles (2,000 - 5,000 words)
These should be either **(i)** reports of new findings related to osteopathic medicine that are supported by research evidence. These should be original, previously unpublished works; or **(ii)** a critical or systematic review that seeks to summarise or draw conclusions from the established literature on a topic relevant to osteopathic medicine.

Submission Declaration
Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the copyright-holder.

Ethical Considerations
Human subjects. Work on human beings that is submitted to The International Journal of Osteopathic Medicine should comply with the principles laid down in the declaration of Helsinki; Recommendations guiding physicians in biomedical research involving human subjects. Adopted by the 18th World Medical Assembly, Helsinki,

Finland, June 1964, amended by the 29th World Medical Assembly, Tokyo, Japan, October 1975, the 35th World Medical Assembly, Venice, Italy, October 1983, and the 41st World Medical Assembly, Hong Kong, September 1989. The manuscript should contain a statement that the research has been approved by the appropriate ethical committees related to the institution(s) in which it was performed and that subjects gave informed consent to the work. Studies involving experiments with animals must state that their care was in accordance with institution guidelines. Patients' and volunteers' names, initials, and hospital numbers should not be used. In a case report, the subject's written consent should be provided. It is the author's responsibility to ensure all appropriate consents have been obtained.

Patient anonymity. Studies on patients or volunteers require ethics committee approval and informed consent which should be documented in the manuscript.

Patients have a right to privacy. Therefore identifying information, including patients' images, names, initials, or hospital numbers, should not be included in videos, recordings, written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and you have obtained written informed consent for publication in print and electronic form from the patient (or parent, guardian or next of kin where applicable). If such consent is made subject to any conditions, Elsevier must be made aware of all such conditions. Evidence of written consent must be provided to Elsevier on request.

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If such consent has not been obtained, personal details of patients included in any part of the paper and in any supplementary materials (including all illustrations and videos) must be removed before submission.

Role of the funding source

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. If the funding source(s) had no such involvement then this should be stated. Please see http://www.elsevier.com/funding.

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At the end of the text, under a subheading "Conflict of interest statement" all authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

Acknowledgments
In the appendix one or more statements should specify (a) contributions that need acknowledging, but do not justify authorship (b) acknowledgments of technical support (c) acknowledgments of financial and material support, specifying the nature of the support. Persons named in this section must have given their permission to be named. Authors are responsible for obtaining written permission from those acknowledged by name since readers may infer their endorsement of the data and conclusions.

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Manuscripts going forward to the review process are reviewed by members of an international expert panel. All such papers will undergo a double blind peer review by two or more reviewers. All papers are subject to peer review and the Journal takes every reasonable step to ensure author identity is concealed during the review process. The Editors reserve the right to the final decision regarding acceptance.

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Submitted papers should be relevant to an international audience and authors should not assume knowledge of national practices, policies, law, etc. Authors should consult a recent issue of the journal for style if possible. Since the journal is distributed all over the world, and as English is a second language for many readers, authors are requested to write in plain English and use terminology which is internationally acceptable.

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Manuscript Layout
The manuscript with a font size of 12 or 10 pt double-spaced with wide margins (2.5 cm at least) and number pages consecutively beginning with the Title Page. Depending on the paper type (see above) this should include the title, abstract, key words, text, references, tables, figure legends, figures, appendix. Microsoft Word or similar programme should be used.

Please check your typescript carefully before you send it off, both for correct content and typographic errors. It is not possible to change the content of accepted typescripts during production.

To facilitate anonymity, the author's names and any reference to their addresses should only appear on the title page. Please check your typescript carefully before you send it off, both for correct content and typographic errors. It is not possible to change the content of accepted typescripts during production.

Papers should be set out as follows, with each section beginning on a separate page:

Title page
To facilitate the blinded peer-review process, **two** title pages are required. The first should carry just the title of the paper and no information that might identify the author or institution. The second should contain the following information: title of paper; full name(s) and address(es) of author(s) clearly indicating who is the corresponding author; you should give a maximum of four degrees/qualifications for each author and the current relevant appointment only; institutional affiliation; name, address, telephone, fax and e-mail of the corresponding author; source(s) of support in the form of funding and/or equipment.

Keywords
Include four to ten keywords in alphabetical order, which accurately identify the paper's subject, purpose, method and focus. These should be indexing terms that may be published with the abstract with the aim of increasing the likely accessibility of your paper to potential readers searching the literature. Therefore, ensure keywords are descriptive of the study. Use the Medical Subject Headings (MeSH®) thesaurus or

Cumulative Index to Nursing and Allied Health (CINAHL) headings where possible (see http://www.nlm.nih.gov/mesh/meshhome.html).

Abstract
Both qualitative and quantitative research approaches should be accompanied by a structured abstract of no more than 250 words. Commentaries and Essays may continue to use text based abstracts of no more than 150 words. All original articles should include the following headings in the abstract as appropriate: Background, Objective, Design, Setting, Methods, Participants, Results, and Conclusions. As an absolute minimum: Objectives, Methods, Results, and Conclusions must be provided for all original articles. Abstracts for reviews of the literature (in particular systematic reviews and meta-analysis) should include the following headings as appropriate: Objectives, Data Sources, Study Selection, Data Extraction, Data Synthesis, Conclusions. Abstracts for Case Studies should include the following headings as appropriate: Background, Objectives, Clinical Features, Intervention and Outcomes, Conclusions.

