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Exercise is a proven fall prevention strategy: it should be embedded into usual physiotherapy practice

Falling and the injuries sustained from falling are a substantial problem for many older adults. Accident Compensation Corporation's (ACC) website states that falls are the leading cause of injury-related hospitalisation in people aged 65years and over. Falls are also a substantial problem for the health system. They account for half of all ACC claims and costs in this age group and 75% of injury-related hospital admissions (ACC 2012). It is important that we are aware of the evidence supporting the reduction of falls in older adults.

Exercise is a proven fall prevention intervention. A 2010 Cochrane review (Gillespie et al 2010) of interventions for preventing falls in older people living in the community, which included 111 trials (n=55,303), reported that exercise reduced falling, as follows:

- Multiple-component group exercise (rate ratio* (RaR) 0.78, 95% CI 0.71 to 0.86; risk ratio** (RR) 0.83, 95% CI 0.72 to 0.97).
- Tai Chi (RaR 0.63, 95% CI 0.52 to 0.78; RR 0.65, 95% CI 0.51 to 0.82).
- Individually prescribed multiple-component home-based exercise (RaR 0.66, 95%CI 0.53 to 0.82; RR 0.77, 95% CI 0.61 to 0.97).

Exercise thus significantly reduces both the rate (by 22-37%) and risk of falling (17-35%). A meta-analysis in 2011 concluded that the most effective exercises to reduce falls were those that involved a challenge to balance, with a dosage of at least 2 hours over a week for the duration of at least 6 months (Sherrington et al 2008). In contrast to the effectiveness of exercise to reduce rate and risk of falls, assessment and multifactorial intervention were found only to reduce the rate of falls (RaR 0.75, 95% CI 0.65 to 0.86) but not the risk of falling.

Other non-exercise based interventions, for example surgery, medications, nutrient and fluid therapy, cognitive behavioural interventions, environment/assistive technology and knowledge/education interventions, were found to have equivocal evidence relating to effectiveness. There was some evidence that vitamin D may reduce the rate of falls in those with low vitamin D levels (RaR 0.57, 95% CI 0.37 to 0.89) and that home safety interventions may reduce the rate of falls in people with severe visual impairment (RaR 0.59, 95% CI 0.42 to 0.82). Further the Cochrane review reported some evidence that fall prevention strategies were cost saving.

Exercise is clearly a proven stand-alone fall prevention strategy and is currently part of evidence-based recommendations in the UK, USA, and Australia. In contrast, in the New Zealand Ministry of Health of Older People Strategy (2002), community-based exercise is mentioned and advocated, but not explicitly recommended.

*rate ratio = ratio of the occurrence of an event in one group over time (exposure or intervention group) to that in another group (control), **risk ratio = ratio of the risk of an event in one group (exposure or intervention) to that in another group (control) (in other words, the probability of occurrence of a given event.)

It is now well over a decade since a New Zealand designed fall prevention exercise programme, the Otago Exercise Programme (OEP), was developed. Four clinical trials and a meta-analysis have supported the effectivenss and cost-effectiveness of the OEP as a falls prevention intervention (Campbell et al 1997, 1999a, 199b; Gardner et al 2001; Robertson et al 2001a, 2001b). A 2010 systematic review with meta-analysis evaluated the effect of the OEP on fall rates (Thomas et al 2010). In 7 trials (n=1503, mean age 81.6 SD 3.9 years) there was a significant decrease in fall rates (incidence RR = 0.68, 95% CI = 0.56–0.79), a reduction in falls of about 32%. Furthermore of the 747 participants in the included studies at 12 months, 37% were still exercising more than three times per week. The continuation of participation in exercise programmes beyond the formal intervention period may be an important factor in the success of falls prevention strategies in the longer term (Taylor et al 2012). The OEP has been adapted as a group community-based peer led exercise programme (the Otago-based Steady As You Go programme) with favourable outcomes, not only in improving measures of strength and balance, but of building social capital (Waters et al 2011).

In 2003 the OEP was rolled out across New Zealand as a coordinated service. Health professionals delivering the OEP were funded by ACC and AUT University was funded by the Ministry of Health to co-ordinate the training of the workforce to deliver the OEP. A website was developed that provided resources for people to deliver the OEP and train others to deliver the OEP. Despite continued positive reviews of the effectiveness of the programme in reducing falls, ACC cut funding of the programme in August 2009. In answer to a question in Parliament, Nick Smith (the ACC Minister at the time) stated that in terms of return on investment the OEP was not cost-effective. In 2006/7 the cost to ACC of falls related claims in community dwelling adults aged 80 years and over was $30.1 million, whilst the cost of implementing the OEP was $2.5 million (Robertson and Campbell 2008). However, a return of investment calculation does not consider effectiveness of the programme or impact on quality of life. Robertson and Campbell's (2008) comprehensive report, commissioned by ACC, provided costs based on economic modeling and showed that if the OEP is targeted at those over 80 years it is cost saving in terms of fall related hospital admissions. However, it appears that ACC did not use this information in their decision making. A close inspection of the cost of falls data reveals some interesting facts. Most falls cost the health system very little (in 2006/7 56% of falls cost less than $250, 80% of falls cost less than $700) with only 2.3% of the falls costing over $10,000.

The OEP has now been implemented in many parts of the United Kingdom, the United States and Australia as a fall prevention programme. Offered at the American Physical Therapy Conference in Chicago earlier this year, were workshops to certify physical therapists in delivering the OEP. In April 2012 Denise Taylor and Elizabeth Binns from AUT University

were invited to assist with the implementation of the OEP across Queensland, Australia. By June 2012 around 80 health professionals had been trained to deliver the OEP and to train others to deliver the OEP. Interestingly, in Queensland the drive is to embed the OEP into usual practice in an attempt to avoid the catastrophic situation experienced here in NZ when the funding for the OEP was cut. The OEP website, offering free access to OEP resources, is once again active and can be accessed on www.oep.co.nz.

ACC are strongly advocating vitamin D as a fall prevention measure for older adults living in residential settings. Vitamin D deficiency has been associated with muscle weakness, disability, poor physical performance, and cognitive impairment (Annweiler et al 2009). A meta-analysis of supplemental vitamin D trials (Bischoff-Ferrari et al 2006) concluded that doses of 700 IU to 1000 IU supplemental vitamin D a day could reduce falls by 19% (or by up to 26% with vitamin D3) and this did not depend on additional calcium supplementation. The effect was significant within 2-5 months of treatment and extended beyond 12 months of treatment. Conversely, their results did not support vitamin D doses below 700 IU a day for the prevention of falls among older individuals. A 25(OH) D concentration of at least 60 nmol/l is required for fall prevention; therefore, a daily intake of at least 700 IU supplemental vitamin D is warranted in individuals age 65 and older.

Muir and Montero-Odasso (2011) conducted a systematic review and meta-analysis on vitamin D supplementation and muscle strength, gait and balance. All studies used daily doses of 800 IU or more and only one study demonstrated a beneficial effect on balance with a single large dose. High single dose of vitamin D or high weekly or monthly doses were not consistent in showing improvements in physical performance measurements as daily high doses (700-1000 IU). This finding is consistent with a recent clinical trial that failed to show an effect of a very high single dose of vitamin D (500,000 IU) on falls prevention (Sanders et al 2010). The authors stressed the importance of considering not only the vitamin D effect of dose size, but also the dosing interval on neuromuscular function. There is evidence supporting a neurotrophic effect of vitamin D (Annweiler 2010) and that vitamin D may regulate neurotransmission by acting like a neurosteroid hormone (Buell et al 2008). These authors suggested that improvements in balance may be mediated through a neural effect. In conclusion, Muir and Montero-Odasso's (2011) review supported daily regiments of vitamin D in the range of 700-1000 IU.

It is therefore with concern that whilst ACC promotes vitamin D for older adults living in residential settings, they no longer fund evidence-based programmes for older adults living in the community such as the Otago Exercise Programme or Tai Chi and are cutting back funding on the Otago-based Steady As You Go peer-led falls prevention classes, which have also been shown to be effective (Waters et al 2011). As physiotherapists, we should be embracing the evidence for exercise as a fall prevention intervention; after all we are the health professionals best placed to deliver and/or supervise appropriate exercise interventions; so by potentially reducing the nation's financial burden of the consequences of falling. However, who is responsible for delivering and funding such interventions appears unclear. Perhaps we can learn a lesson from our neighbours and attempt to implement the OEP by embedding it in our usual practice and not relying on an external funder to provide the incentives to run the programme.

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Forced expiration exercises in asthma and their effect on FEV[1]

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Many authorities say that forced or prolonged expiration in the treatment of asthma is wrong. Prolonged expiration can only be obtained by slowing the respiratory rate and disturbing the respiratory cycle. This leads to increased oxygen consumption and makes it difficult to increase respiratory rate in response to exercise, maximum breathing capacity depending on the rate as well as the depth of respiration. In addition, bronchial diameter decreases during expiration. Forcible or prolonged expiration accentuates this. For all of these reasons, prolonged or forced expirations have been discarded by many physiotherapists in the treatment of asthma.

In the tuition of normal breathing or breathing control we would agree entirely with this. Diaphragmatic movement during expiration is entirely a passive recoil. Prolonged expiration cannot play any part in re-education of the diaphragm. It has been stated by Gandevia (1964) that mucus is not the important factor in simple asthma. We feel that it is certainly quite as important as bronchospasm, mucosal thickening and other factors such as poor breathing pattern and tense posture.

In making this statement, Gandevia appears to make a distinction between severe asthma states and simple asthma.

It is well known that patients who die in status asthmaticus do so with their bronchial trees completely blocked with inspissated mucus. We believe that the difference between simple and severe asthma is one of degree rather than kind and the removal of mucus makes an important contribution to the relief of breathlessness which is at least partly due to sticky plugs and casts in the smaller air ways. We further believe that no amount of relaxation will remove these casts. Forced expiration by producing an accentuation of the normal expiratory movements of the bronchial tree, i.e., narrowing and shortening, squeezes mucus from the small peripheral to the larger central bronchi. From here it can be coughed up. We believe that mucus is moved in the more peripheral bronchi, not by a blast of expired air, but by the squeezing action of the narrowing and shortening of the bronchial tree during forced expiration the peripheral branches shortening towards the central bronchi. We have demonstrated this pattern of movement by cine-radiography. Our use of forced expiration is solely for the upward movement of mucus.

Another argument against the use of forced expiration is that it actually irritates the bronchial mucosa and produces more mucus. If this were so, patients who practise this technique would never dry out. We find that even with an increasing programme of forced expiration activity, many patients dry out completely. Furthermore, some patients who have reached this state and give up their forced expiration exercises because they feel so well, gradually fill up again.

Complete rehabilitation depends on:

(1) Management of the attack by relaxation and breathing control, i.e., inspiratory diaphragmatic mobilization and modified forced expiration.

(2) Between attacks – a graduated scheme of coughing exercises to keep the air ways clear. Forced expiration is the simplest and most effective means of producing adequate coughing. Being aware that it increases spasm leads the physiotherapist to modify its use. A successful mixing of forced expiration and breathing control will wheedle sputum from patients who have tried all other methods unsuccessfully.

(3) Again, between attacks, postural and mobilizing exercises.

RESPIRATORY FUNCTION TESTS

As a result of the controversy that has arisen about our use of forced expiration in asthma treatments, we have recently carried out a series of respiratory function tests before and after use of this method.

Forced Expiratory Volume in one second or FEV[1], the test we have used, is universally accepted as a satisfactory test of air ways obstruction.

Exercise, per se, has been shown by Jones et al (1962) to produce a decrease of FEV1 in asthmatics even when symptom free.

Recently, over a two-month period, we tested all our patients in the age group between two and twenty years. Most of the children were between five and fifteen years of age. This is a group comparable to that tested by Jones. Some patients are at the beginning of their treatment – a first or second day. Some are weeks, months or years after commencing treatment by this form of breathing exercises.

Patients demonstrate various levels of distress. The estimate of treatment was made and given by three different physiotherapists; vitallograph tests were conducted in a room off the treatment and class rooms. Room temperatures were the same in all rooms. No bronchodilators or other drugs were used.

Respiratory function tests have tallied with our clinical findings. In some cases, improvement has exceeded our expectations.

Exercises are graded according to the information given in the books, *Better Breathing* and *Asthma and Your Child* (Thompson, 1967, 1968). In general, a first treatment would consist of two exercises each using tipping or twisting movements of the chest combined with arm swinging. The movements are

Thompson B and Thompson HT (1968): Forces expiration exercises in asthma and their effect on FEV1. *New Zealand Journal of Physiotherapy* November; 19-21. A paper presented at the New Zealand Society of Physiotherapists' Conference, March 23, 1968.

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done approximately six times each and forced expiration is performed as vigorously as possible in time with the exercise. At its conclusion, a vigorous double cough is encouraged. It is not always expected that patients will spit up mucus at this stage. All patients are given postural drainage. On the first occasion it would average six forced expirations and a good cough twice each side. Nose blowing is encouraged occasionally throughout the treatment and at its conclusion. Diaphragmatic breathing and relaxation is always encouraged between exercise changes and at conclusion of the treatment until the patient is comfortable. If treatment is correctly judged, this should take no longer than a minute.

Over a variable period according to the patient's mastery of breathing control, the exercise programme is extended. It gradually includes more of the vigorous forced expiration exercises which are always followed by postural drainage as previously described.

RESULTS

During the two-month period of testing at the beginning of this year 111 patients were tested. Of these, 91 patients were improved, six remained the same and 14 were worse. Subsequently, all of the 14 patients who became worse have been retested and now show improvement. Two of the patients whose FEV^1s were unchanged now show improvement and four remain unchanged. Some of these have not been available as yet for re-testing.

The percentage of improvement in all cases ranges from 0% to 150% with an average of 33%.

CONCLUSIONS

From these results we have reached the following conclusions:

The measurement of FEV^1 before and after our type of breathing exercises makes it abundantly clear that in the vast majority of asthmatics in this age group, bronchial obstruction is not increased, but in fact the airways are less obstructed. As has been shown quite clearly by Jones and others, the increased bronchial obstruction after ordinary gymnastic exercise is caused by increased bronchial spasm. Taking this into consideration, we can only assume that it is the movement of mucus that improves the respiratory capacity of our patients.

In most patients who have failed to improve when tested initially, subsequent tests have shown improvement. We think that this is probably due to improved muscle tone as a result of regular daily practice of these exercises, leading to more efficient clearing of the bronchial tree.

In some cases, the time of day for the exercise programme has proved significant.

Two children who failed to improve in an afternoon session, after a tiring day at school during very hot weather, showed immediate improvement at a morning session.

Moreover, we feel that the very few patients who have not yet demonstrated FEV^1 improvement after these breathing exercises will do so by persistent practice, as clinically they are already demonstrating increased exercise tolerance.

In some patients who had apparently intractable asthma, tests have been repeated as the increase in FEV^1 was beyond our expectations. Subsequent tests have confirmed our initial results. Our clinical success has been thoroughly upheld by the results of these tests.

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Commentary

The use of forced expiration in the management of asthma was the subject of much discussion by physiotherapists and had to be defended by Bernice Thompson in her paper presented at the New Zealand Society of Physiotherapists national conference in 1968 (Thompson and Thompson 1968). Forty four years on asthma management is once again the subject of attention by the profession. At the national conference held in May a paper outlining the tools to measure the control of asthma was presented by new graduates (Tucker et al 2012) and the profession launched its publicity campaign to encourage people with asthma to see a physiotherapist as part of overall management of the condition (Physiotherapy New Zealand (PNZ) 2012).

So what has happened over the past four or more decades in regard to the prevalence and management of asthma? From an epidemiological perspective asthma is now estimated to affect 30 million people worldwide (Masoli et al 2004). It is underdiagnosed, undertreated, has a direct association with obesity and is the most chronic disease in children (Global Initiative for Asthma (GINA) Executive Committee 2011). As well it is the most common cause of hospital admissions for children in New Zealand and represents a high socio-economic burden to the country (Ministry of Health 2009). Such facts confirm that GINA's strategy for asthma management and prevention is not being met and unless better asthma control is achieved the impact of this chronic disease will continue to have an unnecessary economic burden on health.

What role is there for physiotherapists in the management of this disease? Thompson and Thompson (1968) stated that the role was clear and that forced expiration was the key. Their focus was on the management of asthma in children and adolescents and the Thompsons suggested that "complete rehabilitation" depended on management "of the attack" and "between attacks", in other words a continuous regime in order to maintain well-being. Their rehabilitation included a regimen of relaxation and breathing control and forced expiration during attacks. Between attacks a graduated scheme of forced expiration and breathing control was prescribed to continue to remove mucus along with exercises that focussed on changing posture and thoracic mobility as well as postural drainage. The publicity around the management of asthma currently advocated by the profession (PNZ 2012) is focussed on breathing correctly, staying active, control of coughing and clearing mucus; perhaps a less dogmatic regime but yet it still retains an emphasis on the key themes of breathing control, clearance of mucous and exercise in order to maintain the individual's well-being.

Has there been a new discovery by physiotherapists in the approach to the management of asthma or is the justification stemming from a body of knowledge that we already have? The physiological explanation underpinning current management is not new. From the cine-radiography they undertook Thompson and Thompson (1968) were able to demonstrate the process we now understand as the dynamic compression of the airways. This compression of the airways is the basis of the flow-volume curve as explained by West (1982) during expiration. Furthermore, the technique of forced expiration is what we currently describe as the "huff". Research undertaken by physiotherapist experts in the field, namely Pryor and Webber in 1979, to evaluate the huff,

confirmed that using the huff requires less effort than a cough at the same lung volume. Importantly over the same time period more sputum is able to be cleared than without a huff and it does not increase airflow obstruction. In their paper Pryor and Webber (1979) defined the technique as "the forced expiration technique".

Such findings provide a strong evidence base for physiotherapists to include the forced expiration technique and breathing control in our practice. Asthma is currently a huge burden for global health yet it is possible for asthma to be under control (GINA Executive Committee, 2011). Let's keep physiotherapy moving by building on the evidence provided by our colleagues and using it to help our patients keep their asthma under control.

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Vestibular influence on cranio-cervical pain: a case report

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ABSTRACT

This case report describes a 39 year old woman with a 10 month history of right-sided temporal headaches. In addition, she experienced a 'wobble' feeling when rolling toward her right side and reported suboccipital pain, tinnitus and a mild visual disturbance. Objective assessment revealed she had a positional upbeat clockwise torsional nystagmus, that is, a positive Dix-Hallpike test for benign paroxysmal positional vertigo. Furthermore, manual assessment revealed right upper cervical joint dysfunction. She was treated with a four stage canalith repositioning manoeuvre for the vestibular system which abolished her 'wobble' symptom. Subsequently, manual therapy techniques were applied to the cervical joints and suboccipital musculature resulting in the relief of the patient's headache, suboccipital pain and mild visual disturbance. This case report discusses the importance of considering the peripheral vestibular system in patients who present with headache and dizziness. The purpose of this case study is to highlight that the vestibular system along with cervicogenic originating symptoms of headache and visual symptoms should all be considered and assessed accordingly.

Gargano F, Hing W and Cross C (2012): Vestibular influence on cranio-cervical pain: a case report. New Zealand Journal of Physiotherapy 40(2) 51-58.

Key words: Dizziness, BPPV, Headache, SNAGs

INTRODUCTION

Dizziness is a term that encompasses four subtypes. Vertigo describes a sensation of the environment spinning, presyncope depicts a feeling of impending fainting, disequilibrium refers to a feeling of loss of balance in standing and non-specific dizziness is considered a vague light headed or heavy headedness that cannot be described with the other three terms (Eaton and Roland 2003, Vidal and Huijbregts 2005). The exact prevalence of dizziness in the general population is not known; however, a community based study of 4869 German adults between the ages of 18-79 years estimates that 29.3% of the population suffers a moderate to severe episode of dizziness in their lifetime (Neuhauser et al 2008). The aetiology of dizziness is varied and can arise from numerous body systems, presenting a diagnostic challenge to clinicians (Huijbregts and Vidal 2004, Kristjansson and Treleaven 2009). Medical conditions such as anxiety, low blood pressure, endocrine and cardiac disease, hyperventilation and drug interaction can cause dizziness and clinicians should be aware of these. In their practice, clinicians need to have the ability to identify and differentiate between several types of dizziness, including dizziness that is cervicogenic in origin, that which is related to vestibular disorders, or due to vertebrobasilar insufficiency (VBI), to determine whether referral or treatment is warranted.

Cervicogenic dizziness is characterised by imbalance or disequilibrium, which is commonly associated with neck pain, stiffness or headache (Wrisley et al 2000). The exact aetiology of cervicogenic dizziness is not well understood but may occur from a whiplash-associated disorder (WAD) that results after a flexion/extension injury. It is estimated that 0.1% of the population annually will experience a WAD (Spitzer et al 1995). Pain and headache are often immediate whereas dizziness or disequilibrium are likely to manifest latently in 20-58% of individuals diagnosed with a WAD (Oostendorp et al 1999, Rubin 1973).

Vestibular disorders can arise from both central and peripheral structures. Peripheral vestibular disorders, predominantly benign paroxysmal positional vertigo (BPPV), account for a large proportion of dizziness cases (Huijbregts and Vidal 2004, Rashad 2010). According to epidemiological research by Neuhauser et al (2008) vestibular disorders affect 25.2% of those who experience moderate to severe dizziness over a lifetime. Of these, 2.4% suffer from BPPV (Bhattacharyya et al 2008, von Brevern et al 2007). The term BPPV relates to otoconia (microscopic calcium carbonate crystals) that are normally present in the utricle of the inner ear being displaced into the semi-circular canals (Barany 1921). The presence of these crystals in the semi-circular canals causes the canal to abnormally sense gravity. This creates an asymmetry of vestibular input to the central nervous system, resulting in vertigo. BPPV can arise idiopathically with ageing or due to trauma, inflammation or degeneration of the inner ear (Huijbregts and Vidal 2004).

Symptoms of dizziness due to ischemia of the vertebrobasilar arteries may include any one of the four dizziness subtypes (Thiel and Rix 2005). Epidemiological research from 529 asymptomatic Russians between the ages of 36-84 years estimates a prevalence of 2.1% of the population with ≥ 50% stenosis in a vertebral artery (Harer and Gusev 1996). Furthermore, it is estimated that 52% of patients presenting with isolated dizziness of no known origin have anomalies in their posterior cerebral circulation (Cloutier and Saliba 2008).

VBI dizziness may occur following trauma but commonly has no known causative event. Although dizziness can occur in isolation, it is often associated with other motor or sensory disturbances (Cloutier and Saliba 2008). The aetiology of VBI symptoms can arise from both internal vascular compression such as atherosclerosis, a thromboembolus or arterial dissection as well as from external factors such as mechanical compression from hypertonic musculature, osteophytes, cervical fracture or dislocation and head posture (Huijbregts and Vidal 2004).

Physiotherapists need to combine a thorough subjective and objective assessment to determine the cause of dizziness in patients. Specific questioning and assessment of the positions that cause the onset of dizziness, the latency and duration of dizziness symptoms, the fatigability of a dizzy episode and observing for the presence of nystagmus can aid differential diagnosis. Furthermore, in the absence of trauma, dizziness of VBI origin should be considered as vascular pathology, which is the most common risk factor for VBI dizziness (Cloutier and Saliba 2008).

Huijebregts and Vidal (2004) have clearly summarised the factors that will assist the differential diagnosis between cervicogenic dizziness, BPPV and VBI dizziness. The onset of both cervicogenic dizziness and dizziness due to BPPV are due to alterations in head position whereas VBI dizziness arises from a sustained head position rather than a change. A change in head position will bring about immediate symptoms in cervicogenic dizziness; however, with BPPV a short latency of 1-5 seconds will be experienced while dizziness of VBI origin has a long latency of 55 (SD 18) seconds. If the head is maintained in the initially provocative position, cervicogenic and BPPV dizziness will fatigue whereas VBI dizziness will increase. Nystagmus due to VBI is in a vertical direction but with BPPV, the nystagmus is torsional or horizontal depending on the involved canal.

There are several objective measures to aid physiotherapists further in their differential diagnosis of these three forms of dizziness (Vidal and Huijebregts 2005). Active and passive range of motion testing of the cervical spine may demonstrate musculoskeletal dysfunction and elicit headache and/or dizziness symptoms with cervicogenic dizziness. The neck torsion test can differentiate between cervicogenic dizziness and vestibular dizziness. With this test the head is held stationary, which limits stimulation to the peripheral vestibular system, while the patient rotates the trunk, thus implicating cervicogenic dizziness if positive. There is, however, no gold standard test to confirm cervicogenic dizziness and more often this is a diagnosis of exclusion when there is a history of trauma and the reported dizziness correlates with neck pain (Huijbregts and Vidal 2004). Although debate exists in the literature regarding the value of vertebral artery testing due to the low sensitivity of available tests (Thiel and Rix 2005), the sustained neck rotation test for VBI may elicit dizziness due to vascular compromise. The Dix-Hallpike manoeuvre used to assess for BPPV can distinguish between cervicogenic dizziness and BPPV.

The vestibular system integrates information from the proprioceptors of the eyes and neck to determine the position of the head in space (Armstrong et al 2008) and the vestibulocollic reflex (VCR) can be considered the conduit for the transformation of vestibular signals into cervical movements. Wilson et al (1995) describe the neural circuitry for the VCR as a three-neuron arc that consists of primary vestibular afferents, vestibulocollic neurons, and cervical motor neurons. This establishes a direct and indirect neurological pathway between the peripheral vestibular sensory receptors and cervical motor neurons, which needs consideration when evaluating dizziness and dysfunction in the cranio-cervical region. The correlation about treatment between the vestibular system and the cervical spine is not well documented; few authors have considered the vestibular and cervical systems together in their treatment models (Kristjansson and Treleaven 2009, Schenk et al 2006).

The purpose of this case study is to demonstrate the need to assess and when appropriate, sequentially treat both the vestibular and cervical region to reduce dizziness and pain when a dual pathology is present. Full informed consent was gained from the patient concerned in this report.

CASE PRESENTATION

History

A 39 year old female physiotherapist (PB) attending a course pertaining to manual therapy reported that she was experiencing right sided temporal headaches, suboccipital pain and a mild visual disturbance that began insidiously approximately 10 months prior. Upon further questioning she also described a 'wobble' feeling when rolling toward her right side which would last 20-30 seconds then diminish. She reported the 'wobble' symptom arose around the same time as the headache and suboccipital pain. PB was otherwise healthy besides suffering from asthma.

Relevant past medical history revealed PB was involved in three rear-end collision motor vehicle accidents. The first accident was 15 years earlier and the second and third occurred two weeks apart a year prior to her presentation. She reported recovering from these accidents without residual problems. PB also reported she had tinnitus that had been present for more than a year and that she was not taking any medications and had not sought any prior treatment.

Objective Assessment

Based on her presenting symptoms, the Dix-Hallpike manoeuvre (Figures 1A and 1B) was the only assessment performed on Day One. This was done before any joint or muscle assessment to rule in or rule out the presence of BPPV and reduce the risk of symptom provocation from multi-system assessment. The Dix-Hallpike manoeuvre is considered the test of choice when diagnosing BPPV (Bhattacharyya et al 2008). The validity of this test has been compared to a side lying test and reported to have a sensitivity of 79% and a specificity of 75% (Halker et al 2008). It is a reliable test in the diagnosis of BPPV when a paroxysmal positional nystagmus is produced (Norre 1995). The left ear down Dix-Hallpike manoeuvre was performed first and produced no symptoms or nystagmus. In the right ear down position (Figure 1B) the patient demonstrated an upbeat torsional nystagmus and her wobble symptoms were reproduced for approximately 10 seconds. On bringing the patient back to an upright position the nystagmus reversed (downbeat torsional) indicating a posterior canal BPPV (Gianoli and Smullen 2008).

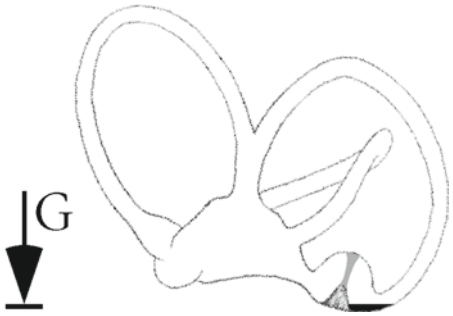
A cervical assessment was performed on Day Two. In restful sitting, PB was observed to assume a right laterally flexed cervical posture. Prior to assessing the cervical joints, the sustained active rotation test for VBI was performed in sitting

Figure 1. Dix-Hallpike manoeuvre 1A-1B. Canalith repositioning manoeuvre 1A-1E. Figures include images of the semi-circular canals to indicate the force of gravity within the canals during the canalith repositioning manoeuvre.

G = gravitational force.

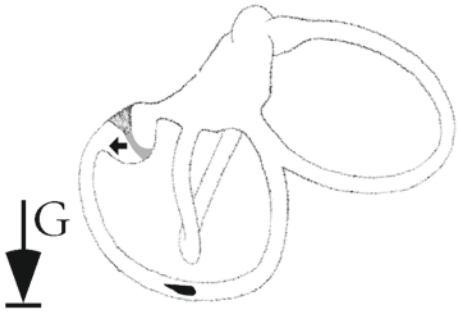
(For purposes of publication a model has been utilised for the following figures)

A)



45° passive right horizontal rotation in sitting

B)

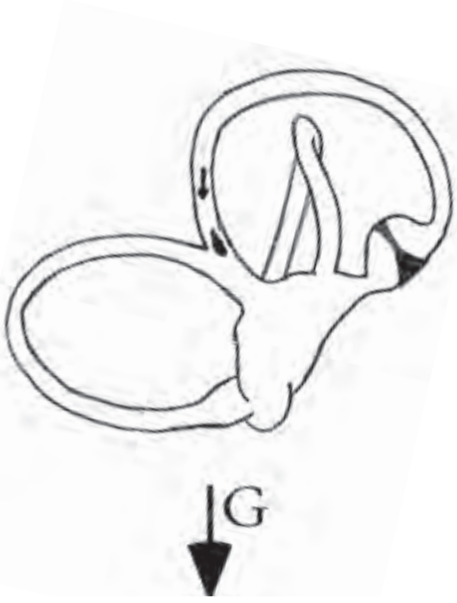


Patient quickly assisted into supine with 30° of extension

C)

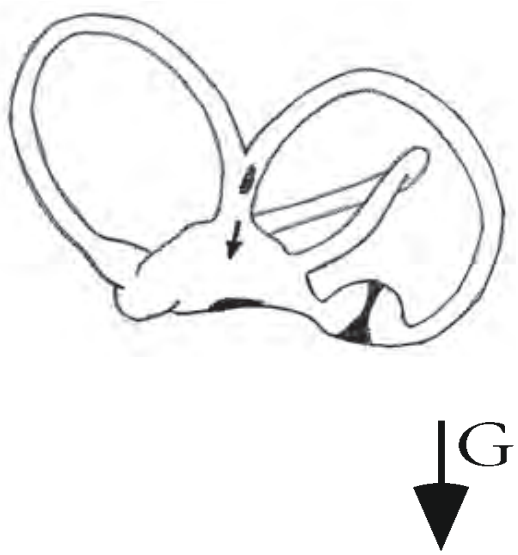
90° passive left rotation ending with 45° rotation with 30° extension maintained

D)



Patient actively rolls onto their left side as the clinician passively controls the head ensuring the head is slightly flexed and the nose pointing down in relation to gravity

E)



Return to sitting maintaining left rotation and flexion

in both left and right directions. PB did not experience any of her wobble or tinnitus symptoms; however, on turning to the right she had a painful restriction and noted an alteration to her peripheral vision. These symptoms reduced when the head was held at the end of the available rotation for more than 10 seconds. The supine flexion-rotation test was used to assess upper cervical passive range of motion. The supine flexion-rotation test was validated for determining the presence of a C1-C2 rotation restriction in patients with a cervicogenic headache and has a sensitivity of 91% and specificity of 90% ($p< 0.001$) with an overall diagnostic accuracy of 91% ($p< 0.001$) (Ogince et al 2007). PB demonstrated approximately 40° of rotation to the left but a unilateral painful restriction of approximately 20° on the right. The C2-C3 segment was also found to be hypomobile through manual palpation of combined physiological right rotation, right side bending and extension. This assessment technique of intersegmental motion was shown to have a sensitivity of 98% and a specificity of 91% with a positive likelihood ratio of 10.9 (Humphreys et al 2004). Palpation of the suboccipital region demonstrated increased muscle tone on the right compared to the left.

Clinical Impression

A primary diagnosis of BPPV was made due to the positioning nature of PB's 'wobble' symptoms, the brief latency of these symptoms and the positive Dix-Hallpike test demonstrating a positional upbeat clockwise torsional nystagmus. A secondary diagnosis of cervicogenic headache was made due to the unilateral nature of her headache and suboccipital pain and the cervical assessment demonstrating right sided joint restriction and altered muscle tone. These symptoms meet the Cervicogenic Headache International Study Group (CHISG) diagnostic criteria for cervicogenic headache (Sjaastad et al 1998).

Intervention

Day One - Vestibular Intervention

The primary diagnosis on Day One of BPPV prompted using the canalith repositioning manoeuvre (CRM) described by Epley (1992) to reposition the otoconia suspected to be present in the right posterior semi-circular canal (refer to Figures 1A-1E). Randomised controlled trials using the CRM were recently reviewed by the Cochrane group and concluded that CRM is an effective treatment for BPPV (Hillier and McDonnell 2011). The right ear down Dix-Hallpike manoeuvre was repeated to establish it was negative, that is, no torsional nystagmus or 'wobble' feeling were present. Although negative, the CRM was repeated to ensure that all of the otoconia particles were cleared from the posterior canal. There is some controversy in the literature regarding the need to have the patient sit in an upright position for 24-48 hours following CRM (Cohen 1999, Nuti and Passali 2000). The upright protocol relates to the use of gravity to maintain the otoconia in the utricle where it can be reabsorbed. In this situation PB was required to be upright for the next day and teach a course, thus she was instructed to sleep as she normally would. The decision was made that if the symptoms generated by BPPV returned, then repositioning treatment could be repeated.

Day Two - Upper Cervical Intervention

On Day Two PB had no further 'wobble' symptoms when rolling to her right; however, the right temporal headache, suboccipital pain, tinnitus and blurred right peripheral vision were present. To treat the cervicogenic headache, trigger point therapy was performed on the hypertonic suboccipital muscles in sitting. Pressure was maintained for 15 seconds and repeated twice until the perception of pain eased and muscle tone was reduced in each trigger point. Travell and Simons (1983) describe this type of tone reduction as an ischemic compression.

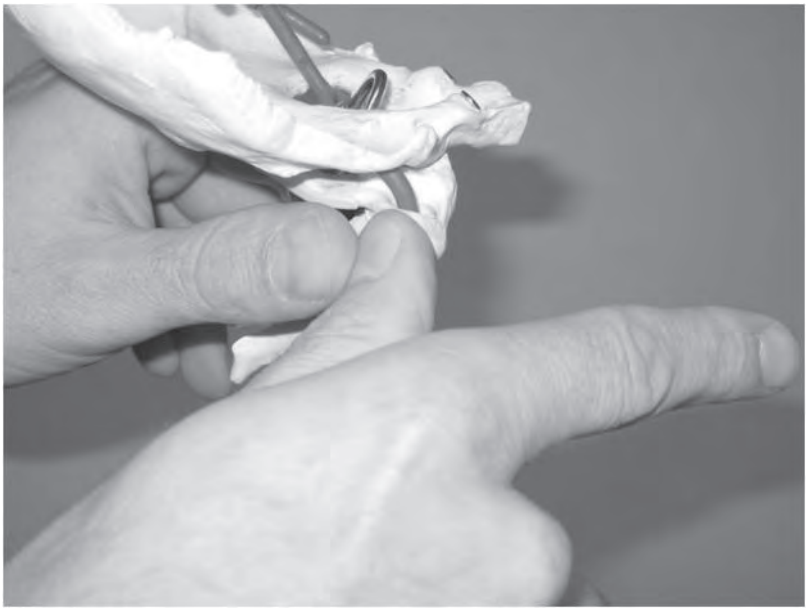
Management of the upper cervical joint restriction was addressed by the application of specific Mobilisations with Movements (MWM's) termed sustained natural apophyseal glides (SNAGS) as described by Mulligan (1999) (Figures 2A-C). MWMs to the cervical spine have been shown to be beneficial in the treatment of cervicogenic headaches (Hall et al 2007). The C1-C2 and C2-C3 segments were treated with the aim of restoring segmental mobility and this procedure was repeated for six repetitions according to Mulligan recommendations (Mulligan 1999).

Outcome

Following manual therapy treatment on Day Two PB stated that it was the best that she had felt in a long time. She immediately reported that her right side temporal headache, suboccipital pain and blurred vision had ceased, but her tinnitus was still present. Several hours later, reassessment of the supine flexion-rotation test showed C1-C2 segmental rotation to be equal with 40° bilaterally. Combined physiological rotation (C2-C3), side bending and extension was equal bilaterally and pain free on

Figure 2. SNAG finger placement (A), start position (B) and end position (C)

A)



B)

C)

the right and she had normal muscle tone in the suboccipital region on palpation. No formal follow-up was performed. However, incidental meetings during subsequent physiotherapy courses at nine weeks, three years and five years established that PB had no further 'wobble' sensation when rolling to her right or had experienced any further temporal headaches, suboccipital pain or visual disturbance; however, her tinnitus remained unchanged.

DISCUSSION

The purpose of this case report is to demonstrate a need to evaluate all possible sources of a patient's complaints when determining the cause of their dizziness. This case report identifies an undiagnosed primary vestibular dysfunction in conjunction with cervicogenic headache. In similar cases clinicians may initially treat the patient's cervical spine, which could potentially reduce a patient's pain; however, this would not necessarily address dizziness or a 'wobble' sensation, as in the case of PB. Due to the neurological integration that occurs between the vestibular system and cervical proprioceptors, altered vestibular afferent signals may affect cervical spine proprioception. In turn, localised joint or muscle dysfunction in the cervical spine may not resolve after specific treatment to the cervical region if there is an underlying peripheral vestibular disorder. Additionally, it is known that the cervical spine proprioceptors have a direct influence on oculomotor control and, when dysfunctional, can create visual disturbances (Carlsson and Rosenhall 1990, Gimse et al 1996). This may have been the mechanism for PB's residual visual disturbance following CRM and why manual correction of the cervical dysfunction resolved this symptom (Carlsson and Rosenhall 1990). Therefore, it is theorised that in order to obtain a lasting clinical effect, it is important to identify and correct peripheral vestibular dysfunction, in particular BPPV, before initiating treatment to the cervical spine.

The patient's complaint of the 'wobble' sensation did not fit the typical BPPV presentation of experiencing vertigo. There is, however, a subset of the population that has symptomatic BPPV without the complaint of vertigo (spinning), sometimes referred to as *'BPP Oops'* (Oas 2001, Oghalai et al 2000). The 'V' in BPPV has been purposely left out owing to the absence of the familiar spinning sensation which is typically used to make the clinical decision to perform a Dix-Hallpike manoeuvre.

There are several limitations to this report. A major factor is that VBI testing and active range of cervical motion were not evaluated on initial assessment. Although the 'wobble' symptom reported by PB indicated that BPPV was the most likely diagnosis, current clinical guidelines recommend VBI testing (Magarey et al 2004). In particular, VBI testing should be performed in the presence of other motor or sensory disturbance such as tinnitus or visual disturbances as was present with PB. Standard clinical practice also involves active range of motion testing. Had this been performed, this would have added impetus to our differential diagnosis of BPPV as opposed to cervicogenic dizziness or dizziness due to VBI being the cause of PB's wobble sensation. In addition, objective assessments such as a visual analogue scale (VAS) for pain quantification, cervical proprioception and functional questionnaires should have been implemented to complete the differential diagnosis and clinical picture.

This clinical scenario does not represent what is typically seen in clinical practice and was an incidental finding on a physiotherapy course. Neuhauser et al (2008), in their dizziness prevalence study, established that a large proportion of the community who experience dizziness do not seek medical care. The incidental finding with PB perhaps indicates a common scenario in the community and should prompt therapists to carefully question patients on dizziness symptoms when treating cervical complaints.

In conclusion this clinical perspective suggests that a peripheral vestibular dysfunction should be considered in the differential diagnosis of patients with cervicogenic headache when dizziness is also present.

KEY POINTS

- The vestibular system should be considered in patients who present with dizziness and headache due to the integrated neurological pathways between vestibular, oculomotor and cervical motor neurons.
- Treatment of a dual pathology of dizziness and headache requires careful differential diagnosis and a sequential approach with applied techniques.
- The canalith repositioning manoeuvre is a useful technique to treat peripheral vestibular dysfunction.

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To tell or not to tell? Physiotherapy students' responses to breaking patient confidentiality.

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ABSTRACT

Confidentiality is known to be a challenging aspect of physiotherapy practice. This paper explores current guidance available to the profession in New Zealand. Using a contentious real life case study from health care practice nine undergraduate physiotherapy students were asked to provide their responses to the ethically complex scenario using the Values Exchange web-based decision-making tool. In line with anecdotal evidence this small scale study found the students effectively confronted and worked through the inherent tension between autonomy and beneficence as they used the online technology to attempt to balance the right to confidentiality with their desire to protect the patient. Students also showed an appreciation of the complexity of their decisions and the Values Exchange facilitated a foundation for physiotherapy students to consider their professional role in contemporary physiotherapy practice. A larger study is needed to confirm and expand upon these findings.

Lees AB, Godbold R (2012): To tell or not to tell? Physiotherapy students' responses to breaking patient confidentiality. New Zealand Journal of Physiotherapy 40(2) 59-63.

Key words: physiotherapy, confidentiality, ethics, decision-making

INTRODUCTION

The principle of confidentiality raises complex ethical issues in physiotherapy practice. Confidentiality is about respecting other people's secrets (Gillon 1985) and maintaining the security of information elicited from individuals in the privileged circumstances of a professional relationship (Reid cited Cross and Sim 2000). It is a foundational principle stemming from the autonomous right of individuals to make decisions about their personal information and essential to the trusting relationship between health professionals and their patients. There is an assumption that patients will need to divulge private information to receive the assistance they require, but that this information will be protected within the professional relationship (Brann and Mattson 2004). Failure to provide confidentiality may detrimentally affect a therapeutic relationship and deter patients from seeking help from health professionals (Jones 2003). But is confidentiality an absolute obligation?

BACKGROUND AND OVERVIEW

In New Zealand physiotherapists have both ethical and legal guidance. The Aotearoa New Zealand Physiotherapy Code of Ethics and Professional Conduct, section 3.2 states that physiotherapists should "not disclose identifiable health information about a patient/client without the patient's/ client's permission, unless disclosure is required or permitted by law" (p 2). The relevant law can be found within Part IV of the Privacy Act 1993, Rule 11 of the Health Information Privacy Code (HIPC) and s22F of the Health Act (1956) (Keenan 2010). While Rule 11 of the HIPC advises that, 'serious' or 'imminent threats' to a patient's life would justify breaching confidentiality, much is left to the interpretation of the physiotherapist. For example, will such a breach guarantee the prevention of the imminent threat? What are reasonable grounds? Is the disclosure necessary to prevent that imminent threat?

The commentary accompanying the New Zealand Physiotherapy Code of Ethics and Professional Conduct [Consultation Draft] (2011) states that although there may be opportunities when information may be disclosed without consent (e.g. "when the patient/client poses a serious and imminent threat to themselves or someone else") these situations are rare and unlikely in the physiotherapy context (Section 3 p 8). However, Cross and Sim (2000) suggest that for physiotherapy "the issue of confidentiality is typical of 'everyday' ethical conflicts" (p 447). Regardless of the gravity of a breach of confidentiality, the ethical tensions remain the same. It is therefore worthwhile engaging students in the classroom so they are better equipped for practice.

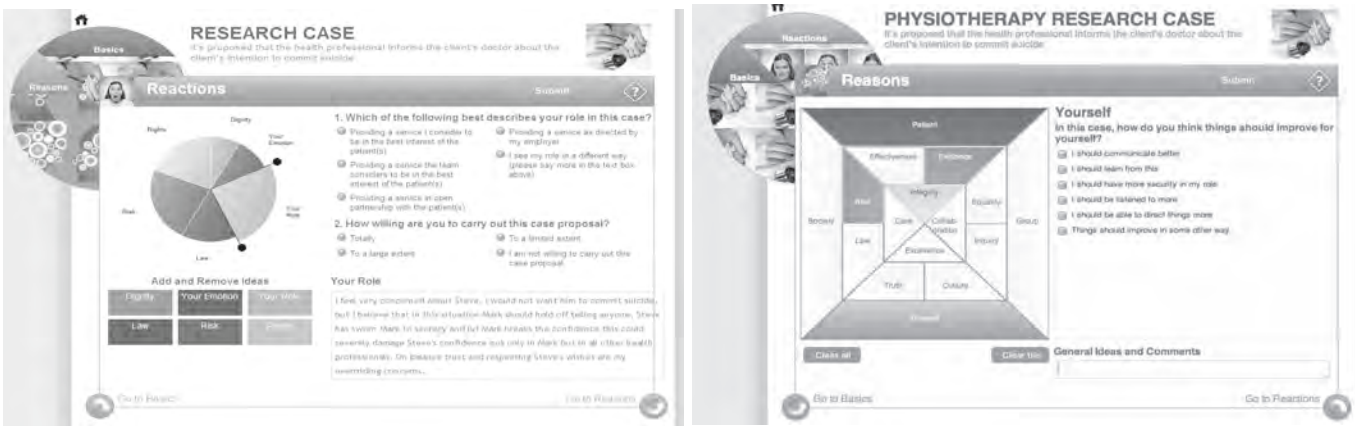
The authors have been delivering inter-disciplinary ethics programmes to undergraduate physiotherapy students for seven years. During that time the complex issues associated with confidentiality in physiotherapy practice have been regularly explored using an online decision making tool; the Values Exchange (AUT University Values Exchange 2011). A values approach underpins both our ethics education and the Values Exchange (Vx). While evidence based practice is necessarily central to decision making in health care, there is increasing acknowledgement that values play an integral role (Dickenson and Vineis 2002; Fulford et al 2002; Godbold 2007; Hope 1995; Lees 2011; Mills and Spencer 2005; Newcombe 2007; Petrova et al 2006; Seedhouse 2005; Seedhouse 2009).