Text
The text of observational and experimental articles is usually, but not necessarily, divided into sections with the headings; introduction, methods, results, results and discussion. In longer articles, headings should be used only to enhance the readability. Three categories of headings should be used:

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- Secondary ones should be typed in lower case (with an initial capital letter) in the left hand margin and underlined (i.e. Participants).
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Do not use 'he', 'his' etc. where the sex of the person is unknown; say 'the patient' etc. Avoid inelegant alternatives such as 'he/she'.

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When submitting a manuscript you will need to consider if you, or any of your co-authors, are an Editor or Editorial Board member of the International Journal of Osteopathic Medicine. If this is the case you will need to include a section, at the end of your manuscript immediately before the reference section, called "Statement of Competing Interests". Example statement, which may require editing, is as follows: (Name of author) is an Editor of the Int J Osteopath Med; (Name of author) is a member of the Editorial Board of the Int J Osteopath Med but was not involved in review or editorial decisions regarding this manuscript.

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1. Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. J Sci Commun 2000;**163**:51-9.

Reference to a book:
2. Strunk Jr W, White EB. The elements of style. 3rd ed. New York: Macmillan; 1979.

Reference to a chapter in an edited book:
3. Mettam GR, Adams LB. How to prepare an electronic version of your article. In: Jones BS, Smith RZ, editors. Introduction to the electronic age. New York: E-Publishing Inc; 1999, p. 281-304

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Note shortened form for last page number. (e.g., 51-9), and that for more than 6 authors the first 6 should be listed followed by "et al." For further details you are referred to "Uniform Requirements for Manuscripts submitted to Biomedical Journals" (J Am Med Assoc 1997;**277**:927-934) (see also http://www.nejm.org/general/text/requirements/1.htm).

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Tables, illustrations and figures should be placed on separate pages as separate electronic files and not placed within the manuscript. Each table, illustration or figure should be accompanied by a number (e.g. Table 1) and a brief description of the content of the table, figure or illustration, below the table, illustration or figure. All tables, illustrations or figures should be referred to in the manuscript.

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SPECIFIC GUIDANCE FOR ORIGINAL RESEARCH ARTICLES

The text of **original research** for a quantitative or qualitative study is typically subdivided into the following sections:

Introduction
State the purpose of the article. Summarise the rationale for the study or observation. Give only strictly pertinent references and do not review the subject extensively. Do not include data or conclusions from the work being reported.

Materials and Methods
Describe your selection of observational or experimental participants (including controls). Identify the methods, apparatus (manufacturer's name and address in parenthesis) and procedures in sufficient detail to allow workers to reproduce the results. Give references and brief descriptions for methods that have been published but are not well known; describe new methods and evaluate limitations.

Indicate whether procedures followed were in accordance with the ethical standards of the institution or regional committee responsible for ethical standards. Do not use

patient names or initials. Take care to mask the identity of any participants in illustrative material.

Results
Present results in a logical sequence in the text, tables and illustrations. Do not repeat in the text all the data in the tables or illustrations. Emphasise or summarise only important observations.

Discussion
Emphasise the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the introduction or the results section. Include implications of the findings and their limitations, and include implications for future research. Relate the observations to other relevant studies. Link the conclusion with the goals of the study, but avoid unqualified statements and conclusions not completely supported by your data. State new hypothesis when warranted, but clearly label them as such. Recommendations, when appropriate, may be included.

Conclusion
A summary of the pertinent findings and, relevance of the study and implications of the study for future research.

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1) Contributions to conception and design; data acquisition; data analysis and interpretation;
2) Drafting of manuscript, or critical revision for important intellectual content;
3) All authors must have given approval to the final version of the manuscript submitted for consideration to publish.
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Example of suggested format (note the use of author initials).
AB conceived the idea for the study. AB and CD contributed to the design and planning of the research. All authors were involved in data collection. AB and EF analysed the data. AB and CD wrote the first draft of the manuscript. EF coordinated funding for the project. All authors edited and approved the final version of the manuscript.

SPECIFIC GUIDANCE FOR PROTOCOLS

Organisation of a Protocol - the following need to be adequately addressed.

- Title
- Abstract/Summary - this should provide a concise description of the purpose of the Protocol and should not exceed 200 words.
- Background, including rationale and any previous systematic review(s).
- Keywords - provide 4-10 keywords.
- Principal investigator(s); contact details.
- Aim(s).
- Design (randomised, double-blind) - including inclusion and exclusion criteria; intervention(s)/method; primary and secondary endpoint(s); side-effects reporting and quantification
- Statistical analysis - including sample size and power calculations; type of analysis; statistical testing.
- Ethical issues - including ethics committee approval; informed consent form and information sheet.
- Publication plan.
- Time required - an estimation of the time required to run the protocol should be given per separate step and for the whole protocol, including reporting.
- Funding source(s).
- References.