The Vx is web-based technology that provides users with a framework for thinking and justifying decisions. An increasing number of universities, schools and health care institutions use it internationally, including AUT University (AUT University Values Exchange 2011). The Vx reflects a process orientated approach to ethics education and the view that a good decision is one that is robustly justified, rather than matching any desired right or wrong response (Seedhouse 2009). The tool incorporates traditional theoretical approaches, but remains accessible to students with little or no knowledge of ethics by using everyday terminology. Since this study, an updated version of the Vx with

greater interactivity is now being used within education and other institutions. Readers are welcome to view an example of this site at http://aut.vxcommunity.com .

The primary aim of the Vx is to make values transparent. Through a series of interactive screens; users are provided with a framework for considering ethically challenging clinical scenarios in depth and given opportunities to develop justified reasoning for their decisions. First, the user is asked to consider a case proposal and take a position on whether they agree or disagree. They are then required to choose what they see as the most important consideration and who matters most in the case. The software then requires the user to develop their initial response into an in-depth analysis using the interactive rings screen to reflect on their reactions to the case and the ethical grid to provide reasons for their position.

Figure 1: The Reactions and Reasons screens based on Seedhouses's Rings of Uncertainty and Ethical Grid



The Reactions and Reasons screens (presented in Figure 1) are an evolution of Seedhouse's earlier philosophical frameworks: the Rings of Uncertainty and the Ethical Grid (Seedhouse 2009). Upon completion of a case, users can access reports summarising their own responses as well as the responses of all others who have also completed the same case. These reports combine both quantitative and qualitative data, outlining rings and grid choices as well as free text entries.

The following case, which is possible in many different health care settings, has been regularly used in the Vx to provoke student thinking about the complex ethical tensions relating to confidentiality. *A patient has significant injuries following a car accident. After some weeks of rehabilitation, and swearing the physiotherapist to secrecy, the patient discloses that they are saving their medication to commit suicide.*

Anecdotally physiotherapy student responses have been mixed, but in line with students from other disciplines. They grapple with conflicts between autonomy and beneficence, a duty to protect the patient while wanting to protect themselves, as well as considering the wider implications for the patient's family and their profession. To explore their responses in a research context, the authors asked student physiotherapists to respond to this scenario using the Vx.

METHOD

A small, purposeful interpretive study invited physiotherapy students enrolled in a 12-week inter-disciplinary health care ethics paper to use the Vx to consider the scenario. This qualitative approach acknowledges multiple realities, where the researcher explores and constructs subjective interpretations of the data (Merriam 2009).There were three male and six female participants with seven of those between ages 20 to 29 and two between 40 and 49. To avoid any conflicts of interest, students were recruited by a lecturer not involved in the teaching or assessment of the paper, and random passwords and logins were used by participants to access the Vx to protect their anonymity. Participants gave consent through responding to a series of questions at the beginning of the Vx case study response. The study was approved by AUT's ethics committee.

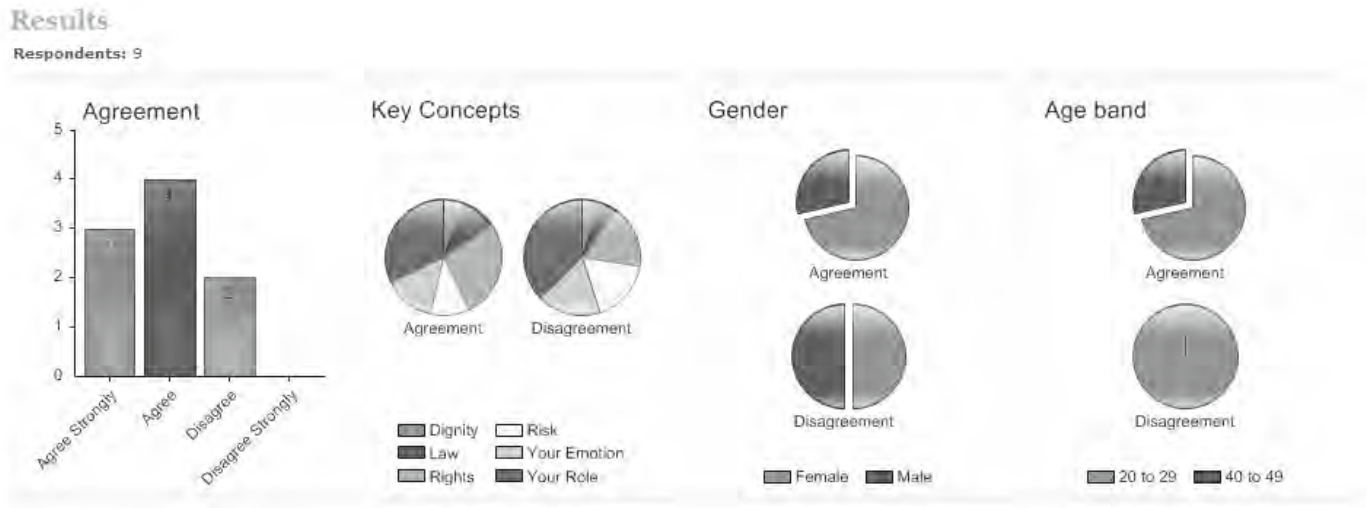
The case analyses from each of the participants were thematically analysed using Braun and Clarke's (2006) six step process. This involved "familiarisation with the data, the generation of initial codes, searching for themes, reviewing, defining and naming the themes and producing the report" (p 87). To ensure validity, the responses were analysed separately by each researcher. No significant points of difference were identified. The analysis gave rise to three main themes; *balancing interests, the patient in a transient phase and seeking guidance.*

FINDINGS

To begin the participants were asked to consider a detailed version of the scenario to which they were asked to provide their initial response to the proposal: *that they would inform the doctor of the patient's intention to commit suicide*. Seven agreed, or strongly agreed, while two disagreed. This correlates with anecdotal evidence from the authors' teaching experiences using this case scenario over several years and are similar to the findings of Lees (2011). In that study, the same case scenario was used with a small group of health professionals. The majority agreed to inform the doctor even though it involved breaching the patient's confidence.

Having provided their initial response participants were asked to rate the importance of the following key ethical considerations in relation to the case: dignity, law, rights, risk, your emotion and your role (Figure 2). Despite differences in their initial positions of agreement, 'your role' was of greatest consideration for all participants. In fact, the degree of importance of all key concepts was similar irrespective of whether people agreed they should break confidentiality or not.

Figure 2 Results overview



BALANCING INTERESTS

That health professionals' actions will positively impact their patients' health outcomes is a fundamental goal of health care practice (Beauchamp and Childress 2001). Participants used the Vx to balance the risks and benefits of the situation and determine the most important outcome. All participants shared the common goal for the patient not to commit suicide. There was genuine concern for the wellbeing of the patient and participants felt a sense of responsibility to ensure suicide did not occur. Irrespective of their position on disclosure, participants expressed this duty in terms of acting in the patient's 'best interests'. For example those who agreed to breaching confidence, justified their decision in terms of wanting to preserve life. *I understand it would breach confidentiality of the patient, but when it is literally a life and death situation, surely taking action and overriding the confidentiality agreement would be deemed acceptable in this case?*

All study participants had a clear understanding of confidentiality and the duty to respect the information entrusted to them, as well as an awareness of the relevance of this trust within the relationship. Most recognised that by breaching confidence to protect the patient they were in fact betraying the promise given to them. Difficulties with professional role and breaking confidentiality in similar scenarios feature in the literature (Chaimowitz et al 2000; Kennedy 2008). Despite an understanding of confidentiality, most participants felt uncomfortable about their role and subsequent decision. For example. one reported that by telling the doctor they did not feel completely comfortable as it was seen to be breaking their professional relationship with their patient. Another felt concerned that *the professional should not have been 'sworn to secrecy' initially because that puts him in a compromising position.*

Feeling 'uncomfortable' is a common reaction to ethical dilemmas where there is no clear one right action. In this study participants voiced their discomfort in a number of ways: they felt confused, scared, bad, and had a desire to feel comfortable with their decision. These feelings of discomfort linked closely with the act of betrayal and going against the patient's wishes. *I don't want the patient to commit suicide but I feel if he knows I went against his wishes he will commit suicide.*

When exploring responses to ethical issues by physiotherapists, Barnitt and Partridge (1997) found similar reactions. Their participants experienced "frustration, inadequacy and anger in the face of decisions which could not be judged as right or wrong, better or worse and for which there were no obvious actions to 'put it right'" (p 190). One participant proposed an alternative to speaking to the doctor, choosing instead to disclose the intention of the patient to commit suicide to the family. However this did not lessen the perceived severity of the betrayal. *I propose that I speak to his family, however it's impossible to know whether this would be considered more or less of a 'betrayal'.*

Only one participant felt that the obligation to respect confidence was absolute and as a result chose not to breach confidence. *The patient has a right if they said this in confidence to you, that you keep it between yourself and them.* However, the majority (seven out of nine) felt that betrayal was justified in terms of the severity of the situation. *I would feel bad for breaking a promise, but this is an exceptional circumstance where life and death is involved. It is unfortunate that it involves breaking the patient's trust in me…but some situations are worth that risk*.

The patient in a transient phase

The duty of confidentiality is extremely important to ensure a relationship of trust is created with each patient (Gabard and Martin 2003). This is evidenced in the prominence of confidentiality within professional codes. Despite this, only one participant acknowledged the negative potential impact of disclosure on other, future patients. *By breaking confidence with the patient, it is possible that other patients will not be honest with their own health care professional as they may fear their confidence will not be upheld. This may reduce the effectiveness of their treatments.* Using a classic utilitarian approach, which requires the chosen action to achieve the greatest good for the greatest number of people, participants argued instead that a short term breaking of the duty to maintain confidentiality was acceptable for other long term goals for the patient and

their family. *Breaching confidence and informing the doctor will provide the best outcome measures in the long term, ultimately putting the patient first.* A perspective shared by five participants was that the patient was in some sort of temporary phase, where recent circumstances prevented him from thinking in a rational way. This added weight to the argument in favour of overriding the patient's autonomous request.

While autonomy is a highly prized Western principle that underpins patient rights, including confidentiality, participants justified a beneficent, if paternalistic approach by the perceived transitory inability of the patient to make the 'right' decision. *The patient is progressing through the depressive stage of grief, therefore he has irrational thoughts. I do not believe people in that state of mind are thinking things through logically. After his depression has lifted he may be pleased that these steps have been taken.* This is in common with literature suggesting there is an assumption that any patient with suicidal tendencies is temporarily incapacitated or irrational and must be reported (Bostwick et al 2009). Further, the inability of patients to make 'correct' decisions has been seen as creating a special obligation on health professionals (Sherlock, as cited in Bernat 2008). The participants saw part of their role to help the patient move through this phase. Electing to disclose the intention to commit suicide was the physiotherapist's way of ensuring the patient was protected, as the patient had the *right to be safe from themselves, from doing harm to themselves.*

Seeking guidance

Guidance in relation to confidentiality issues is readily available from the Privacy Commissioner and professional bodies. Students were aware of this through their ethics education. However, when faced with the dilemma of whether to break confidence, the law was not considered as important as other key ethical considerations (see Figure 2). Rather than seeking guidance from the law, participants opted to seek advice from colleagues and other health professionals. Stevens and McCormack (1994) also explored student perspectives on confidentiality from a multi-disciplinary (medical) ethics course and similarly found that legal issues were not explicitly seen to be as relevant as other ethical factors. Their findings suggested that students elected to breach confidentiality because of the perceived beneficial outcome for the patient, rather than simply an adherence to rules. This study had similar findings. As one participant explained the law was not the reason for telling the doctor, *it is not out of fear of being in trouble…it would be out of fear of losing a patient to self harm.*

While concern for the health professional's legal responsibilities was a consideration for participants in Lees' (2011) study, our participants seemed more concerned with their specific role and where they would turn for help with their decision. For example, one participant used the law as a rationale for their decision and a way to possibly distance themselves from the patient: *The patient could be told that this is adherence to policy.* Another focussed on the decision being beyond their scope of practice *I propose that we should be able to listen to what they say and be able to refer them to the correct area as it most likely is out of the physiotherapy scope of practice to be dealing with such things*. The students are taught to seek advice from senior colleagues in their undergraduate programme. Seven participants discussed how they might obtain guidance from colleagues but also from the patient's family and other health professionals. *I am not sure so would ask my manager, I would talk to other members of the team to try to decide, I propose to discuss this with a few colleagues, I was thinking maybe I could discuss with a psychologist, without revealing who my patient is.*

CONCLUSION

This small study has demonstrated the depth of analytical thinking possible by physiotherapy students when given a challenging ethical scenario, which they might face in practice. Using the Values Exchange they have grappled with the inherent tension between autonomy and beneficence as they attempted to balance the right to confidentiality with their desire to protect the patient. While the law has rightly contributed to their decision, this window into their thinking demonstrates the potential for ethical analysis beyond that of a solely rule based approach. Through the examination of an ethical dilemma, physiotherapy students have demonstrated thoughtful appreciation of the complexity of their decisions. The Values Exchange, as a tool for facilitating ethical decision-making has provided a foundation for physiotherapy students to consider their professional role in contemporary physiotherapy practice. A larger study is required to confirm and expand upon these findings.

KEY POINTS

- Confidentiality is known to be a challenging aspect of physiotherapy practice.
- When faced with a practice based confidentiality case, undergraduate physiotherapy students recognise ethical complexity, especially the conflict between the rights of the patient to confidentiality and a desire to protect the patient.
- Web-based educational technologies such as the Values Exchange may have the potential to facilitate in depth analytical thinking.
- The implications of such thinking for student education and future physiotherapy practice are potentially significant but will require further research.

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Appendix A Ethics

Ethics approval for this study was granted by the Auckland University of Technology Ethics Committee on 26 May 2011, Application number: 11/92.

Perceptions of a water-based exercise programme to improve physical function and falls risk in older adults with lower extremity osteoarthritis: barriers, motivators and sustainability.

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ABSTRACT

Falls are a major concern in the older adult population of New Zealand. While several land-based falls prevention programmes exist, these may be inappropriate for individuals with lower extremity osteoarthritis. This paper presents participants' perceptions of a mixed methods study that investigated the effects of a twelve week aqua-aerobics programme on falls risk and physical function in older adults with lower extremity osteoarthritis. Seventeen participants (four males and thirteen females) with an average age of 78 years (range 68-89 years) attended focus group interviews. Perceived benefits included an improvement in mobility, breathing, pain levels, balance and a reduction in falls. Key to sustaining participation adherence was a motivating instructor, commitment to a structured programme and valued companionship.

The findings of this study, including insight into motivating this population to attend, should be considered by providers and potential participants of water-based exercise classes alike, to aid in creating sustainable programmes. Strong positive feedback as well as constructive criticism from participants provided the basis of recommendations which may be used to create an optimal programme to promote long-term participation, guiding those planning to implement water-based programmes.

Moody J, Hale L, Waters D (2012): Perceptions of a water-based exercise programme to improve physical function and falls risk in older adults with lower extremity osteoarthritis: barriers, motivators and sustainability. New Zealand Journal of Physiotherapy 40(2) 64-70.

Keywords: Exercise, Water-based exercise, older adults, falls prevention, focus groups.

INTRODUCTION

In New Zealand, approximately 30% of people over 65 years old experience a fall at least once a year, with an estimated cost to the Accident Compensation Corporation (ACC) of $100 million per year (Accident Compensation Corporation 2006, Arnold and Faulkner 2007, Johnston 2006). The risk of falling is greater in older adults with lower extremity osteoarthritis than in older adults without osteoarthritis (Arnold and Faulkner 2007). Osteoarthritis is the most common form of arthritis, presenting in almost half of all people over the age of 60 and nearly all people over the age of 80 (Arthritis New Zealand 2008). The large proportion of people affected suggests that interventions or strategies to prevent falls for this population are particularly important.

Land-based falls prevention programmes are available in New Zealand for the older adult population. However, these may be inappropriate for some individuals, potentially aggravating the symptoms associated with arthritis. Water-based exercise is an activity that may be a suitable alternative intervention for falls prevention exercise for older adults with OA. The buoyancy provided by the water places less stress on the joints, while at the same time delivering strength, balance and fitness benefits similar to land-based exercise (Bartels et al 2007). Studies investigating water-based exercise in older adults have reported increases in functional reach (Simmons and Hansen 1996), cardiorespiratory fitness, muscle strength and endurance (Ruoti et al 1994, Takeshima et al 2002), leaning balance (Lord et al 2006), and dynamic balance (Hale and Waters 2007). From our pilot study investigating the benefits and feasibility of water-based exercise to improve dynamic balance, it appeared that older adults enjoy this form of group exercise (Hale and Waters 2007).

Only a few qualitatively-based studies have explored the perceptions of older adults to community-based group exercise. One such study (Schoster et al 2005) used semi-structured telephone interviews with 51 females with joint pain (average age 67 years, range 32–90 years), who had participated in the People with Arthritis Can Exercise (PACE) programme, and who derived considerable social support from exercising in a group with others who have arthritis. Participants in these group classes said they were motivated to attend as they felt they could exercise safely at their own pace in the class and they valued the instructor. Similar sentiments were expressed by older adult participants in a focus group study of perceptions towards involvement in group Tai Chi classes (Hutton et al 2009). Understanding what older adults perceive to be facilitators and barriers to group exercise is important to inform improvement in group exercise delivery.

We recently investigated, in a randomised controlled trial, the effects of a group water-based exercise programme on falls risk and physical function in older adults with lower extremity osteoarthritis. In this study experimental group participants

were provided with a group-based twice weekly water-based exercise programme for 12 weeks (Hale et al 2012). Following completion of the water-based intervention, participants were invited to participate in focus group discussions on the benefits and delivery of the group classes. Furthermore, the researchers were conscious that following the study this free water-based programme would no longer be available for participants. The research had paid for participants' public pool entry, the hire of the pool lanes and the audio system used to provide the classes, as well as the exercise instructor. In the focus groups, we also asked participants for their ideas of how they could continue with the water-based exercise in a beneficial yet low cost manner. This paper reports on the findings of these focus group discussions. Participants' ideas for sustaining the programme at a low cost and what constituted a good group programme were of particular interest.

METHOD

Design

Focus groups interviews were used to explore participants' perceptions.

Participants and Recruitment

This study followed the completion of the aforementioned randomised control trial investigating the effectiveness of a twelve week, twice weekly water-based exercise programme (Hale et al 2012). On completion of the twelve weeks of the water-based exercise intervention and follow-up testing, participants were invited to take part in focus group discussions.

Inclusion criteria included: over the age of 65 years (or > 55 years if the participant identified as Māori, due to ethnic disparities in health) (Blakely et al 2005), had at least one risk factor for falls as assessed by the Falls Risk Assessment Tool (FRAT) (Nandy et al 2004), a medical clearance from their general practitioner to participate, and moderately severe osteoarthritis of the lower limbs. Level of severity of OA was evaluated using the Western Ontario and McMaster Universities Osteoarthritis Index score (WOMAC) (Bellamy 2002). Participants scoring "mild" on 2 items or "moderate" on 1 item in the "PAIN" domain, and "mild" difficulty in 4 items or "moderate" difficulty in 2 items in the "PHYSICAL FUNCTION" domain, were included (Goggins et al 2005). Participants were excluded if they were unable to ambulate independently; had a chronic medical condition that would limit participation in moderate intensity exercise; had severe cognitive limitations (as determined by the telephone Mini-Mental State Examination) (Newkirk et al 2004); had a hip or knee replacement in the past six months; or were already participating in an exercise programme aimed at improving strength and balance.

Twenty-nine participants who had completed the water-based exercise programme were mailed information and invitations to participate in the focus group study. Interested participants signed and returned included consent forms. Volunteers were contacted by telephone to answer any questions regarding the study and to arrange the focus groups. Ethical approval was gained from the University Ethics Committee (reference number 08/008).

Data Collection

Data were collected via four focus groups (FG1, FG2, FG3 and FG5). A fifth focus group was arranged but as only one participant attended, this session was conducted as a semi-structured interview with that individual (FG4). The focus groups were formed based on participant availability and ranged in size from three to five participants. A semi-structured, open-ended approach was used; discussion was guided by but not restricted to pre-set questions. Focus groups were conducted at the School of Physiotherapy, taking between 45-90 minutes. To ensure consistency the same researcher facilitated all focus groups and engaged and encouraged the participants, using a few open-ended questions and verbal prompts, to discuss the water-based programme. A process of constant comparison was used in that ideas and concepts raised in one focus group were used to inform the questions of the subsequent focus groups. Each focus group discussion was audio-recorded and transcribed verbatim. Summaries of the focus groups were sent to participants for verification prior to analysis in order to ensure accuracy. Participants were kept anonymous within the transcriptions.

Data Analysis and Interpretation

The General Inductive Approach (Thomas 2006) informed data analysis. No conceptualized framework was used to guide this analysis, rather the General Inductive Approach allows for the examination of the data from the perspective of the research questions. These questions were: (1) what benefits did the participants gain from involvement in the exercise, (2) what were the facilitators and barriers to engagement, and (3) how did they feel they could continue with the exercise now that the research classes were finished? As described (Thomas 2006), all transcripts were read multiple times and specific text segments related to the research objectives were identified and rudimentarily coded by the primary researcher. The generated codes and themes were then discussed and refined by the research team. Each transcript was then coded independently by two researchers and discrepancies discussed to ensure that the coding process was reliably and exhaustively undertaken.

Results

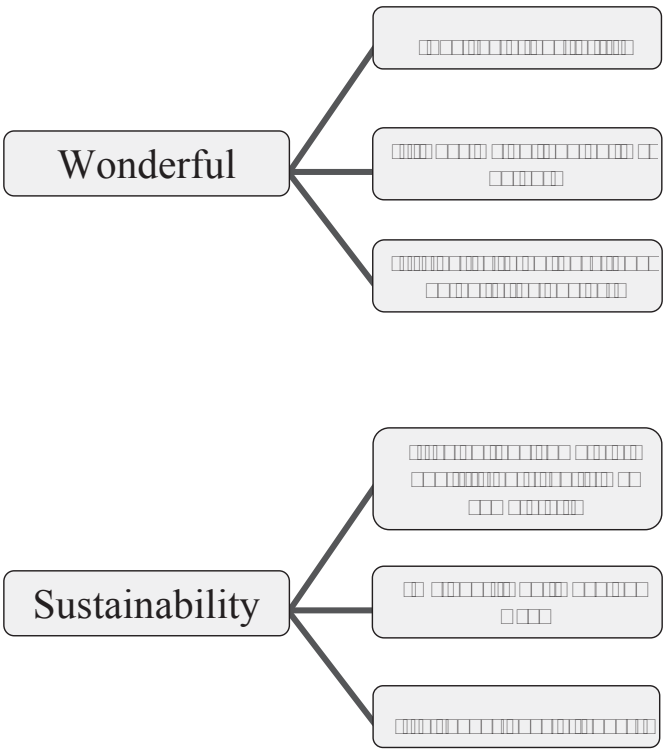
Nineteen individuals consented, 16 of whom attended focus groups and one of whom attended an individual interview. One potential participant withdrew due to illness and another potential participant forgot to attend. Of the seventeen participants, four were male and 13 were female. The average age of the participants was 78 years (range 68-89 years).

Two over-arching key themes emerged from the data: 'wonderful' and 'sustainability' (Figure 1). The theme 'wonderful' encompasses three sub-themes. These were "The social part of it," "It woke me up and got me going," and "It's better to go there than going to the doctor". The theme 'sustainability' encompasses three sub-themes. These were "I've got one complaint and it is only really my complaint", "We don't want much do we?" and "I'd sooner have a leader". The next section discusses these themes and subthemes in detail.

Theme: Wonderful

All participants thought that the water-based exercise programme was "*wonderful*" for a number of reasons; for the social aspect of it, that it was motivating, they derived benefits from it and they were extremely enthusiastic to keep going.

Figure 1: Themes and sub-themes



"The social part of it"

Participants spoke of the good social atmosphere of camaraderie created by the group and the instructor, *"the social side of things is really, really good" (FG1)* and the friendships that were forged. Exercising with others made it more fun and enjoyable and participants found they helped one another. As they were *"all in the same boat" (FG1)* they felt more comfortable and could empathize with and relate to each other.

The instructor was important and group members considered essential attributes of an instructor were: being understanding, tolerant, friendly, and someone who will *"jolly you along."(FG3)* The participants valued their relationship with a challenging instructor with whom they could establish a connection.

"Yes, I think the instructor was sort of aware of our capabilities and kept the challenge up. And it made it more interesting that way, because if you did the same thing over and over at the same level, it would be boring." (FG2)

"It woke me up and got me going."

Participants found the programme to be motivating: *"Well I thought it was marvellous really it um you know got us out of bed in the morning and got us into the pool and umm the instructor we had was very, very good and ah I think it was just so good. And I think the motivation was there which is the big thing is to get you motivated you know?"* (FG1). It emerged that accountability was an important factor in motivation; participants felt if they missed a class the instructor or group would notice, and this helped keep them motivated to go: *"Yeah, so it's just funny little things that keep you thinking you have a responsibility to attend 'cause someone's gonna miss you." (FG1)* The fact that there was a record of attendance being kept also contributed towards this. Participants were cognizant of the instructor watching them and noticing if they were doing exercises incorrectly, that he would playfully encourage them to challenge themselves and they wanted to do well for the instructor. All of these factors contributed to the feeling of accountability, and were strong motivators to attend the classes.

Many people stated they would not have gone to water-based exercise or similar exercise on their own: *"…sometimes being actually on your own to be motivated uh it's harder. It's harder: A lot harder." (FG1)* Some participants expressed frustration that they could not motivate themselves to go alone, but that there was no problem with motivation if they went with the group. Being part of a group contributed to motivation both for getting to the classes and also once they were there. Some people believed that fun was an important motivator; for others their motivation came from having a structured programme to attend. There were some participants who were motivated to go because it was free. Being part of the study contributed to motivation as participants said they were committed to the classes and knew the researchers were relying on them to attend and to be tested.

"It's better to go there than going to the doctor"

Participants reported a number of benefits that they derived from participation in the water-based exercise programme; they found it fun, enjoyable and interesting and expressed gratitude at being able to partake. Participants described the perceived health benefits they received from attending the programme, such as an increase in movement or mobility, an improvement in breathing, a decrease in their pain levels, balance had improved and a reduction in falls. Non-physical benefits included a greater awareness of their balance, valuable knowledge about falls prevention and greater confidence to move around.

Participants were of the opinion that exercise in water was superior to other forms of exercise for them. They talked of other types of exercise they had tried and how land-based exercise caused pain whereas water-based exercise did not: *"... exercise in the water, it's not like walking or running…You're not jarring any limbs or bones…And for old people I'm, I'm sure that's the best sort of exercise that you could do."(FG1)*

Participants had overwhelming enthusiasm for continuing with water-based exercise. Many participants wished the classes had continued and there were numerous comments or requests for the classes to continue: *"Anything that will help me continue with it? You put it on and I will be there! Let's start tomorrow!" (FG1)*

Theme: Sustainability

Participants were enthusiastic about continuing with the water-based exercise programme and discussed ways in which this could occur now that the research programme had finished. In the first subtheme below, they spoke of the barriers to participation that could be addressed in order for the programme to become sustainable

"I've got one complaint and it is only really my complaint."

Barriers or difficulties that prevented or hindered participation in the classes were actively sought in the interviews, and a few factors, specific to individuals, were identified, prompting one participant to say: *"I've got one complaint and it is only*

really my complaint. It was that most of them could manage so much quicker than me." (FG4) In fact most participants had no complaints, and the discussion frequently focussed on potential rather than real issues. One initial barrier encountered by some participants was the anxiety at starting the programme, and some admitted a fear of the water. In fact, one participant had never learnt to swim and had kept to the side of the pool throughout the class when he first started.

One barrier to on-going participation was that of illness, *"Umm, I suppose the things that sort of do prevent you are if you get ill. One thing, that's probably the only thing would be if I got ill…I probably wouldn't be able to go, but only that would keep me away." (FG1)* For some participants fatigue was an issue, *"Well for me, at first that's why I missed some of them. I couldn't go more than one because I was just so tired the next day and would sleep so sound, you know at the night-time, that I couldn't always wake up early enough to get myself organized to get the bus."(FG4)*

Transport could be a major problem, especially if the person could no longer drive. However, the convenience of the city bus service to the pool was commended. A few participants without transport had been able to get a ride to the pool with other members of the group, which was very helpful to them. All other issues regarding the sustainability of the water-based exercise programme could be considered logistical problems and these are discussed below.

"We don't want much do we?"

The location of the water-based exercise classes (a large indoor aquatic centre pool) was discussed, as well as other potential locations (the warm therapeutic community pool, local school pools, the community salt water pool and other smaller community pools). Participants weighed up the pros and cons of the various pools and opinion differed on the ideal location for the classes. One discussion was on the temperature of the pool. A few people thought the pool used was too cold and would prefer a warmer pool such as the therapeutic pool, whereas others thought a therapeutic pool would be too hot to exercise in. The next discussion centred on which community pool to use. While a few people thought that using local smaller community or school pools would increase accessibility and reduce transportation issues, the suitability of these pools, particularly the depth and width, were questioned. Furthermore, these pools did not regularly have lifeguards in attendance and thus safety concerns were raised. Most people liked the large, centrally located medium-depth pool the classes were held in even though it was *"very public"* and busy. An added bonus to the latter pool was the spa pool which some participants used at the end of each class.

A few participants talked of the noise and the poor acoustics in the pool used. For some this was related to school groups using the pool at the same time, and it was suggested that the classes be scheduled when the schools were not using them. This would also alleviate the problem of crowded changing rooms. However, for some, the busy times were interesting, seeing what everyone else was up to in the pool, and that this kept them entertained while they did their exercises.

The size and age of the classes were discussed. The smaller classes were appreciated although participants realized that in reality larger classes would keep the costs down. Having classmates who were of a similar age was considered by some participants to be beneficial: *"Being with the group of elderly people…of same age and we related to so many things that we did, you know. We talked about what helped us and what didn't help us, you know?" (FG2)*

There was much discussion surrounding all aspects around the timing of the classes (time of day, frequency, regularity, which days of the week, how many days per week, duration of class, duration of programme, continuity, time of year/season) and no consensus was reached. This discussion mostly hinged around tiredness, illness and busyness. Some people felt they could not manage twice a week as they got tired or were too busy, while others would prefer the classes to be more frequent, for example three times a week or more to derive more health benefits. It was considered inevitable by some participants that they would become ill going to the pool in winter and thus classes should be held in the summertime only, while others felt they would like a year-round programme. Some participants said a continuous programme would help keep them motivated because if they stop they would not go back. Others felt they would need a break every twelve weeks or so.

Money (for example, cost, funding, payment, expense, price, discounts) and who pays or contributes was discussed extensively. While grateful for the free classes, participants were realistic in understanding that this could not continue. The majority of participants said they would not mind contributing a small amount of money towards pool entry or the cost of the classes. Some participants were confident that alternative funding could be sourced, and thought that personal contributions may not be necessary allowing the classes to continue to be run free of charge. Ideas of how the classes could continue were discussed and are presented below.

"I'd sooner have a leader."

A number of questions as to how a water-based exercise programme could continue to run, especially if funding for it was limited, were discussed. One question was the use of a buddy system, where people would be paired up and go to the pool with their buddy to do the exercises together. However, most participants were unenthusiastic about this idea as they would rather attend in a group with an instructor, *"No, I'd sooner have a leader."(FG3),* and did not want to rely on one person to go with; although a buddy system for transport to group classes was considered a good idea.

It was asked if groups could run with a short term instructor for a few weeks to demonstrate the exercises, with the groups then becoming self-sufficient. Reactions to this idea were mixed. Some felt this would work, as long as it was a structured group with a set time and place to meet. Most participants however, felt that an instructor was essential and that a class without an instructor would fall apart; that they were too forgetful to remember the exercises without an instructor there to tell them or that there would not be sufficient motivation. It was considered embarrassing to go without an instructor and some felt it would not be safe exercising without an instructor to guide them. A few participants had continued with the water exercises on their own since the classes had finished, and had found it difficult to maintain. Nominating a leader from the group to be the instructor was suggested and some participants

liked this idea but others felt this would not be fair on the nominated instructor. A question related to reducing costs would be to have an unpaid volunteer instructor. Some liked the idea of this and it was proposed a student or retiree would be ideal for the job. Others felt it was an unreasonable request.

Alternative sources of funding was discussed, such as from local charitable organisations concerned with assisting older adults or perhaps the pool itself would provide discounted or free entry for these classes. The majority of participants said they would not mind contributing a small amount toward pool entry or to the running of the classes. Some participants however stated they *"…couldn't probably afford a big amount, twice a week" (FG5)* on their pension and that it was a great motivation to have the classes for free.

Participants also discussed other options if the water-based exercise classes could not continue, such as attending the "Thursday" water-based exercise class (another water-based exercise class run in the same aquatic centre for all age groups), individual aqua jogging, or aqua jogging classes. These classes were not considered suitable because they were too difficult and participants felt they would be *"left behind."*

DISCUSSION

This study explored participants perceptions of the water-based exercise programme, with particular emphasis on how a similar programme could be developed and sustained long-term. The theme 'wonderful' highlighted participants' enthusiasm for the water-based exercise programme; they found it to be a positive and beneficial experience. Creating an exercise programme that people will enjoy enhances regular attendance and sustainable participation, as observed in a focus group study of 48 older adults recruited from the community (not necessarily from group exercise classes), which also found that enjoyment and support from others were key factors in enhancing self-efficacy and the belief that the individual could continue participating in physical activities (Hardy and Grogan 2009).

Support from others was also a key finding of the present study, similar to that reported by other studies (Fuller et al 2010, Schoster et al 2005). A strong link emerged between the 'wonderful' sub-themes: "The social part of it" and "It woke me up and got me going". Most participants said they would not be motivated to do water-based exercise or similar exercise on their own, but once they were in a class they continued to attend because of the class structure (both the group, the instructor and having a definite time and place to go) as well as the responsibility they felt towards other members of their class. The fun atmosphere added to the social motivation. Peer support has previously been identified as a strong facilitator for physical activity engagement in older adults, both those with disability (Damush et al 2007), and those without disability (Hardy and Grogan 2009). Older adults participating in group Tai Chi classes considered important factors to encourage engagement in exercise were education about exercise requirements and the benefits to be gained; support from health professionals and peers; and classes conducted by well-trained leaders to ensure safety and suitability, and in accessible and appropriate venues (Hutton et al 2009). One focus group study explored the perceptions of 99 healthy older adults and those with chronic illness (aged over 50 years) to the barriers and facilitators to being physically active (Fuller et al 2010). Participants spoke of the importance of social support and environments conducive to promoting physical activity.

Additionally, in the present study, participants felt strongly that the instructor was an important encouraging factor. This has been previously reported (Crone et al 2005, Hale and Waters 2007, Schoster et al 2005). One study reported, on a grounded theory based study of the perceptions of adults referred to exercise programmes, that the instructor has an important role in helping exercise participants to understand a more holistic experience of exercising (Crone et al 2005). This allowed for a more positive exercise experience than if the instructor purely focused on the physiological benefits or technical aspects of the exercise.

Participants believed that exercise in water was particularly relevant to them, a finding similar to that of other studies. Water-based exercise programmes have been reported to make it easier for people with arthritis to exercise (Der Ananian et al 2006, Foley et al 2003, Wilcox et al 2006), as less pressure is placed on the joints (Der Ananian et al 2006, Foley et al 2003). A common finding among older adults with arthritis is a fear that exercise will cause pain or exacerbate the disease process. Water-based exercise has been shown to reduce pain in people with arthritis (Hendry et al 2006, Lambert et al 2000). Confidence, water, and balance appeared to be linked in the present study. From the participants' discussions, the benefits of the programme creating a positive cyclical effect, being in the water gave participants the confidence to perform balance exercises safely, which then improved their balance which increased their confidence.

Some participants identified barriers to participation in the water-based sessions such as the pool being too cold or that the class was too difficult; however these negative perceptions were countered by other participants (the temperature of the pool was fine or the class needs to be tougher). Although it is acknowledged that it is difficult to please everyone, research has shown that not only do different people with arthritis respond to exercise differently, but that an individual with arthritis' response to exercise can change daily (Der Ananian et al 2006). Being aware of the body, and understanding how it is responding on any particular day, assists the person to know the level of exercise they can engage in, so that the exercise session is a beneficial (Der Ananian et al 2006). Thus, it is not surprising that participants in this study had varying needs. Providing a flexible programme may be required, such as offering two variations on the classes. One could be a gentler class, no more than twice a week for twelve weeks, perhaps in summer only. This could be for those that are new to water-based exercise or those particularly prone to illness or fatigue. Another class could run that is 'tougher', running twice a week or more and continuously year round. This could be for those that want more of a challenge. Participants could graduate from the gentler class to the tougher class if and when they felt ready.

It was recognised that the classes were funded by the research study and that funding for their continuation would have to come from other sources. One of the attractions of the research classes was that they were free. While the majority of participants said they would not mind making a payment contribution to continue to attend, it would probably be necessary to explore funding options for the remainder of costs.

Water-based exercise classes are probably more expensive then land-based exercise classes. The pool entry fee, hire of pool space and an audio system (to deal with the acoustic problems) is more expensive (locally at least) than hiring a community hall. Furthermore, for many people, exercising in a public pool can be daunting, and participants spoke of their anxiety to attend, were concerned about their lack of safety if an instructor were not present as well as feeling embarrassed when exercising without an instructor. Although participants considered alternative options to sustain the water-based exercise programme now that the research funding the programme had ceased, such as a buddy system to assist each other in the exercises, groups running with a short term instructor for a few weeks to demonstrate the exercises and then the groups becoming self-sufficient, or finding a voluntary instructor, the strong opinion was that a trained instructor was a necessity.

Locally, in the South Island of New Zealand, land-based strength and balance exercise classes are run in citywide community halls. These classes begin with a paid instructor and after ten weeks move to being a peer-run model with a member of the class becoming the instructor. This person is trained and supported by a local organization catering for the needs of older adults, and some of the classes have been running continuously for over five years (Waters et al 2011). This option however did not appear to be appealing to the participants in this study. The smaller community pools, although accessible, were not considered suitable (not deep or wide enough), and many do not have lifeguards in attendance. Furthermore, they are only open in the summer months. Having a peer leader or buddy system was also not considered conducive to continued, safe exercising; a trained instructor appeared to be the essential element.

While the water-based programme was considered to be *'wonderful'* and perceived to be extremely beneficial by participants in this study, running it in a low cost manner does not appear to be appealing. To continue the programme at the level run in the study would require alternative sources of charitable or government funding along with personal contributions in order for it to be affordable for older adults on pension to attend.

Strengths and Limitations

Consistent methods of data collection and cross checking of the analysis strengthened the reliability of this focus group study and data saturation was clearly obtained. The focus group facilitator also actively sought negative comments about the programme from the participants. A limitation of the study was that due to the voluntary nature of study recruitment, individuals who were unable or unwilling to attend the water-based exercise classes for the randomised controlled trial were not sampled, creating the potential for selection bias. Also, the small sample size, and being predominantly European New Zealanders, limits general applicability.

CONCLUSION

This study explored the perceptions older adults with OA of participating in a water-based exercise programme. Participants were enthusiastic about the programme, deriving enjoyment and benefit from it, and they expressed a desire to continue. Water-based exercise may therefore be considered a viable exercise alternative to land-based exercise programmes for this population. However, this form of exercise is probably a more expensive option. Solutions such as peer leaders, buddy support or using smaller community pools were not appealing, and thus sustaining the programme would necessitate additional funding. The findings of this study, including insight into motivating this population to attend, should be considered by providers and potential participants of water-based exercise classes alike, to aid in creating sustainable programmes.

KEY POINTS

- Older adults with lower limb arthritis and at risk of falling value and enjoy water-based exercise programmes.
- The perceived benefits of such programmes included an improvement in mobility, breathing, pain levels, balance, and a reduction in falls.
- Key to sustaining adherence in our water based exercise programme was a motivating instructor, commitment to a structured programme and valued companionship.
- Solutions to reduce the expense of an instructor-led water-based programme, such as peer leaders or buddy support did not appeal to participants.

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Physiotherapists' knowledge and uptake of the ABC approach to smoking cessation

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ABSTRACT

The purpose of the study was to determine physiotherapists' knowledge and uptake of the ABC approach to education on smoking cessation. An invitation to complete a web-based survey was emailed to each member of Physiotherapy New Zealand. Data gathered included demographic details, personal smoking habits and knowledge and uptake of the ABC training. Results were analysed using descriptive statistics. Respondents, n=602, (response rate 19%), were representative of physiotherapists in New Zealand when demographics were matched with national workforce data. Over 50% knew about the ABC approach, however only 30% had completed training with Otago respondents reporting the highest level of training and those in Taranaki, the lowest. District Health Board employees were more likely to have completed training (60%) than those in the private sector (16%), or elsewhere (24%). Participants who had completed the ABC training more frequently or always asked patients if they smoked (69%) and more frequently scored the correct answer to true/false questions on social misconceptions regarding smoking (57%). The results suggest that geographic, employment and work environment impact on physiotherapists' engagement in the ABC smoking cessation education. It is recommended that the profession specifically targets training in areas where uptake of the training is lowest.

McCleary RE, Johnson GM, Skinner MA (2012): Physiotherapists' knowledge and uptake of the ABC approach to smoking cessation. New Zealand Journal of Physiotherapy 40(2) 71-75.

Key words: smoking cessation, ABC training, workforce data.

Smoking is a major determinant of mortality, morbidity and socioeconomic disparity in New Zealand (Ministry of Health 2009a) and the negative effects of smoking are well recognised by health professionals. Smokers themselves have begun to recognise the negative effects, as illustrated by the fact that 60% of New Zealanders who smoke have made attempts to quit within the last five years (Ministry of Health 2009a). Many such attempts are self-initiated and consequently fail as components for successful quitting such as behavioural support and nicotine replacement therapy (NRT) are lacking (McRobbie et al 2008). The provision of cessation advice to patients who are current smokers is considered to be a logical way of turning smokers away from the habit (Fagerström 2002) and potentially improving the health of that sector of the New Zealand population. Furthermore, a concerted approach to a smoke-free New Zealand from the entire health sector is likely to be beneficial as research has shown that health professionals who have undertaken training programmes identify more people who are smokers and offer advice to quit to more people (An et al 2008). Furthermore when patients are asked about their smoking status by two or more health professionals, they are nearly three times more likely to make a quit attempt (Bodner and Dean 2009; Ministry of Health 2011a).

Providing better support for smokers 'to quit' is a strong focus of the Ministry of Health (2009b). The New Zealand Smoking Cessation Guidelines were first published by the Ministry of Health in 2007. The online programme for health care workers, the ABC approach to smoking cessation (Lancaster and Fowler 2000), has now been active for over a year and smoking cessation has been identified by the Government as a Primary Health Target for 2010-2012 (Ministry of Health 2009b).

The ABC approach to smoking cessation is designed to integrate evidence-based advice and support into patient management and focuses around three key concepts: **A**sk the patient if they are a smoker, give **B**rief advice and provide **C**essation support (Lancaster and Fowler 2000). Training is by an internet or seminar-based programme which informs health practitioners about best practice for encouraging and supporting smoking cessation (Lancaster and Fowler 2000). By meeting the competencies of the accompanying test, the practitioner is able to register to become a Quitcard provider and to issue patients with an exchange voucher for NRT (e.g. gum, lozenges and nicotine patches) (Lancaster and Fowler 2000).

Results from a recent study indicate that 76.9% of physiotherapists surveyed in Canada strongly agreed or agreed that they should ask their patients about their smoking habits; however, only 56.8% agreed that they should receive training on smoking cessation and over 70% were not prepared to provide counselling on cessation (Bodner et al 2011). There are currently no published data on the uptake of education and use by physiotherapists in New Zealand of the ABC or other approaches to smoking cessation in patient management (Lancaster and Fowler 2000). This study aimed to gather information to determine physiotherapists' knowledge and uptake of the ABC approach to education on smoking cessation in order to determine the profession's response to the Ministry of Health's initiative for health care workers, and to have a basis on which to strategically target future education of the profession on approaches to smoking cessation.

METHOD

A short web-based questionnaire was developed to determine physiotherapists' uptake and use of the ABC approach to smoking cessation. An online survey was selected as the method of distribution and for data collection. The inclusion criteria for participation were physiotherapists, physiotherapy students and physiotherapy assistants who were members of the professional organisation, Physiotherapy New Zealand (PNZ) and whose contact details were listed on the email distribution list (n=3157). This allowed contact via email with approximately 80% of physiotherapists registered with the Physiotherapy Board of New Zealand (PBNZ) and the majority of final year undergraduate students and reduced the potential for bias by having PNZ act as an independent conduit for the survey.

Relevant literature and the ABC training programme were reviewed and a questionnaire that included both open and closed questions was then developed: *Section A*: General questions on demographics including age range, ethnicity, years since graduating, province, employment area, personal smoking history. *Section B*: Knowledge of and training undertaken in the ABC approach to smoking cessation and the physiotherapists' application of the knowledge **A** (**A**sk the question) to patients seen in clinical practice. *Section C*: This section comprised four true/false questions designed to determine the physiotherapists' general knowledge of smoking prevalence and its effects on health.

Consultation with Maori was completed as part of the ethical approval process and approval for the study was gained from the University of Otago Human Ethics Committee prior to commencement of the research.

The questionnaire was initially piloted on a sample group of physiotherapists for clarity and feedback. In response to feedback on the ability to compare the level of knowledge of participants who had undertaken smoking cessation education with participants who did not have the benefit of training, four true/false general knowledge questions about smoking were added. A letter of invitation from the researchers including information about the study and the web link to the survey were emailed by PNZ to members in early November, 2010. Reminder emails were sent after two weeks and a final reminder at the end of week three, one week before the survey closed. The notices that were circulated with the reminders included a thank you to members who had already participated in the survey. Completion of the survey was taken as consent to participate in the study.

The results were returned anonymously to a web address in text format and were then downloaded into an Excel file and a rank-ordered database was created. The provinces and employment areas were grouped and numerically coded using key words which matched the 2010 Health Workforce Survey categories (Ministry of Health 2011b). Data were extracted for analysis using descriptive statistics (frequencies and percentages). Answers to open questions were grouped according to key themes identified in the responses.

RESULTS

Of the surveys emailed to potential participants, 615 were returned. Thirteen responses were excluded because of incomplete or unusable data, thus the results were based on completed data from a total of 602 participants, comprising 587 physiotherapists and 15 physiotherapy students (2.5%) who were members of PNZ, a response rate of 19% from the potential group surveyed. Physiotherapists who participated were representative of the physiotherapy population in New Zealand when matched with current physiotherapy workforce data (Ministry of Health 2011b). Demographics of the survey participants are summarised in Table 1 and their knowledge and uptake of the ABC approach are recorded in Table 2. The uptake of the ABC training was also analysed by work type. Physiotherapists working in the musculoskeletal field were found to have a low uptake of the ABC approach (19%) whereas there was a high uptake by physiotherapists working in the acute adult inpatient setting (68%).

Table 1: Demographics of the survey participants (n=602)

Age range (years)	Total group (%)	Number of previous smokers	Number of current smokers
20-29	129 (21%)	6	2
30-39	177 (29%)	20	3
40-49	148 (25%)	21	0
50-59	111 (18%)	24	0
60-69	34 (6%)	18	0
70+	3 (<1%)	3	0
Total number of participants	602	92 (15%)	5 (0.8%)
Location			
Urban	456	69 (15%)	5
Rural	82	14 (17%)	0

Overall 9.4% of participants stated they did not intend to complete the training. Reasons given included "no patient contact", "not relevant to their practice", "feel it is not within their scope of practice", and "other smoking cessation guidelines in place so no need to train".

Participants' knowledge about smoking prevalence is summarised in Table 3; overall results were better for participants who had participated in ABC training. Figure 1 sets out the results for the number of survey participants who had completed ABC training and their responses to the frequency of questioning patients about smoking habits. In regard to geographic distribution of the participants and their knowledge, those participants residing in Otago (n=49, 77.5%) knew about the Government initiative, 73.4% were aware of the ABC approach and 53.1% had completed training. In contrast, the responses from the Wellington region (n=53) were 73.6%, 47.2% and 28.3% respectively. Physiotherapists in Taranaki had the lowest completion rate for ABC training (n= 11, 9.1%); though 72.7% knew of the Government initiative however only 18.2% were aware of the ABC approach.

DISCUSSION

The key purpose of the survey was to determine physiotherapists' knowledge about and uptake of the ABC approach to education regarding smoking cessation that is available to health practitioners in New Zealand. Results showed

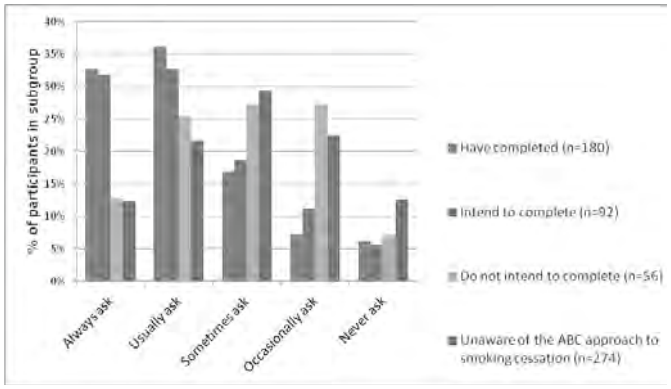
Table 2: Participants' knowledge of and uptake of the ABC approach to smoking cessation described as total numbers (percentage)

	Total n	Aware of government initiative (%)	Aware of ABC approach (%)	Completed training for ABC (%)
Participants	602	478 (79.5)	328 (54.5)	179 (29.8)
Employer Description				
District Health Board	163	158 (96.9)	50 (80.9)	97 (59.5)
Private practice	265	184 (69.4)	106 (40.1)	42 (15.5)
Other	161	120 (74.5)	83 (51.5)	38 (23.6)

Table 3: Responses (percentages) to True/False questions regarding smoking prevalence and smoking cessation from participants who had and had not completed the ABC smoking cessation training

Questions 14-21 from survey requiring True/False answers	Correct Answer	Not Completed ABC - answered correctly	Completed ABC - answered correctly
Q14- The prevalence of smoking amongst Maori and Pacific people in NZ is higher than for other groups.	True	98%	97%
Q15. The prevalence of smoking amongst Maori women is higher than for other women in NZ.	True	98%	96%
Q16. The chance of taking up smoking later in life is higher if both parents of a child smoke.	True	94%	96%
Q17. The chance of success in smoking cessation is higher if a person participates in a quit smoking programme such as the Quit Group/Te Roopu Me Moto.	True	95%	97%
Q18. The chance of success in smoking cessation is higher if nicotine replacement therapy is used in conjunction with behavioural therapy & support.	True	98%	98%
Q19. People from lower socio-economic groups are less likely to make a quit attempt than people from higher socio-economic groups.	False	32%	57%
Q20. Appropriate smoking cessation interventions can increase a person's chance of quitting by up to 300% compared to 'cold turkey'.	True	89%	91%
Q21. Nearly 70% of Maori smokers have made a quit attempt in the past 5 years.	True	58%	71%

Figure 1: Participant responses to Ask the question "Do you ask your patients if they smoke?" and status regarding completion of the ABC training programme for the grouped data



that the majority (75%) of participants were aware of the Ministry of Health's initiative to have all health practitioners involved in offering support for smoking cessation and more than half were aware of the Ministry's training initiative, the ABC approach to smoking cessation. The uptake, or intended uptake from this group was high as 80% of this group had completed the training, or intended to complete it. However the data did serve to highlight provincial differences in the uptake of the ABC training programme, though the survey format did not enable responses to be linked to a particular factor or factors.

In general those physiotherapists who had completed the training were more likely 'always' or 'usually' to ask their patients if they smoked, compared to those who had not completed or were unaware of the programme. These results are in line with the review of the outcomes of training health professionals in smoking cessation (An et al 2008). Although there are no data available yet on the direct contribution the ABC approach has on smoking cessation of the population, it is known that two or more approaches from health professionals have a positive impact (Bodner and Dean 2009; Ministry of Health 2011a). The survey outcomes suggest that physiotherapists who have undergone training in the ABC approach to smoking cessation are using the knowledge gained

from the training to impact positively on the health of their patients.

In a survey undertaken of physiotherapists in Canada (Bodner et al 2011) inconsistencies between their knowledge and perceived barriers to smoking cessation were noted to be at a high level. Only 56.6% agreed they should receive training and more than 70% reported they were not prepared to provide counselling citing lack of resources and lack of time as key barriers. In our survey a smaller group (9.3%) of participants were not prepared to undertake training. Their reasons included "no patient contact" or "not relevant to their work area", however such responses are contrary to the evidence supporting the benefits of training for all health professionals and suggest a lack of knowledge by the physiotherapists about the benefits of smoking cessation as reinforcement of the quit smoking message does not have to just be in a clinical setting or context. (Ministry of Health 2011a). The evidence suggests that such answers may have differed if the physiotherapists had the benefit of training (Bodner 2011). Results from our study that showed the number of correct answers given by the physiotherapists who had undertaken smoking cessation training was higher, especially for Question 19 which had a societal bias (Table 3).

Data obtained on the number of physiotherapists who smoke suggest that as a group they smoke less than other health professionals do. While 15% of participants stated they were previously smokers, fewer than 1% stated they were current smokers. This figure is significantly below the national figure for smokers (21%) and the most recent New Zealand census data obtained for doctors (3.5%) and nurses (16.5%) who smoke (Edwards et al 2006, Edwards et al 2011). It is noted that those participants who were in the older age groups were more likely to have a history of smoking though they are no longer currently smoking (Table 1). This change suggests that they were part of the societal trend against smoking and in choosing to quit were aware of the negative relationship between smoking and health outcomes.

A higher percentage of physiotherapists working in District Health Boards (DHBs) were aware of the ABC approach compared with those working in private practice. Of the physiotherapists working in DHBs, 80% were aware of the ABC approach and 60% of this group had undertaken smoking cessation training. In the private sector 40% were aware of the ABC approach and 16% had undertaken training whereas in other areas including industry, schools, research and teaching 23.6% had undertaken training. The wide variation in the results amongst the physiotherapy workforce sectors may in part be attributed to the fact that the large institutions such as DHBs employ health workers to educate their workforce on matters such as smoking cessation (Ministry of Health 2011a).

Because of the likelihood of managing patients with a history of smoking it is not surprising that more physiotherapists working in areas such as acute care and cardiopulmonary care had seen the relevance of undertaking training – 64.5% had completed ABC training compared to physiotherapists working in the musculoskeletal area which had the lowest completion rates (18.6%). The Ministry's policy is to encourage all health professionals to be actively involved in helping their patients to stop smoking, regardless of their area of work, and the policy has been supported by the registration authority, PBNZ (2009). Thus the authors suggest that more targeting of the education needs to be made to groups within the profession identified as having a low uptake of the education.

A key objective of the New Zealand Smokefree Coalition (2010) is that by 2012, all health professional graduates will have received training on smoking cessation as part of their compulsory studies. It is worthy of note that both Schools of Physiotherapy in New Zealand have already taken up this opportunity and so by the end of 2012 all graduating physiotherapists should have knowledge on smoking cessation and will be able to add to the success rate of quit attempts by including smoking cessation advice and reinforcement of the message (An et al 2008) as a standard part of clinical practice.

Limitations of the study included the fact that the physiotherapy population invited to participate in the survey included only those who were members of the professional organisation, PNZ which represents 80% of those registered, and that only 19% of the potential survey group of 3,157 responded. However the results showed that responses from physiotherapists who participated mirrored the demographics of the registered physiotherapists who completed the most recent Physiotherapy Workforce Survey (Ministry of Health 2011b) so we are confident that the participants are a representative sample of the physiotherapy profession across New Zealand.

In conclusion the outcomes showed that over 50% of the participants were aware of the ABC approach to smoking cessation. The data suggest that there are geographical, employment and work environment differences in the number of physiotherapists who have taken up smoking cessation education. It is recommended that regions where the trends were lowest are targeted to encourage local physiotherapists to undertake a programme to become registered as a provider of smoking cessation education. Secondly it is important that professional organisations such as PNZ use a variety of methods to continue to engage their members to promote knowledge of and training in smoking cessation education. In the long term the greater challenge for the physiotherapy profession will be for clinicians to ensure they include questions relating to smoking history as a standard component of patient assessment, and furthermore that they follow through with **B**rief advice and **C**essation support in order to assist patients to quit. By being proactive in the area of smoking cessation training and education of their patients, physiotherapists will be taking a practical step towards improving the overall health of the population in New Zealand.

KEY POINTS

- Only half of the physiotherapists surveyed were aware of the ABC approach to smoking cessation.
- Physiotherapists who had completed the ABC training more frequently or always asked patients if they smoked.
- Results suggest that geographic, employment and work environment differences impact on physiotherapists' engagement in the ABC smoking cessation education.
- It is recommended that the profession specifically encourages uptake of quit-smoke education for physiotherapists in areas where training was reported to be the lowest.

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Abstracts from the Physiotherapy New Zealand Conference, held in Wellington on 5th - 6th May 2012.

Keynote Presentations

Physical activity and sedentary behaviour: How can we help people move more and sit less?

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Low levels of physical activity and high levels of sedentary behaviour (sitting) are contributing to significant public health problems in developed, and now developing, countries. The problem is clear – but the solutions are more difficult to implement. Behaviour change is required, but efforts to date have had only variable success. This presentation will overview what we know about the correlates of physical activity across the lifespan, what the evidence tells us about successful behaviour change, and what we should or can do better in the future. Moreover, with excessive levels of sitting in the workplace, at home in front of screens, in cars etc., we also need to address sedentary behaviour. This has become a major area of interest in recent years. Sedentary behaviour change may require a different approach from that associated with physical activity. For both physical activity and sedentary behaviour, change needs to tackle social, psychological and environmental factors that encourage or inhibit the behaviour of interest. The physiotherapy profession can play a major role in positive health behaviour change through addressing the dual needs of helping people move more and sit less.

Differential Diagnosis: The Best Tests and Future Opportunities

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In clinical practice, physical therapists use tests and measures for a probabilistic approach to clinical decision making. This decision making approach requires that the tests and measures provide tangible value and can alter the post-test probability of diagnosis or prognosis. Good tests and measures are vetted for effectiveness through rigorous methodologies. Recent evidence also dictates that selected tests should be used either early in the examination process to rule out contenders or late in the examination process to confirm hypotheses. Use of diagnostic accuracy values such as sensitivity, specificity, and positive likelihood ratios has improved our ability to discriminate tests' strengths. The focus of this pre-conference course is to provide those tests and measures and the appropriate order within an examination that improves probability of a correct diagnosis or outcome.

LEAPS trial – improving mobility post stroke

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LEAPS is a prospective, multi-site (5 sites), randomized controlled rehabilitation trial that

has recruited 408 individuals within 45 days of their first stroke. At 2 months, persons with stroke who were ambulatory but with severe (< 0.40 m/s) to moderate (0.40 – 0.80 m/s) walking impairment were randomized into one of three walking rehabilitation groups and followed for 1 year (~7% lost to follow-up).

The intervention groups included: a specialized locomotor training program (LTP) that includes use of body weight support and a treadmill as a rehabilitation modality provided 2 months post-stroke (LTP-early), or 6 months post-stroke (LTP-late), and a non-specific, progressive home-based exercise (HEP) intervention provided 2 months post-stroke (control-comparison).

The trial was specifically designed to answer 3 clinical questions concerning physical therapy interventions for walking recovery after stroke:

1. At the end of 1 year post-stroke, is an intense, task-specific walking rehabilitation that includes a specialized locomotor training program more effective than a home-based exercise program for improving walking speed and distance?
2. Does the timing (2 months or 6 months post-stroke) of intense specialized walking rehabilitation program affect walking outcomes? How does severity (severe or moderate walking impairment) or timing post-stroke influence intervention effectiveness? For example, do individuals with severe stroke perform better if an intense walking rehabilitation program is provided later, in the 6 month time point, after stroke?
3. What is the optimal dose (12-, 24-, or 36-sessions) to achieve clinically meaningful changes in walking speed?

Thus, the purpose of this presentation is to share with the New Zealand physiotherapy community the outcomes of this major rehabilitation clinical trial and to discuss the implications of the results of this trial for the development of walking rehabilitation interventions and falls prevention for individuals with stroke.

Sensitisation in musculoskeletal pain

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Chronic and widespread musculoskeletal pain is often accompanied with hyperalgesia, referred pain, and widespread hyperalgesia. Peripheral and central sensitisation, facilitated central integration, and expansion of receptive fields have been identified in basic studies of musculoskeletal nociception; emerging evidence show that similar manifestations can be assessed in pain patients. Hyperalgesia can be explained by increased sensitivity of deep-tissue nociceptors (peripheral sensitisation) or by increased responses from dorsal horn neurons (central sensitisation). Widespread pain and hyperalgesia is probably related to increased sensitivity of central neurons (central sensitisation) and to changes in descending control from supraspinal centres. Manifestations related to the different aspects of sensitisation can be assessed quantitatively in humans by quantitative sensory tests. Pressure algometry and cuff algometry (inflation of a tourniquet) is used for assessing the pain sensitivity of deep-tissue and for detecting localised or widespread hyperalgesia in pain patients. Repeated pressure stimulation evaluates the degree of temporal summation of deep-tissue pain which is a proxy for the level of central sensitisation and is facilitated in pain patients. Expanded referred pain area is another biomarker reflecting central sensitisation in pain patients. Pressure algometry assessed during experimental pain is useful for assessing the descending control where a shift between inhibition and facilitation is likely in chronic musculoskeletal pain. Central sensitisation has been detected with the above biomarkers in chronic musculoskeletal pain patients e.g. osteoarthritis, low back pain, and myofascial pain. The transition of acute musculoskeletal pain into chronic pain may be related to the progression of peripheral and central sensitisation.

Invited speakers

Inspiratory muscle training across the subdisciplines of physiotherapy

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Inspiratory muscle training (IMT) is the application of a specific training load to the inspiratory muscles with the goal of inducing a training adaptation. Although IMT can be applied in several ways, a simple threshold resistance device applied via a mouthpiece is usually recommended because it avoids the need for complex rebreathing circuitry and it does not allow the patient to ease the training load by reducing their inspiratory flow. However, alternative methods (respiratory biofeedback, abdominal weights) are effective in some patient groups. IMT follows the same principles as other types of training, including specificity, progressive overload, recovery and reversibility. Control of learning effects is also important in assessing the effect of training on respiratory muscle performance. A survey of the Physiotherapy Evidence Database (www.pedro.org.au) shows that IMT is beneficial in certain patient groups. In healthy people, IMT reduces ventilation and dyspnoea at isoexercise on a progressive exercise test, which tends to extend the time to fatigue. In trained rowers, cyclists and swimmers, IMT improves time trial results. In people with complete cervical spinal cord injury, IMT improves ventilatory capacity, respiratory endurance and dyspnoea. In high-risk orthopaedic/abdominal/cardiac surgery patients, pre-operative IMT significantly reduces post-operative pulmonary complications and length of stay. In people with asthma, IMT can reduce the use of beta-agonist medication. IMT improves exercise capacity and quality of life in people with stroke and in people with chronic obstructive pulmonary disease. Other diseases in which respiratory muscle training is beneficial include several adult and paediatric neuromuscular diseases, renal failure, bronchiectasis and cystic fibrosis.

Smoking Cessation - What is happening in New Zealand?

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Smoking cessation is a life-saving intervention. More smokers are making more attempts to quit thanks, in large part, to the advice they are receiving in hospitals and general practice. Encouraging smokers to use treatments (behavioural and pharmacological) increases their chances to stop smoking for good. Hospitals and primary care has been actively involved in helping people who smoke to stop by using the ABC approach (Ask, Brief advice, Cessation support) which systematises the key steps needed to prompt quit attempts and enhance smoking cessation outcomes. This has been most publically reported as the Better Help for Smokers to Quit Health Target. This presentation will provide an update on the effect of brief advice and offer of treatment provided by healthcare professionals and clinical management for smokers who want to quit, including evidence-based pharmacotherapy and behavioural support. It will also provide key messages about tobacco use and smoking cessation. The session will also cover outreach approaches that work and using hospital discharge information to your advantage should you be working in a primary care setting.

Expanding the Horizons of the Physiotherapist's Role in Fall Prevention

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The purpose of this invited presentation is to explore the expanding role of physiotherapists in fall prevention, a role beyond that of merely teaching fall prevention exercises. The presentation will provide an overview of current evidence for exercise-based fall prevention programmes for older adults and for disabled adults. The paper will debate the sustainability of such programmes. It draws on the findings of our qualitative research that provide insight on factors that encourage long-term adherence to exercise and the social capital gained in the community networks formed beyond the exercise intervention. The talk will also draw on the findings of three recent fall prevention trials that the author and colleagues have undertaken, studies investigating the effectiveness of Tai Chi, water-based exercise and peer-led exercise groups to reduce fall risk in older adults. These studies' findings provide pause for reflection as to whether *what you do* (in the form of a fall prevention exercise-based activity) is as important as the fact *that you actually do* something physically active. Moreover, that doing something physically active long term requires the development of self-efficacy and social networks and that physiotherapy plays an importance role in this. The knowledge gained from our research guided the development of a fall prevention exercise programme for people with intellectual disability, which is presently being evaluated, and which this discourse will explain.

Imaging in Physiotherapy

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Medical Imaging plays a major role in physiotherapy practice. With respect to referral, physiotherapists in Australasia have referred for specific types of imaging in their role as a primary provider for quite some time. Physiotherapists often ask for imaging to assist and confirm their diagnoses and treatment options or clarify their decision to treat or refer. Developments worldwide have also lead to physiotherapists extending their referral and scope of practice boundaries. As a result of having the responsibility to refer a patient for imaging the need to appreciate imaging findings and technology are paramount. There are a number of types of imaging available, all with their particular use and value. Some have greater relevance to physiotherapy while others less. It is in the interest of the profession to assess and understand the various imaging options. One of the most common imaging methods familiar to physiotherapy is diagnostic ultrasound imaging. Diagnostic ultrasound imaging has grown in popularity and currently is recognised as the imaging modality of choice for a shoulder injury/pathology. From an alternate imaging appreciation ultrasound imaging has gained in popularity and developed into a 'new and novel' tool for physiotherapists. Rehabilitation USI has been established and recognised consisting of biofeedback, identification of anatomy, exercise education, dynamic assessment and injection guidance to name a few key uses. Regarding the scope of practice of musculoskeletal physiotherapy, in relation to scanning, we must assess and recognise the ability of a physiotherapist. A physiotherapist's depth of knowledge in areas such as anatomy, physiology, pathology, coupled with their ability to assess, clinically reason and diagnose musculoskeletal pathology strongly support the rationale that they should also be able to scan for diagnostic purposes. Diagnostic ultrasound scanning training has been taught with a focus on obstetrics and general scanning, with little to no time spent on musculoskeletal scanning. However there are now a number of musculoskeletal imaging training and qualifications offered at a postgraduate level worldwide for physiotherapists. This is exciting and valuable for the physiotherapy profession.

Developing solutions: Research-based evidence to reduce inequalities

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Growing inequalities in income and wealth have a corrosive effect on health. Causal evidence from our community-based trials on retrofitted insulation, sustainable heating, mitigating home hazards, providing heating subsidies and increasing the uptake of walking and cycling highlight that we can adopt public policies that can improve the health of more vulnerable members of society.

Biomechanical Basis for Conservative Treatment of Patellofemoral Disorders

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Patellofemoral pain is the most common lower extremity condition seen in orthopaedic practice. Despite its high prevalence however, treatment approaches remain highly variable and often lack scientific backing. One reason for the lack of consistency in managing patellofemoral joint problems is related to the fact that the pathomechanics of this disorder remain poorly understood. Over the past 15 years, our group has taken a multidisciplinary approach to better understand the root cause(s) of patellofemoral dysfunction. In particular, recent publications from our lab suggest that atypical movements resulting from poor proximal control may underlie the development of patellofemoral pain and perhaps cartilage pathology. The purpose of this session is to highlight recent research in the areas of biomechanical evaluation, dynamic imaging, and computational modeling that has lead to a better understanding of this multifaceted clinical problem.

Physiotherapy following major surgery – the state of the ark

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Postoperative complications are known to increase overall health care costs with postoperative pulmonary complications (PPCs) being a major contributor to increased intensive care and hospital length of stay (LOS) and use of resources. Over the past two decades, widespread developments in postoperative management and fast track postoperative rehabilitation protocols have led to a reduction in morbidity and mortality following major surgery and faster discharge from hospital. Physiotherapy has been considered an essential component of perioperative care to minimise the adverse effects of anaesthesia and surgery on the respiratory, cardiovascular and musculoskeletal systems. Despite being routinely utilised in the prevention and amelioration of postoperative complications since the 1960s, physiotherapy practice has remained relatively unchanged. The increasing emphasis on cost-effective provision of healthcare and the focus on evidence-based practice have challenged physiotherapists to examine their traditional practices and the number of high quality studies investigating physiotherapy interventions in major surgical populations has been increasing. These studies have led to increasing debate about the effectiveness of physiotherapy interventions in preventing and treating postoperative complications. Key questions include: do physiotherapy interventions reduce the incidence of postoperative complications and improve recovery (and rate of recovery) from major surgery? This presentation will review the evidence to date and address what constitutes current physiotherapy practice in patients undergoing major surgery and the evidence to support these practices. The presentation will make recommendations for changes to clinical practice based on the evidence to date and will consider future research directions in this area.

Women's health matters for all physiotherapists

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Women's health physiotherapy practice is changing, with research evidence driving the changes. Research is most effective when it addresses a condition that is common, that causes disruption to the patient's quality of life, and is relatively simple to make changes to that condition. Pelvic floor dysfunctions such as incontinence and prolapse, are conditions that fit all these criteria. The results of recent research into these conditions will be presented. This presentation will then address how our management of pelvic floor dysfunctions is changing due to our better understanding of the causes of each of these dysfunctions, the clinical conditions themselves, and the consequences of these dysfunctions. New technology is also driving change. Ultrasound imaging has improved our understanding of the anatomical changes occurring in incontinence and prolapse, thus increasing our understanding of the cause and consequences of each condition, leading to changes in our physiotherapy management. Pelvic pain conditions will be explored as an area of intensive research, but with less successful outcomes. Pelvic pain is common, causes extreme disruption to a patient's quality of life, but the condition is less mutable to change. The consequence of this is that non-evidence based treatment techniques have emerged,

as patient's seize on anything that will alleviate their distress. Physiotherapists play an ever expanding role in the management of pelvic dysfunctions as research supports our interventions. As a profession, we need to look to expanding our scope of practice in this area, particularly in establishing primary contact positions within public health.

Equity and health

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There is a growing body of evidence of unequal treatment by ethnicity within health systems. Reducing inequalities in health outcomes, especially inequalities between Māori and non-Māori, is a high level goal of the New Zealand health sector, and contributes to fulfilling the right to health for all.

This presentation will follow the process of a research project that explores unequal treatment in the New Zealand health system, and how it contributes to Māori and non-Māori disparities in ischaemic heart disease. The project utilised both quantitative and qualitative research methodologies.

It will raise questions and issues that clinicians and practitioners will no doubt confront at sometime during their career in New Zealand. It is hoped that this presentation will provide some insight into how disparities may be generated and maintained within the health system, and discuss the role we can play in achieving equity.

Moving Physiotherapy forward – which direction do we take?

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The Executive of the World Confederation for Physical Therapy (WCPT) developed its strategic plan for 2011-2015 with regard to participation in and engagement with the World Health Organisation (WHO) and other UN related agencies as well as engagement with the 108 Member Organisations. WCPT's vision is *to move physical therapy forward so the profession is recognised globally for its significant role in improving health and well-being*. Success in achieving its goals will be dependent on accountability and excellence in governance as well as outcomes from research informed collaborations at an international and national level. The key issues identified by the WHO for improving global health include the need to address the epidemic of non-communicable diseases, inequitable access to healthcare, health policies that are not well-informed by research evidence, a lack of health workers in rural communities and an aging health workforce. These issues are also identified in WCPT's strategic plan and fit within the New Zealand context, but how well is the physiotherapy profession doing here and in which direction do we need to focus our research, education and collaborations? The presentation will discuss ways to move physiotherapy forward in New Zealand and provide evidence in support of initiatives such as inter-professional education for health professionals, new models for pre-entry physiotherapy education, embracing diversity in the profession and methods of engaging clients in our services.

Free papers

Exercise therapy, manual therapy, or both, for management of osteoarthritis of the hip or knee: The MOA Trial

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There is evidence supporting the effectiveness of both exercise therapy and manual therapy for hip and knee osteoarthritis (OA), but their use alone or in combination has not been compared against usual medical care. In this 2x2 factorial randomised controlled trial, adults meeting the American College of Rheumatology criteria for hip or knee OA were randomly allocated to either: (a) exercise therapy; (b) manual therapy; (c) both exercise therapy and manual therapy; or (d) usual medical care only. The Western Ontario and McMaster (WOMAC) osteoarthritis index (a scale of 0 to 240) and physical performance measures were assessed, blind to group allocation. Of 206 participants recruited, 193 (93.2%) were retained at follow-up. Intention-to-treat analysis showed reductions in WOMAC scores at one year compared with the usual care group of 28.5 (95% confidence interval 9.2 to 47.8) for manual therapy alone, 16.4 (-3.2 to 35.9) for exercise therapy alone, and 14.5 (-5.2 to 34.1) for combined exercise therapy and manual therapy. Among participants who did not have joint replacement surgery during the trial, mean reductions in WOMAC score compared with the usual care group were 31.9 (16.2 to 47.7) for manual therapy alone, 16.3 (0.3 to 32.2) for exercise therapy alone, and 18.9 (2.7 to 35.2) for combined therapy. There was an antagonistic interaction between exercise therapy and manual therapy (P=0.027). Physical performance test outcomes favoured the exercise therapy group. Both exercise physiotherapy and manual physiotherapy provided incremental benefit over usual care alone, which was sustained to one year follow-up.

Economic evaluation of the MOA Trial: exercise therapy and/or manual therapy for management of osteoarthritis of the hip or knee

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Conservative interventions are recommended as first line treatments for osteoarthritis (OA), however few economic studies have assessed their value for money. We conducted a cost-utility analysis alongside the Management of Osteoarthritis (MOA) Trial. Participants (n=206) were randomised to either: (a) supervised multi-modal exercise therapy; (b) individualised manual therapy; (c) both exercise therapy and manual therapy; or (d) usual medical care only. The main outcome measures of the cost-utility analysis were health care and societal costs (presented in 2009 NZD) and quality adjusted life years (QALY) at 12 months. Incremental cost effectiveness ratios (ICER) and 95% CIs and cost-effectiveness acceptability curves were reported. All three treatment groups resulted in mean QALY gains relative to usual care. Manual therapy was cost saving relative to usual care from the societal perspective. Exercise therapy resulted in incremental cost utility ratios regarded as cost effective but was not cost saving. From the perspective of the New Zealand health system, exercise therapy was the only treatment to result in an ICER under 2 times gross domestic product (GDP) per capita at $44 058 (–70 885 to 194 558). Based on willingness-to-pay thresholds of 2 and 3 times GDP per capita, the probability that exercise therapy was cost effective was 61% and 79%, increasing to 74% and 87% for participants who did not receive joint replacement therapy during the trial. Combined therapy dominated usual care for this subgroup from the societal perspective, but it was not cost effective from the New Zealand health system perspective.

Comparison of Nordic and ordinary walking for Parkinson's disease: A single case design

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This single case design tested the feasibility of protocols for a larger mixed methods investigation of the effect of Nordic and ordinary walking on physical function and wellbeing in people with Parkinson's disease. The single case design consisted of five six week phases (ABACA); A = baseline/washout, B = ordinary walking, C = Nordic walking. A 64 year old female with an 11 year history of Parkinson's disease participated. Physical function was measured weekly using the six minute walk test, timed up and go, and 10 metre walk test. The Parkinson's Disease Questionnaire (PDQ-39) was answered at the beginning of the study and end of each phase. At the end of the study the participant was interviewed about her experiences of the two types of walking and their effect on her wellbeing. Physical function data were graphed and analysed using repeated measures analysis of variance. Transcribed interview data were analysed using content analysis. The only significant difference for physical function was between PDQ-39 mobility scores at the end of Nordic walking and its washout phase, with the latter scores indicating greater mobility. Interview content analysis revealed the participant considered Nordic walking more beneficial than ordinary walking. During Nordic walking she felt more stable, did not have to focus on walking and her step length increased. She also reported coping better with daily activities and general health improvement. While this study provides a broad insight into the effects of Nordic walking, future research should include physiological measures.

Does the Physiotherapy Board have the regulatory bar in the right place?

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The Physiotherapy Board is the responsible authority, appointed under the Health Practitioners Competence Assurance Act 2003, to protect the health and safety of New Zealanders by regulating physiotherapists. The legislation authorises the Physiotherapy Board to establish mechanisms to ensure physiotherapists are competent and fit to practise. In taking on this responsibility on behalf of the Minister of Health, the Board is aware of the need to keep a balance. If the Board under regulates physiotherapists, the public may be at risk of harm or lose confidence in the profession as safe and effective health providers. If too much regulation is imposed, the autonomous nature of physiotherapy practice may be eroded and unnecessary work is required for no added value. The Board has been operationalizing the Act since 2004 and its current regulatory mechanisms are well established. The outcomes from the Board's regulatory programmes and the evidence of severity of harm from physiotherapists are the indicators which demonstrate whether the Board has the regulatory bar in the right place. The outcomes from the past three years show the registration process has declined <1% of overseas applicants. The recertification programme has identified one participant in three years who has not demonstrated satisfactory ongoing professional development. The complaints and incidents process reviewed 48 concerns in the three year period that related to Physiotherapy practice. This represents 1.1% of practising physiotherapists. The level of patient harm from complaints was categorised using a Risk impact Score. Patient harm was insignificant to minor and the risk to reputation of the profession minor. These results suggest there is low likelihood of public of harm from physiotherapy practice however this process identified gaps in the information the Board receives related to public harm.

Measuring levels of physical activity in individuals with severe disability living in residential care: an observational study

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Physical activity is promoted and encouraged for all of the population. Despite this, persons with disability are less physically active than the able-bodied population, with consequent impact on their overall health and well-being. This observational study aimed to investigate the levels of physical activity of people with physical disabilities who live in residential care. We used the behavioural mapping technique to record time, location and companionship during the day's activities of 21 participants (eight females, 13 males; mean age: 61.55 years) who volunteered for the study. Observations occurred at ten minute intervals for ten hours a day, across three days. Activities observed were classified into Metabolic Equivalent of Task (MET) categories. Functional ability was classified using the Functional Independence Measure and Functional Assessment Measure (FIM-FAM). The study demonstrated that the participants spent significant amounts of time (50.1%) alone in their bedrooms. In addition, the majority of participants' time (79.9%) was spent in activities requiring less than 1.5 METs. Interestingly, no statistically significant relationship was found between the FIM-FAM score and average MET score. Overall, the majority of participants' time was spent alone, performing little physical activity. Our findings suggest that facilities catering for individuals with physical disabilities need to identify ways to increase participation in physical activity for their residents.

Early use of thrust manipulation versus non-thrust manipulation: a randomized clinical trial

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One study exists that has compared the outcomes of thrust versus non-thrust manipulation in patients with low back pain (LBP). That study reported that the outcomes of thrust manipulation were much better than those that used non-thrust manipulation, but the study used a non-thrust technique that was markedly different than what is typically performed during clinical practice. The purpose of this study was to investigate the comparative benefit of early thrust or non-thrust manipulation. The study was a single blinded, randomized clinical trial, that involved 93 patients, 18 years of age or older, with mechanically reproducible LBP with no signs of red flags or nerve-root involvement. After randomization, patients received either thrust or non-thrust manipulation and a standardized home exercise program from physiotherapists with advanced training in manual therapy. After the first two visits, the physiotherapists were allowed to perform any treatment procedure they felt would be beneficial for the patient in addition to manual therapy. Pain, perceived recovery, function, totals visits, and total days of care were the outcomes assessed. A two-way ANCOVA (which controlled for patient expectations and clinician personal equipoise) was used as the analysis tool. There were no significant differences in the thrust and non-thrust groups baseline characteristics ($p>0.05$) or for any of the five outcomes measures ($p>0.05$). The study demonstrates that early use of thrust or non-thrust results in similar outcomes, thus for clinicians who either lack specific trust training or are not allowed by licensing requirements to use thrust, non-thrust manipulation appears to be a useful alternative.

What factors are associated with a successful outcome in patients with low back pain who receive a manual therapy approach?

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Identifying prescriptive treatment selections using single-arm analyses is not recommended when developing decision rules. Rather than influences from prescriptive treatment, findings of associations could be purely related to prognosis. Recently, many clinical decision rules have been created with this erroneous assumption. Nevertheless, identifying which factors are associated with a successful outcome may still have selected clinical utility in terms of understanding the likely prognosis of a patient. The purpose of this study was to identify whether selected characteristics were associated with good prognosis (50% change or greater in Oswestry Disability Index [ODI]). Data from 93 patients from a randomized controlled trial that involved two arms of manual therapy intervention (thrust and non-thrust manipulation) were pooled. A multivariate logistic regression analysis was used to identify prognostic factors among the baseline characteristics of duration of symptoms, irritability, pain score, fear avoidance score, ODI score, met a clinical prediction rule (CPR) for thrust manipulation, and between-session changes (which involved a change from baseline to follow up). Significant prognostic variables included less than 20 weeks, duration of symptoms (OR=14.1; 95%CI=2.8-70.4), positive between-session change (OR=9.4; 95%CI=1.8-49.9), met CPR (OR=3.3; 95%CI=1.1-9.7), and a negative finding of irritability (OR=2.7; 95%CI=1.0-7.1). The most compelling prognostic variable was duration of symptoms followed by a positive between-session change. The CPR for thrust manipulation was prognostic suggesting meeting the rule leads to a positive outcome even when thrust and non-thrust subjects were combined in one group. Future studies need to determine whether the findings are prescriptive *and* prognostic.

Physiotherapy - an integral part of the interdisciplinary team in a 'high needs' primary health centre

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Physiotherapy is an established component of the New Zealand healthcare sector delivering services within the District Health Board (DHB) structure as well as in private clinics in community settings. Public funded physiotherapy services are still predominantly based in secondary care facilities despite the Primary Health Care Strategy (PHCS) vision for a multi-disciplinary team (MDT) of primary health professionals meeting the complex and varied needs of their community. Funding from the PHCS Innovations Fund supported the piloting of a DHB-employed physiotherapist in a primary health centre in a low socioeconomic area of the Hutt Valley (HV) fulfilling the HVDHB strategic goals of improving integration of primary and secondary health services and reducing health inequalities for high needs groups.

A small qualitative research project involved the collection of interview data from the physiotherapist, the practice manager and two general practitioners. The health professionals were asked to describe their experience of the first 6 months, with particular emphasis on the challenges and successes of the pilot. Using a phenomenological approach to determine participant perspectives five themes were identified through data analysis of the interviews: Challenges (of High Needs Populations), Access, Team Communication, Learning and Efficient Seamless Care. The results demonstrated that access to physiotherapy services for the enrolled population of the health centre was improved and changes in practice and improved job satisfaction for health professionals working with a high needs population were also noted.

Comparison of different neural mobilisation exercises upon longitudinal sciatic nerve movement: an in-vivo study utilising ultrasound imaging

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Neural mobilisation has been advocated for conditions where peripheral nerve movement is thought to be compromised. Recent cadaveric and in-vivo research has concluded that median nerve excursion differs significantly between different types of neural mobilisation exercises. Clinically it is important to understand the mechanical influence upon the peripheral nervous system when prescribing neural mobilisation. A controlled laboratory study using single-group, within-subject comparisons was conducted to determine whether different types of neural mobilisation exercises are associated with differing amounts of longitudinal sciatic nerve excursion. High-resolution ultrasound imaging and frame-by-frame cross-correlation analysis was utilised to assess longitudinal sciatic nerve excursion at the posterior mid-thigh. Four different neural mobilisation exercises were examined in thirty-one healthy participants. A repeated-measures analysis of variance and isolated means comparisons were used to analyse the data. The findings of this study concluded that different neural mobilisation exercises induced significantly different amounts of sciatic nerve excursion ($p<0.001$). The two-ended slider was associated with the largest sciatic nerve excursion (3.2 ± 2.0mm) and was significantly greater ($p<0.02$) than seen with a one-ended slider (2.6 ± 1.4mm; $p<0.02$) and a tensioner (2.6 ± 1.5mm). These findings support those seen in previous research which has examined median nerve excursion associated with different neural mobilisation exercises. Appreciation of the varied mechanical influence imposed upon the nervous system will allow the prescription of neural mobilisation exercises to be more specific in respect to the magnitude of nerve movement that is optimal for a given pathology.

Identifying the sequence of sciatic nerve excursion during different neural mobilisation exercises: an in-vivo study utilising ultrasound imaging

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Research suggests that peripheral nerves exhibit a sigmoidal sequence of excursion during limb movements. Initially slack is taken up before nerve excursion occurs followed by a period of elongation. Knowledge of such a sequence during neural mobilisation exercises will enhance their design to maximise nerve excursion. A controlled laboratory study using single-group, within-subject comparisons was conducted to determine whether the sciatic nerve exhibits a sigmoidal sequence of excursion *in-vivo* during different types of neural mobilisation exercises. High-resolution ultrasound imaging of sciatic nerve excursion was synchronised with cervical and knee joint range of movement data during the performance of three different neural mobilisation exercises in thirty healthy participants. A sigmoidal sequence of nerve excursion was identified for the two-ended slump slider and slump tensioner exercises but not the one-ended slump slider. A significant difference in regard to the point of greatest nerve excursion was seen between all exercises, once 73-80% of each exercise had been completed (during a three second exercise period), ($p<0.05$). These findings support previous cadaveric research that sciatic nerve excursion exhibits a sigmoidal sequence during a two-ended slump slider and slump tensioner neural mobilisation exercises. Appreciation of the sequence of nerve excursion during different neural mobilisation exercises will enhance their prescription for conditions where nerve excursion is compromised.

An investigation into the amount of PEP produced by a modified syringe

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Positive expiratory pressure (PEP) devices are commonly used to aid in the clearance of secretions from the lungs. Most devices are designed to produce 10-20cmH_2O during mid-expiration. Many of these devices are expensive to use when trialling their suitability in a patient situation. A laboratory based study was designed to test the amount of PEP generated by seven modified 10ml disposable syringes. These were cut to produce outflow diameters ranging from 2.3-3.3mm. Gas flow was generated with 100%O_2 source gas passed through a high rate flow meter. Flow rates ranging from12.1L/min-28.3L/min were passed through the syringe and PEP values recorded from a manometer in the circuit. This study showed that a modified syringe with an outflow diameter of between 2.3-2.7mm was able to produce PEP values between 12.5-22.5cm H_2O with a flow rate of 19.6L/min. Syringes with an outflow diameter of above 2.7mm were unable to produce PEP values above 6.5cm H_2O under the same laboratory conditions. Based on these findings the 10ml syringe may be viable for use in a clinical population, but the point at which the syringe is cut is crucial to obtain a PEP value within a therapeutic range.The information will be of use to physiotherapists working in the respiratory care setting and may provide a more cost effective PEP device.

Quantification of biplanar wrist motion: An observational case series in a real time call centre environment.

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The call centre setting offers an opportunity to observe workers undertaking a similar work task within the same environment. The primary objective for this study was to quantify biplanar wrist range of movement in call centre operators (n=4) undertaking a mouse dominant task in a real- time work situation. Biplanar wrist posture was quantified for each participant using a biaxial electrogoniometer which was secured to the dorsal aspect of the working hand for duration of 30 minutes. Biplanar wrist postures (degrees) were calculated for flexion /extension and radial/ulnar deviation angles by the median position (50th percentile) and the extreme positions (10th, 90th percentiles). Range of movement was calculated as the difference between the 10th and 90th percentiles. The

results showed the median angle for participants represented an extended wrist position ranging from 10.17 - 32.45degrees. Different patterns of biplanar wrist motion were identified with two of the four participants assuming a median working wrist posture of 14.4, 13.05 degrees of ulnar deviation respectively. In contrast the remaining two participants adopted a median working wrist posture of radial deviation with values of 4.14 and .54 degrees respectively. The objective measurement of biplanar wrist motion in a real time call centre provides new insight into the individual nature of patterns of movement adopted by the human wrist particularly with respect to the relative amounts of radial and ulnar deviation that takes place whilst undertaking a mouse dominant task. These differences suggest that evaluation at the worksite is important to identify individual variation.

The professional development and educational potential of Health Practitioners Disciplinary Tribunal cases

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The regulation of registered health professionals in New Zealand was transformed when the Health Practitioners Competence Assurance Act 2003 repealed eleven regulatory statutes including the Physiotherapy Act 1949 creating one regulatory framework. An important feature of the Act was the creation of a single disciplinary tribunal to hear and determine disciplinary charges from what are now 20 registered health professions. The Tribunal can cancel or suspend a physiotherapist's registration, require a guilty physiotherapist to pay a fine up to $30,000 and is made up of a chair, who is a barrister or solicitor, a lay person and three professional peers. So far, just 5 cases considering misconduct by physiotherapists have been heard by the Tribunal and reflect ethically challenging issues in physiotherapy: 2 relate to ACC fraud and 3 overstepping professional boundaries. All cases resulted in a guilty finding. This presentation uses the most recent physiotherapy case heard by the Tribunal to demonstrate how the published case reports offer considerable professional development and educational potential. The case highlights several important factors relevant to physiotherapy practice, particularly in relation to professional boundaries and text messaging. Texting can reap advantages for both patients and health practitioners, but this case highlights how the current lack of professional guidance on when texting is inappropriate is problematic. Given the findings of this case and expanding use of mobile technologies to enhance practice it is incumbent on the profession to explore current perceptions and set clear guidelines on appropriate use of text messaging in physiotherapy practice.

Total knee arthroplasty: strength and activation of the quadriceps and post operative function: a review

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The ageing population in New Zealand will continue to increase the demand for total knee arthroplasty (TKA) and yet few guidelines have been developed for the post operative rehabilitation following TKA. Impairment in quadriceps strength (QS) has been identified as a possible cause of ongoing loss of function after TKA surgery. Reduced QS is usually associated with muscle atrophy however impairment of voluntary activation of the quadriceps should also be considered when assessing QS. The purpose of this paper is to provide a systematic review of papers that have assessed QS and voluntary activation following TKA and secondarily to review studies that have assessed post operative function in relation to strength. Electronic data bases were searched (Cumulative Index to Nursing and Allied Health Literature, MEDLINE, SPORT Discus via EBSCO, AMED via OVID and SCOPUS) using the search terms " knee arthroplasty", "knee replacement", "quadriceps strength", "function" and "outcome". Eighteen articles were identified and the methodological quality of the studies was assessed using the Downs and Black quality index. The results showed QS is markedly reduced in the early post operative phase which is in part related to a loss of voluntary activation. This early loss of QS impacts on function however QS improves one year post operatively to between 87-91% of the non operated leg.

Expanding our viewpoint on exercise - an analysis of ACC physiotherapy exercise-related injury claims.

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The Accident Compensation Corporation (ACC) provides comprehensive, no-fault personal injury cover including injuries resulting from treatment but the patterns of claims arising from physiotherapy treatment have not been examined since the implementation of this compensation category in 2005. This study aims to describe the prevalence and nature of ACC claims for physiotherapy treatment injuries directly attributed to exercise. A retrospective, descriptive study in which de-identified data for all physiotherapy treatment injuries (n=278) accepted by ACC from 2005- 2010 was undertaken. Treatment injuries were ranked according to frequency of accepted claims

for each ACC treatment category. Level of harm, based on the ACC criteria for consequence of treatment injury events, and types of exercise treatment injuries were tabulated. Exercise injuries were categorized according to anatomical location, relationship to body part for which initial physiotherapy referral was made and level of physiotherapy supervision. Reliability of data categories was assessed by Kappa scores. The results showed that the highest number of accepted claims was in the exercise treatment category (31.6 %, n=88) followed by manual therapy (13.3%, n=37). Of the exercise treatment injuries, 58.1% (n= 31) were sprains/strains with 38.6% (n=34) affecting the lower limb. Forty two (47.7 %) exercise injuries occurred within a therapeutic setting not necessarily directly supervised. Forty nine (55.7%) exercise injuries were not directly related to the body part for which initial treatment referral was made. These results emphasize the need for careful consideration to manage risk of harm, in particular the level of supervision required when prescribing exercise.

Quantifying needle placement for a specific acupuncture point with respect to De qi

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The aim of this cross-sectional study was to quantify the perceived depth of the *de qi* sensation at the acupuncture point Gall Bladder 34 using digital ultrasound imaging and a novel manual measurement. Ethical consent was gained from a local human ethics committee. Methods: Healthy subjects (n=21) were recruited from a tertiary learning institute. A fine filiform needle was inserted into the acupuncture point Gallbladder 34 and the needle was manipulated until *de qi* was established. The depth of the *in-situ* needle was measured using a 7.5 MHz digital ultrasound at two different focal depths (3.32 and 5.29 cm respectively) followed by a manual measurement of the needle on its withdrawal. The estimated needle depth of *de qi* was recorded in millimetres (mm) for all measurements. Results: The mean depth of the manual measurement was 16.30 ± 3.16 mm and the ultrasound mean depth was 18.98 ± 3.65 and 20.41 ±2.98 at the focal depths of 3.23 cm and 5.29 cm respectively. The manual and ultrasound measurements were then compared using Bland Altman plots. The 95% limits of agreement ranged from 13.0 to 7.60 mm for the manual and ultrasound measurement at the focal depth of 3.23cm, and from 11.3 to 3.1 mm at the focal depth of 5.29 cm. Conclusion, the manual method and ultrasound measurement of estimating *de qi* depth at either focal depth of 3.23 and 5.29 are not equivalent but the results indicate regardless of measurement approaches de qi is more superficial than previously recognised.

The frequency of hamstring stretches required to maintain knee extension range of motion following an initial six week stretching programme.

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Previous research has demonstrated that stretching the hamstring muscle group once per day, five days a week for a six week period improves knee extension range of motion (ROM). There is little research to demonstrate the frequency of stretching required to maintain that range once the initial improvements have been gained. The purpose of this study was to compare two different hamstring stretching frequencies after an initial stretching period of six weeks. Sixty three males (mean age 22.9 SD:5) were recruited for the study. Participants were randomly assigned to one of three groups, two groups that stretched and one group who acted as a control who did not stretch. The two stretching groups both stretched initially three times 30 seconds, once per day, five days a week, for six weeks. Group one then continued stretching with the same stretching routine once a day, three days per week, and group two once a day, one day per week, for a further six weeks. The results of the study indicate that the groups that stretched over the first six weeks increased their knee extension ROM significantly. Over the second six weeks of stretching those participants that stretched three days a week maintained their ROM, whereas those who stretched one day per week did not. This difference was significant. Participants in the control group did not change their ROM at any time point. In conclusion, to maintain improvements in knee extension ROM after an initial stretching programme, stretching three times per week is required.

Acupuncture and dry needling: a fusion of horizons or conflicting paradigms?

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The definitions of acupuncture and dry needling are complex, with differing definitions being used worldwide. The needling of painful myofascial trigger points is known as 'acupuncture', 'dry' and 'trigger point' needling by different practitioners. A qualitative historical methodology was utilised to identify primary and secondary information sources in relation to dry needling origin, development, theories, legislation and

future possibilities. Tensions can arise when the use of the acupuncture needle as a therapeutic tool is defined to meet a legislated scope of practice, such as in Colorado where acupuncture practitioners were potentially prohibited to 'dry needle' and Victoria where physiotherapists using dry needling are not allowed to 'acupuncture'. Dry needling has been defined as separate to acupuncture because the philosophical and theoretical precepts of meridian theory are not part of dry needling. The Chinese demonstrate an oral and written history of 'dry needling' since the 7th century, however many consider Janet Travell the 'forefather' of Western dry needling techniques. Dry needling has strong association to the Western 'branch' of acupuncture based on the underpinning of anatomy and neurophysiology. The major problems emerging from this health system analysis were those of patient understanding and informed consent, the depth of understanding and safe practice when utilising an invasive technique, and practitioners using one tool but calling it by a different name. We conclude that legislation and patch protection are the drivers behind this separation and that greater clarity of professional acupuncture related practices are required for the safety of both patients and practitioners.

Injections by physiotherapists: It is time to broaden our scope

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Injection of local anaesthetic for diagnosis, autologous blood injection and corticosteroid injection are common procedures with adequate supportive evidence used in the management of musculoskeletal disorders. Physiotherapists are primary care clinicians with expertise in musculoskeletal diagnosis and therapies. They can refer directly for imaging studies, imaging guided injection procedures, and can undergo training in ultrasound imaging diagnostics. The use of local anaesthetic injections to identify anatomical sources of pain is an important part of musculoskeletal diagnostics. There are many musculoskeletal conditions that are aggravated by movement, mobilization and exercise based rehabilitation protocols, but respond well to corticosteroid or autologous blood injection therapies. Physiotherapists are ideally suited by training and interest to integrate these procedures into the overall management of such conditions. Musculoskeletal pain and disability are key domains of physiotherapy practice and short of surgery physiotherapists should be employing all available modalities. Injection for diagnostics and therapy is widely practiced in the United Kingdom by physiotherapists and a number of post graduate courses are available there. It is time to extend the scope of practice to include these modalities here in New Zealand. While there is no legal prohibition on physiotherapists performing these procedures within the New Zealand jurisdiction under medical prescription, the practice is uncommon, reflecting the particular circumstances and interests of individual physiotherapists. The profession should begin discussion on including these procedures to augment current advanced practitioner and specialist training programs.

Pulmonary Wii-habilitation: Exercise intensity achieved by people with chronic obstructive pulmonary disease playing Nintendo Wii

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Pulmonary rehabilitation (PR) has been shown to improve physical function, improve quality of life, and reduce rehospitalisation rates in people with chronic obstructive pulmonary disease (COPD). However both provision and uptake of PR is poor. In 2009, less than 1% of the total population of people with COPD in NZ participated in PR programmes. Furthermore, 30% of people with COPD who were offered gym-based PR declined this offer. Alternatives to gym-based programmes may therefore increase uptake of PR. In this regard, kinetic video games are of interest for their potential to provide a form of home-based exercise. The purpose of this study was to explore the level of exercise intensity achieved by people with COPD playing kinetic video games under laboratory conditions. Fourteen participants with COPD were recruited from existing PR programmes. Participants completed cardiopulmonary exercise tests (CPET) under two conditions: 1) Maximal CPET performed on an electronically braked cycle ergometer, and 2) CPET while playing three Nintendo Wii games. Data collected included oxygen uptake (VO_2), carbon dioxide output, minute ventilation, respiratory rate, tidal volume, pulse oximetry, and HR. Preliminary data from the first six participants has indicated that that on average these participants achieved 94.5%, 82.0%, and 83.0% of their maximum VO_2 while playing Wii jogging, Wii rhythm parade, and Wii boxing respectively. This data suggests that Nintendo Wii games may be able to provide a level of exercise intensity that could potentially allow people with COPD to achieve functional gains similar to that provided by gym-based exercise programmes.

Outcome measures assessing pain levels pre- and post- total knee arthroplasty: a literature review

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The number of total knee arthroplasties (TKA) in New Zealand is increasing. Objective measurement of pain pre- and post-TKA is important to determine the efficacy of surgery and rehabilitation. The purpose of this review is to critique all available articles that measure pain outcomes with TKA. Electronic databases (Medline via EBSCO, Cochrane Library, Cinahl, Scopus) were searched up to May 2011 to find relevant articles. Keywords used were "knee arthroplasty" AND "pain" AND "outcome" with either "preoperative" AND "postoperative" OR "before" AND "after". Two researchers critiqued all articles to assess methodological quality using a valid and reliable critiquing tool developed by Downs and Black. Fourteen studies were included in the review and the overall methodological quality was found to be moderate. Results showed positive changes in pain in all studies with ten outcome measures used. The responsiveness of some of the outcome measures is problematic. A research proposal is presented to assess true change in pain by using interval data.

The effect of a jogging program on knee joint swelling and bone marrow lesions post ACL reconstruction

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The purpose of the current study was to use MRI to measure changes in the amount of bone bruising or joint swelling that may occur in the first week after people who have had an ACL reconstruction begin jogging again. Twelve people were examined at a time when their surgeon had recommended they return to straight line jogging. All participants had their surgically reconstructed knee scanned 3 times - baseline (pre exercise scan 1), after 7 days (pre exercise scan 2) and after a further 7 days (post jogging scan). The 7 day period between scans 1 and 2 was designated a control period, with participants asked not to begin a jogging programme and not to perform any other activities that would place undue stress on their knee joint. The jogging program involved four sessions of 20 minutes duration over 7 days. At each measurement interval, the surgically reconstructed knee was scanned on a 1.5-T whole body MRI unit. Bone bruises and joint swelling were identified and measured. All subjects had notable bone bruising and swelling at baseline. There were no significant changes in bone bruising or swelling in the knee joint across time ($p > 0.05$). In conclusion, we found no evidence that the reinitiation of jogging 8-13 weeks after an ACL reconstruction leads to an increase in the amount of bone bruising or swelling in the affected knee joint.

Sick of it …. respiratory physiotherapy in rumination syndrome: a case study.

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This case study illustrates how patients with rumination syndrome (RS), a relatively unknown gastrointestinal disorder, can greatly benefit from respiratory physiotherapy. Rumination is characterized by the effortless regurgitation of partially digested food which is then rechewed, reswallowed or expelled. Diagnosis is made primarily on clinical evaluation by gastroenterologists and the absence of structural gastric abnormalities. The exact mechanism is unclear although increased abdominal muscle activity is thought to precipitate RS; some studies suggest this is a learned behaviour. Psychological features such as anxiety have also been reported. Documented treatment includes behavioural therapy, diaphragmatic breathing and progressive relaxation techniques. Respiratory physiotherapists are therefore ideally placed to assess and manage patients with RS. This case study presents the physiotherapy management of a 21 year old male with a 3 month history of rumination. Symptoms reported were socially limiting including food avoidance, fatigue, and reduced exercise tolerance. Findings supported altered abdominal mechanics and a breathing pattern disorder (Nijmegen questionnaire score of 24/64). Management encompassed breathing re-education and relaxation, with a particular focus on integrating the techniques during eating. Improvement was gained at two weeks (Nijmegen score: 5/64 and improved eating habits) and sustained at four weeks (Nijmegen score 2/64) with normal eating habits and increased exercise tolerance. Successful management has resulted in an expansion of services with gastroenterologists now regularly referring to the disordered breathing clinic for assessment/professional opinion.

Expanding services to meet the needs of adolescents with bronchiectasis.

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Non-cystic bronchiectasis (BCT) is a chronic, debilitating disease characterised by productive cough, airflow obstruction, progressive dyspnoea and repeated respiratory infections. Incidence and prevalence of BCT is high in New Zealand compared with other developed countries with a prevalence of 1:6000 amongst children. Few services bridge the transfer from paediatric to adult management and meet the unique needs of adolescents. This presentation shares the experiences of expanding existing adult respiratory services to establish a 'transition' clinic for youths with BCT transferring to adult services and between DHBs. Initiated by two physiotherapists, a shared philosophy of care was established involving Youth Health, medical, nursing and physiotherapy services providing a pathway for adolescents to transition and transfer care to adult services. Whilst cognisant of the unique needs of adolescents and in particular, youths with BCT, the challenges presented to staff and services are highlighted. This includes adolescent pregnancy, multiple missed appointments, parental dominance and death of the young person. Whilst the transition clinic is still evolving, recommendations are made for future developments and in particular, expanding services and patient management to include and engage adolescents.

Piloting a new physiotherapy assessment and action plan to improve disability rights in the Cook Islands.

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The Cook Islands Government recently ratified the Convention of Rights for Persons with Disability (CRPD) in May 2009, after strong lobbying from several local disability groups. Policy-makers and practitioners in the disability field are increasingly looking to evidence-based strategies to assess and maximise limited resources. The knowledge of local traditional beliefs and lived experiences around disability is of vital importance if prioritised needs are to be implemented for people with a disability. Results following volunteer physiotherapy work and interviews of 23 people with disabilities, caregivers and stakeholders, have uncovered that there is weak human rights participation within the disability field. This has shown to be predominantly due to the lack of self-belief of the people with disabilities, their cultural shyness and the lack of their needs being known or available. A new rights-based and capabilities approach assessment tool and action plan has been designed with these findings in mind and Te Vaerua Rehabilitation Council are currently piloting this approach for all new persons registered with a disability in Rarotonga. This capabilities assessment, after four pilot assessments and action plans, has been shown to not only be a tool for enabling disability rights for the participants, but also to uncover attitudes, barriers to development and prioritised needs in an inclusive manner that could be potentially used for future policy formation.

Barriers and facilitators to promoting physical activity for people with physical disabilities: Preliminary research findings and implications for physiotherapists

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In order to promote physical activity participation among people with physical disabilities, physiotherapists must gain multiple perspectives on the social and physical environments of their clients. This study aimed to identify the barriers and facilitators to increasing physical activity from the perspective of three groups: people with physical disabilities, providers of physical recreation facilities and services, and those who plan or fund services for people with disabilities. Using semi-structured interviews, and a questionnaire, we interviewed over 50 people across New Zealand. The study found marked differences in perspectives among the three groups. Despite considerable reduction in barriers in recent years, people with physical disabilities still face challenges arising from attitudes, expectations, information, finance, transport, and the environment. In contrast, providers at recreation facilities often discounted and minimised these barriers, expressing the belief that they did a good job of providing for people with physical disabilities. Funders and planners were very diverse in their ability to influence promotion of physical activity, with system gaps evident. Physiotherapists must recognise that people with physical disabilities vary in their accessibility to activity programmes and facilities, social support to maintain physical activities, and the ability to advocate for themselves to access physical recreation. The findings suggest that promotion of physical activity should be client-centered and should incorporate collaborative problem-solving, goal setting, and monitoring with the clients. There are also opportunities for physiotherapists to take broader roles in their communities as advocates, educators, health promoters and facilitators.

Assessing students' perceived benefit of learning and practicing in an interprofessional health clinic

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Interprofessional collaboration is a key competency for future health care professionals and it is now becoming a key learning outcome for the institutes that train these health care professionals of the future. The Akoranga Integrated Health (AIH) clinic is part of AUT's School of Interprofessional Health Studies. Students completing their clinical placements at the AIH clinic come from a number of different professional backgrounds. A primary goal of the clinic is to facilitate interprofessional learning and practice. Twenty three students from the physiotherapy, podiatry or nursing schools who had undertaken a clinical placement in the AIH clinic were asked to feedback on their experience of learning and practicing within the clinic. The student feedback was provided as part of the clinic's internal development process. All students questioned either agreed or strongly agreed to the statement 'I feel that I benefited from interacting with clinicians and students from other disciplines'. Most students agreed or strongly agreed that the interprofessional approach improved their clinical placement (91%), they wanted more time working with students from other professions (74%), and would encourage other students to complete their placement at the AIH clinic because of the opportunity to work with students and clinicians from other professions (87%). Students stated that the interprofessional approach allowed them to 'understand what other professions do', 'refer patients to other professions easier' and 'discuss different approaches to treatment with different students'. Students stated they would like to have more interprofessional tutorials. In summary, students perceived merit in the AIH's interprofessional approach to learning and practice and more research is required further investigate the benefit of learning and practice in an interprofessional health clinic.

Physiotherapist led Orthopaedic Clinics for assessment, prioritisation and treatment of musculoskeletal conditions, in particular lower limb arthritis.

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Conversion to surgery rates from orthopaedic outpatient consultations may be only 10-25%. Research has shown that over 60% of non-urgent General Practitioner referrals to orthopaedic secondary services did not initially need to see a surgeon. Three quarters of these patients could be appropriately assessed and managed by an experienced physiotherapist; this improved through put whilst maintaining the standard of care, and resulted in lower initial direct hospital costs. In 2007 the orthopaedic team at Timaru Hospital identified the need to reduce waiting times for First Specialist Appointments and manage progress of lower limb arthritis through earlier intervention and patient education. The physiotherapist led Orthopaedic Assessment Clinics were established to provide conservative assessment and management that was timely, comprehensive and coordinated. Patients were referred for assessment, and treatment, aligned with evidence based best practice, comprising modalities aimed at reducing pain, improving biomechanics, joint range, muscle strength, balance and function. There was a strong emphasis on education to promote self -management. Periodic reviews enabled progression of management. Outcomes were measured using the WOMAC, PSFS and NPRS and showed improvements for 78% of patients referred with only 34% of those assessed requiring surgery at some time. Satisfaction by all stakeholders resulted in plans to expand the service so that all arthritic patients are required to be referred to these clinics before any surgery is offered. The role is an exciting expansion enabling the physiotherapist to be an integral member of a specialty team providing a service that is sooner, better and more coordinated.

Interprofessional education in chronic care management: a pilot study

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Interprofessional education (IPE) refers to occasions when health and social care students from two or more professions learn interactively with the aim of developing collaborative practice and improving patient-centred health care. While there is growing evidence to support IPE, examples involving New Zealand students and more specifically New Zealand physiotherapy students are scarce. This pilot study, involving University of Otago Wellington educators and students from three health disciplines (dietetics, medicine, and physiotherapy), used principles of IPE for the delivery of an education module on chronic care management. Educators from each discipline were involved in the planning and delivery of the pilot. Seven students from each discipline participated in an informal social session, an introductory 3-hour interactive interdisciplinary workshop on chronic care management, online discussion forums, home-visits to patients with chronic conditions, and presentations to the class. Subgroups (one student from each discipline) worked together on activities. Evaluation methods included peer feedback of subgroup functioning, before and after self-assessment of learning outcomes, online discussion contributions and analysis of discipline-specific focus groups. Preliminary findings indicate physiotherapy students were positive about their experience of IPE. While the additional workload was a challenge, the experience enhanced their knowledge of roles and responsibilities of the other disciplines and broadened their understanding of chronic care management. The expansion of student/social networks within University of Otago Wellington was also beneficial. With refinement IPE could be incorporated into additional physiotherapy education modules and provide a positive model of collaborative practice and enhanced patient-centred care prior to graduation.

Assessment of asthma control: which instrument is right for the New Zealand context?

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In New Zealand there is currently no standardised assessment instrument for measurement of asthma control in adolescents and adults. This study was undertaken to investigate the assessment instruments used to monitor asthma control in a range of countries and determine their appropriateness for use within New Zealand. The study comprised a critical review of the relevant literature published in the English language from 2002 onwards using a standardised procedure, and including two independent reviewers. The measurement properties of the studies including the effectiveness of the instruments used to measure asthma control, ability of the instruments to detect change, psychometric properties and methods of administration were examined, along with concordance with the international global initiative for asthma (GINA) guidelines. From the 24 studies included, seven instruments to assess asthma control were identified. Two, the Asthma Control Questionnaire (ACQ) and the Asthma Control Test (ACT) were found to be suitable for use with adolescents and adults in the New Zealand context. Measurement properties for both were closely aligned with the GINA guidelines and the instruments were valid and very reliable on their repeated administration. Studies showed the ACQ was able to detect change in asthma control between visits and the ACT demonstrated that a difference of three points is indicative of a clinically meaningful change in asthma control. It was concluded that the ACT and ACQ are simple to use, can be self-administered and are recommended as being suitable instruments to measure asthma control in adolescents and adults in New Zealand.

‘Activity-Coaching’ for improving usual walking in people with neurological conditions

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People with neurological conditions have been shown to improve walking (distance and speed) in a physiotherapy clinic following rehabilitation but no carryover to real world walking has been demonstrated. ‘Activity-Coaching’ is a structured process incorporating behaviour change techniques which aims to improve usual walking. This study explored acceptability and feasibility of ‘activity-coaching’ with physiotherapists and patients undergoing neurological rehabilitation. A qualitative descriptive methodology was used. Six ‘pairs’ of physiotherapists and patients were recruited from community neurological rehabilitation services using purposeful sampling. Patient participants were included if they had a non-progressive neurological condition, were currently receiving physiotherapy and had a goal to improve walking. The activity-coaching intervention was delivered by a dedicated research physiotherapist, who had completed a two day course in health-coaching, as an addition to routine physiotherapy care. The session was observed by the treating physiotherapist. Semi-structured interviews were undertaken with the patient and physiotherapist participants. Two researchers independently analysed the data using content analysis. The intervention was acceptable to patients, and facilitated further engagement in the goal setting process. Aspects of the process were acceptable to physiotherapists as it provided a framework to improve communication. Physiotherapists also described considerable emotional tension when the patient was perceived to be complex due to ‘unrealistic’ goals. Contrasting perceptions between the patient and physiotherapist points of view were common. Further work is necessary on ways to negotiate the tension of managing hope while protecting morale and of managing goal setting with complex patients before this approach could be fully acceptable to physiotherapists

Fusing interpersonal horizons to expand possibilities within community-based physiotherapy practice.

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The idea of ‘fusion of horizons’ is both a way of conceptualising qualitative research in healthcare as well as a description of what occurs in ongoing, complex therapeutic relationships between physiotherapists, their clients, and the family care teams that support those clients. The term ‘fusion of horizons’ comes from the philosopher, Gadamer, who was describing what happens in the activity of interpretation. We argue that such interpretation is invaluable throughout clinical encounters. In this qualitative research project conducted in New South Wales (Australia), Gadamer’s or philosophical hermeneutics was used as a methodological framework. As with the research process, a ‘fusion of horizons’ occurred between the physiotherapists in this study, their clients and members of the family care teams, opening up ongoing possibilities for positive outcomes for them all. By acknowledging the humanity and individuality of the people they had come to assist, and maintaining connection via the social relationship they developed with them, these physiotherapists appeared to become increasingly responsive and able to customise the physiotherapeutic needs of their clients and family care teams. The cyclic nature of this process, shown in a model of care we have called ‘Mindful Dialogues’, was found to provide the motivation and impetus needed to sustain the therapeutic relationship for all parties in these physiotherapy relationships. Given the increasingly complex and demanding situations within which physiotherapists work, this study provides a timely and positive view of how physiotherapists might sustain themselves and their clients through the development of relationships that are truly collaborative in nature.

The Physiotherapy Specialist: a model that meets New Zealand’s health needs?

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Consultation on a potential new scope of practice, the “Physiotherapy Specialist” was completed by the Physiotherapy Board in October 2011. The specialist model presented for consultation requires New Zealand-registered physiotherapists to demonstrate expert clinical practice and knowledge in areas of physiotherapy currently recognised by the World Confederation of Physical Therapy clinical subgroups and Physiotherapy New

Zealand's clinical special interest groups. It is a model that closely follows that of the New Zealand Nurse Practitioner and those put forward by the Australian College of Physiotherapists and the Canadian Physiotherapy Association. A total of 280 responses were received comprising 252 from individuals and 28 from organisations (District Health Boards, Australian and New Zealand health regulatory authorities, government organisations and professional organisations). While the majority of respondents (84%) were supportive of the proposed scope for "Physiotherapy Specialists", some individuals and organisations (3%, n=9) questioned whether the proposed specialist scope was sufficiently distinct from the current general scope of physiotherapy practice and questioned what role the specialist would fill. This is the opportunity to reflect on whether physiotherapy specialisation or alternatively an extension of the current scope of practice (extended scope), or some combination of both options is the best model for addressing the identified areas of health need in New Zealand.

ACC Treatment Injury Claims

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The ACC Treatment Injury Centre has two key roles: assessing claims for injuries related to treatment and notifying potential risks of harm to the public. ACC has data reflecting approximately 45,000 treatment injury claims, providing a basis for examining care and informing quality audit measures. The challenge is to leverage quality improvement in the arena of no-fault injury cover. This presentation will provide a recap of the treatment injury legislation and a quick look at the claim process; updated treatment injury claim lodgement trends and areas of interest; give national and local treatment injury data and adverse event patterns. A range of clinical case vignettes will be discussed. The intent of this knowledge sharing is to

raise awareness regarding treatment injury claims and outcomes; identify key patterns arising from treatment injury data and promote discussion and debate regarding quality of care in light of the ACC adverse event data.

DMA clinical pilates directional bias assessment: reliability and predictive validity

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DMA Clinical Pilates utilizes a directional bias based treatment protocol, to affect deficits in dynamic postural stability and muscle performance. This randomised, repeated measures crossover study determined the reliability of the directional bias assessment and validity for predicting immediate changes in dynamic postural stability and muscle performance following directionally-biased exercises. Two researchers independently assessed 33 participants, each with a history of more than one unilateral lower limb injury, for directional bias. Inter-rater reliability of the directional bias assessment was evaluated using Kappa ($_{K}$), and prevalence-adjusted and bias-adjusted kappa (PABAK) coefficients. Results showed substantial agreement, with $_{K}$ = 0.75 and PABAK $_{K}$ = 0.76. Participants were randomly allocated to two crossover groups to perform matched bias (MB) and unmatched bias (UB) exercises. Two outcome measures, time to stabilisation (TTS) and rebound hopping (RH), were assessed before and following each exercise intervention using a forceplate. Crossover trial data were analysed by *t*-tests for period, interaction and treatment effects, and repeated measure ANOVAs were used to investigate differences between baseline, MB and UB conditions. Following MB exercises, medial-lateral TTS and time on the ground during RH were significantly shorter (p = 0.02, p = 0.05, respectively) compared with UB exercises. Compared with baseline, anterior-posterior TTS (p = 0.008) improved following MB exercises, while time in the air deteriorated following UB (p =0.04) exercises. We conclude that directional bias assessment demonstrates substantial reliability. Results suggest the assessment has validity for predicting immediate improvements in dynamic postural stability and muscle performance following matched directionally-biased exercises.

The Doctoral of Physical Therapy programme in USA: Development of the qualification and potential ramifications if adopted in New Zealand

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This presentation will explore the development of the entry level doctoral degree programme in USA. There has been a nationwide transition to the Doctoral of Physical Therapy (DPT) programme from the baccalaureate degree over the past decade reflecting the vision of the American Physical Therapy Association that by 2020 all physical therapy will be provided by therapists who are doctors of physical therapy. This qualification addresses the changes in the healthcare system, the added roles and responsibilities and reflects the continued expanding of the scope of practice for physical therapists. In the USA there are 199 universities and colleges which provide 212 accredited professional physical therapy education programmes. The majority of these programmes offer the DPT degree and have significant fees. The effect of the longer and more expensive graduate programme is to add further pressure on the cost of healthcare in the US, where more money is spent per person than any other country in the world. Compared to New Zealand the USA profession has different drivers for example direct access to physical therapy which is not universal. Although

it is important that New Zealand physiotherapy education is inline with overseas 'progress' any change in education or qualifications should address the needs and financial implications of change to the New Zealand consumer.

Compliance and efficacy of two different pelvic support belts as a treatment for pregnancy-related symphyseal pain

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In pregnant women who develop pubic symphysis pain, symptoms may be severe and interfere with daily activities. Physiotherapists often prescribe pelvic support belts to treat this problem, yet there is little scientific evidence to support their use. This preliminary trial tested two different pelvic belts to determine efficacy, compliance and tolerance. Pregnant women with clinically diagnosed symphyseal pain were randomly allocated to wear either a flexible or rigid belt for three weeks. The number of hours belts were worn and changes in pain and function were recorded using daily text messages. Weekly phone interviews gathered data on function (patient specific functional scale [PSFS]), pain intensity during the previous week (visual analogue scale [VAS]), and disability (Modified Oswestry Disability Questionnaire [MODQ]). To date, 12 (mean age, 29.2 ± 6.4 years; mean gestation at baseline, 32.3 ± 4.8 weeks) of 20 intended participants have completed the trial. The flexible belt was perceived as the most comfortable and was worn for longer each day; however, there was no significant difference in duration of daily wear between the two groups (mean difference, 1 hour; 95%CI, -2.3 to 1.5). Women wore the belts for an average of 4.9 ± 2.6 hours daily. There were no significant differences between groups for PSFS, VAS or MODQ, although all three outcome measures improved on average in both groups. These preliminary results suggest that pelvic belts for pregnancy-related symphyseal pain may be similarly effective but flexible belts may be more comfortable. A larger prospective randomised controlled trial is planned.

Community-based peer-led group exercise programme for older adults at-risk of falling: impact on injurious falls

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The Steady as You Go (SAYGO) programme is a peer-led fall prevention programme for older adults, and has shown to improve measures of strength and balance. However, details about injuries resulting from falls are not known. This paper presents the number of falls and fall-related injuries during a six-month period of older adults attending the SAYGO programme. All Otago region class attendees of existing groups were invited to participate, and consent and baseline data were obtained from 185 people. Falls were monitored on a monthly basis via self-reported falls calendars and fall event questionnaires. Injurious falls that required medical attention were followed up by phone to obtain detailed information about the fall using a structured questionnaire. At six month follow-up, two participants passed away and seven withdrew. Data were completed for 15 males and 161 females (a total of 176 attendees, average age 78 years, SD 6.7, range 62-100). Thirty three (41.3%) out of a total of 80 falls that occurred did not result in any injuries. Reported injuries were primarily sprains, bruises, and grazes that did not require medical attention. Ten people had injurious falls, of which three people sustained a fracture. None were femoral neck fractures. The study showed that the majority of injuries reported were minor sprains and bruises, and only 3.75% resulted in fractures, a figure much lower than reported in the literature. These findings suggest that older adults at-risk of falling who are attending community-based peer-led exercise classes may sustain less severe injuries after a fall.

Thoracic spine thrust manipulation versus cervical spine thrust manipulation in patients with acute neck pain: a randomized clinical trial.

Puentedura EJ, Landers MR, Cleland JA, Mintken PE, Huijbregts P and Fernández-de-Las-Peñas C (2011) Thoracic spine thrust manipulation versus cervical spine thrust manipulation in patients with acute neck pain: a randomized clinical trial. Journal of Orthopaedic and Sports Physical Therapy 41: 208-220. (Abstract prepared by Emily Solsberg)

Objective

To determine if patients with neck pain who met the Clinical Prediction Rule (CPR) for thoracic spine thrust joint manipulation (TJM) would have a different outcome if they received cervical spine TJM instead.

Methods

Twenty-four consecutive patients, aged 26-48 years, presenting to physiotherapy treatment with neck pain who met four of the six CPR criteria for thoracic TJM (Cleland et al, 2007). Participants were randomly assigned to one of two groups: (i) the thoracic group (n=10), which received two sessions of thoracic TJM plus cervical range of movement exercises, followed by three standardised exercise sessions; or (ii) the cervical group (n=14), which received two sessions of cervical TJM with the same range of movement exercises and standardised exercise sessions as the thoracic TJM group (five treatment sessions in total for both groups). Follow-up assessments were conducted at one week, four weeks and six months. Outcome measures included the Neck Disability Index (NDI), Fear-Avoidance Beliefs Questionnaire, Physical Activity Subscale (FABQ-PA), numeric pain rating scale (NPRS) and Global Rating of Change (GRoC).

Results

The cervical TJM group showed a significantly greater improvement in NDI ($p<0.001$), FABQ-PA ($p<0.004$) and NPRS ($p<0.003$) at all follow up periods. Four of the 14 participants in the CJM group withdrew from the study due to reporting "100% improvement" of their condition after the second treatment session. The number needed to treat to prevent an unsuccessful overall outcome was 1.8 at one week and 1.6 at four weeks and six months. No serious adverse events were reported for either group at any time although some participants reported transient side effects such as headache and temporary increase in neck pain.

Conclusions

Patients treated with a combination of cervical TJM and exercise had significantly greater improvement in pain and disability compared to thoracic TJM plus exercise.

Commentary

A CPR was developed by Cleland et al (2007) to predict those patients with neck pain who would respond favourably to thoracic TJM. This study and the techniques used were based on the proposed biomechanical links between the thoracic and cervical spines (Cleland et al 2007) and the hypoalgesic effects of TJM on neck pain (Vicenzino et al 1998). Another key reason for the development of this CPR was the ongoing controversial topic of safety and risk of cranio-cervical arterial dysfunction from cervical spine manipulation (Ernst 2007). The authors felt that because of an observed favourable response in neck pain to TJM, this technique may be a safer alternative or adjunct to cervical manipulation without adverse side effects such as vertebral artery injury (Cleland et al 2007). Since publication, the validity of this CPR has been called into question, by some of the original authors no less, by a larger, multi-centre randomised controlled trial (Cleland et al 2010), which suggests that the original outcomes were not quite as convincing as previously reported.

The current study shows good outcomes for cervical TJM, with significantly greater improvements in all outcome measures than the thoracic TJM group. However, these results should be interpreted with caution, as the sample size was relatively small due in part to the strict inclusion and exclusion criteria (four out of six of the following: symptom duration less than 30 days, baseline NDI ≥10/50, no symptoms distal to the shoulder, FABQ<12, decreased thoracic kyphosis T3-5, decreased cervical spine extension <30°). Indeed, of the 96 patients screened for the study, only 24 met the criteria. This is not necessarily a negative criticism of the study as it highlights the need, when selecting cervical spinal manipulation as a treatment technique, to carefully consider the characteristics of the patient receiving the treatment and demonstrates the success with treatment when this selection is carried out. However, this patient population presented with acute symptoms (mean duration, 14.7 days) and the strength of the study may have been improved by including a control group to allow for the natural resolution of the condition. Another consideration is the seemingly arbitrary selection of the level of manipulation in the thoracic TJM group; each subject received one thrust at both the mid- and lower thoracic spine. It was not specified why these areas were chosen. In the cervical TJM group, manipulation was directed at a specific hypomobile spinal level as determined through assessment by the clinician. Perhaps a thrust directed at a restricted thoracic level in the TJM group may have changed the outcomes of the study.

In becoming mired in the complexities of risk surrounding cervical spine manipulation, and the consequent distancing from this technique by many in the physiotherapy profession, it is perhaps unsurprising that a treatment technique directed *towards* the affected area (the neck) would have greater effect than one directed distally (the thoracic spine). This study highlights the need for effective *and* safe practice, and provides encouraging evidence both for training and experienced manual therapists to improve and maintain their skills in cervical spine manipulation. If these selection criteria were to be applied to patients in the physiotherapy clinic, it would not eliminate cervical spine manipulation from use but would certainly focus the population it was practised on. This in turn may help to prevent unnecessary adverse consequences of TJM of the cervical spine by targeting patients for whom these techniques are most appropriate.

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Most essential wheeled mobility skills for daily life: an international survey among paralympic wheelchair athletes with spinal cord injury

Fliess-Douer O, Vanlandewijck YC, Van Der Woude LH (2012) Most essential wheeled mobility skills for daily life: an international survey among paralympic wheelchair athletes with spinal cord injury. Archives of Physical Medicine and Rehabilitation 93:629-635. (Abstract prepared by Sara Edwards)

Aims

To (i) determine the most essential wheeled mobility (WM) skills in people with spinal cord injury (SCI) in order to create a hierarchical list, and (ii) compare participant perceptions of WM skills gained during and following clinical rehabilitation.

Introduction

Approximately 80% of individuals with SCI will be reliant on using a manual self-propelled wheelchair (Post et al 1997) and need to acquire a variety of WM skills in order to increase their functional independence. Currently, a range of outcome measures with components of WM skills are used in practice. A valid and reliable standardised tool needs to be developed to (i) guide the rehabilitation process of manual wheelchair users, (ii) assist in decision making regarding the timing of training WM skills, and (iii) assist in evaluation of clinical interventions. A survey population of Paralympic athletes with SCI was chosen; it was assumed that this population would demonstrate the best wheelchair skill performance and therefore set the benchmark for optimal WM skills. A previous pilot study of recreational athletes with SCI and non-sporting people with SCI was conducted in 2008; the results were compared with those of the current study to determine whether the most essential skills are similar between groups and could therefore be generalised.

Methods

During the 2008 Beijing Paralympic games, questionnaires (translated into French, Spanish, Dutch, Chinese and Hebrew) were distributed to individuals with SCI. Participants were asked to rate the essentiality of 24 pre-determined WM skills (1-not essential, 5-extremely essential) and to state where, when and with whom they learned to perform each skill. Additionally, participants were asked to mark their level of WM skills during and after clinical rehabilitation on three visual analogue scales (VAS). A total of 250 questionnaires were distributed; however, 171 had not been sufficiently completed meaning that 79 were included in the analysis. Participants consisted of 49 men and 30 women (mean age 33, standard deviation 8) from 18 different countries, including 64 with paraplegia and 15 with tetraplegia.

Results

The most essential skill identified by the participants from both the pilot study and current study was transferring into/out of a car (mean 4.7, standard deviation -0.7) and the least essential skill was a one-handed wheelie (mean 1.9, standard deviation 1.3). Of all the participants, 57% stated that they had learnt the most essential skills during the early rehabilitation phase and 40% after inpatient rehabilitation. With regard to who taught participants WM skills, 42% of participants stated that they learned the most essential skills by themselves, 42% learned from a professional instructor and 13% learned from a peer. Analysis of the VAS demonstrated that present WM skills were significantly higher than WM gained during rehabilitation and that participants with tetraplegia perceived lower WM abilities than participants with paraplegia.

Conclusion

This study provides a hierarchical list of WM skills in athletes with SCI, with the authors recommending that the most essential skills should be incorporated into clinical rehabilitation for people with SCI. It would be beneficial to investigate a broader demographic to review the more essential WM skills in different SCI populations.

Commentary

It is well recognised in the literature that there is a positive relationship between wheelchair skill performance and participation in people with SCI (Kilkens et al 2005). Therefore, it is vital to include development of WM skills as part of clinical rehabilitation. Currently there is no one universally recognised and standardised assessment tool for assessing WM skills in people with SCI, nor is there a global pathway for training of WM skills. Generic outcome measures with components of WM skills are currently used to measure WM skills in people with SCI. Often, health professionals develop the outcome measures, and therefore choose the WM skills that are assessed (Fliess-Douer et al 2010). Alternatively, this study looks more closely at the opinions of elite athletes who are experienced manual wheelchair users to compile a hierarchical list of MW skills. It is credible that a tool of this kind may be developed with significant input from experienced manual wheelchair users who are proficient in using a wheelchair in a variety of settings.

WM skills are often taught to people with SCI during their inpatient clinical rehabilitation and, to some degree, following discharge. During inpatient rehabilitation there are numerous goals that need to be achieved and WM skills are only one component of these. This study demonstrated that a significant proportion of people with SCI learnt their skills after discharge, with some learning from a peer, and others (in the pilot study) acquiring their WM skills in sport. It is not unusual for spinal cord injured individuals to learn WM skills in community settings such as these. This is one reason, amongst others, that we as clinicians should encourage patients with SCI to become involved in adaptive sports and activities as well as peer support programmes.

This study has made a promising start in gathering information that is essential for developing a standardised assessment tool for WM skills. It has demonstrated that there is consistency within one demographic (elite athletes) with SCI, in terms of opinions on essential WM skills, and some comparison with non-elite athletes. However, it has highlighted that a number of further investigations are required in different SCI populations in order to gather data for the development of a valid assessment tool.

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Kilkens OJ, Post MW, Dallmeijer AJ, van Asbeck FW, van der Woude LH (2005) Relationship between manual wheelchair skill performance and participation of persons with spinal cord injuries 1 year after discharge from inpatient rehabilitation. *Journal of Rehabilitation Research and Development* 42: 65-74.

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Anatomy of Sports Injuries for Fitness and Rehabilitation

Brandon, Leigh, 2011, ISBN 978-1-84773-874-5, 144 pages, Hardback, RRP $49.99

The book's aim is to educate the reader about basic anatomy, review common sports injuries and provide guidance on rehabilitation. The target audience is quite broad from physical therapists, to individuals who compete in sport with no medical training. For this reason it falls short of being particularly relevant to physiotherapists, because of the basic nature of the information contained within. The book is divided into 3 basic sections.

The first section of the book focuses on reviewing the basics of anatomy and movement, including breaking down common anatomical terms so they can be easily understood. The information is well set out, easy to read and covers a wide range of information in a short space of time. However this information relates to information that most physiotherapists would have covered during first year anatomy and is unlikely to add to their knowledge. It may be useful a refresher if required after being away from the discipline for some time.

The second section is the main focus of the book and provides a systematic breakdown of most common sports' injuries. The injuries are divided into body areas, starting from the foot and finishing at the shoulder, covering most problems that you would expect to see from common sports injuries'. The pictures through this section of the book are good and make it easy to visualise the area and injury being discussed. Each injury has a brief description, symptoms, causes, treatment, recovery times and exercises. There are 2 main downfalls for the book in this section. The first is the lack of evidence. There is no reference to any other literature or body of evidence which leaves the reader to assume that it is all anecdotal from the author (CHEK Practitioner & Strength and Conditioning Coach). The second downfall is the vague nature of a lot of the writing and recommendations, meaning there is little concrete advice to actually take from the pages and apply to an injury (outside of RICE). Again this means that there is unlikely to be much specific benefit gained by a physiotherapist reading these pages.

The third and final section is based around rehabilitation. The reader is shown various forms of mobilisation, stretching and strengthening exercises for different areas of the body, where the text is again backed up by excellent illustrations. The author does try to create some link between Section 2 (injuries) and Section 3 (rehabilitation) by referring the reader to the appropriate page, but again the information is quite vague and non-specific.

Overall the book is well set-up, and easy to read, with excellent illustrations to back up the text. Unfortunately physiotherapists are unlikely to gain much knowledge or treatment ideas from the book due to the simple level of the information. The best use for this book by a physiotherapist is likely to be in the waiting room for clients to read at their leisure.

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Motor Control: translating research into clinical practice 4th edition

Shumway-Cook, A & Woollacott, M. (2012). Lippincott Williams & Wilkins, Philadelphia. ISBN 13:978-1-60831-018-0. Hardcover. 641 pages.

This is the fourth edition of a key neurorehabilitation text, the first edition of which was published in 1995. Shumway-Cook & Woollacott state that the focus of this particular edition is to review the current motor control research and explore how this translates to best clinical practices, which is similar in aim to edition 3. Likewise, the text has a similar structure to previous editions. Part 1 is devoted to the theoretical framework, Part 2 is arranged in the three functional groups of postural control, mobility functions, and reach, grasp & manipulation. Each of these functions is further explored within the subheadings of normal control of movement, functional changes across the life span, abnormal function and clinical management. Although the general structure remains unchanged, the chapter structure has altered slightly, there is a subtle change to some terminology and updated reference to the literature.

A change with this fourth edition is the additional resources available for both students and physiotherapy lecturers in the form of an online resource and an accompanying DVD. The DVD contains five case studies, which are each divided into the same four sections as the text i.e. postural control, mobility function, and upper extremity control, in addition to a section on impairments. The five case studies each have a different diagnosis, so that students can become familiar with similarities and differences of stroke, Parkinson's disease, cerebral ataxia, cerebral palsy and an older adult with balance deficits. In addition, the text is available online to those who purchase the book so that the full text is searchable. The videos are also available online. In addition, the figures and photos can be viewed online. For approved instructors, a test generator with 380 multiple choice questions provides an option to supplement teaching.

This book contains features to facilitate learning which support its continued use as a current text. As with the last edition, each chapter starts with learning objectives and contains lab activities with related questions for which answers are provided at the end of the chapter. Each chapter ends with a comprehensive summary. Other complimentary features throughout the book are the technology tool boxes, case studies and assessment tools, along with the generous amount of tables, figures and photos.

There are not many examples of pathologies such as spinal cord injury or traumatic brain injury, however I don't believe this is a serious omission, as the principles learnt from this text are consistent with clinical reasoning and therefore are applicable for the assessment and treatment of any neurological condition. This text remains the most comprehensive and sound neurological text book that I've seen. I bought the first edition and now am pleased to add the fourth to my shelves!

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Therapeutic Taping for Musculoskeletal Conditions

Maria Constantinou and Mark Brown 2010, Elsevier, Sydney. ISBN: 9780729539173. Softcover (with supplementary DVD) 263 pages

Written by two Australian physiotherapists, who are both Fellows of the Australian Sports Medicine Federation, 'Therapeutic Taping' aims to provide "a practical guide to taping techniques used in the management of musculoskeletal conditions within a scientific framework" – and does just that.

The book, both comprehensive and practical, is a great refresher test, as well as a source of inspiration for new ways to use tape in clinical practice. The book would be a great reference for both qualified and undergraduate physiotherapists, as well as other health professionals and athletic trainers.

The first three chapters of the book provide an overview of therapeutic taping including the history, principles and effects of taping, precautions and preparations, and use of outcome measures. Chapters 4 through 6 cover a total of 77 specific taping techniques covering the entire body, each presented on a separate page. The techniques range from commonly known "old faithful's" such as the ankle basket-weave taping, or finger buddy strapping, through to less well known techniques, such as a 'Serratus Anterior Muscle Facilitation' and 'Buttock/ Sciatic Pain De-loading' techniques. For each taping technique, the background and rationale, evidence for (or lack there-of), materials needed, and both patient and therapist positioning is presented. Detailed instructions of how to apply the tape in a step-wise fashion are given along with colour photographs. As a bonus, the book also includes a DVD which presents each technique in video format.

At the end of the book there are two helpful appendices including a patient information sheet on taping that can be photocopied and used with patients. There is also a concise summary of the literature pertaining to each of the techniques described in book, presented in an easy-to-read table format giving the reference, study design, number of subjects, outcome measures used, authors conclusion and critique comments.

The book only includes a short discussion on elastic type tapes, such as kinesotape or dynamic tape, and does not cover any of the dynamic taping techniques. The book also does not cover taping for injury prevention, expect where the taping techniques are the same as for therapeutic benefit.

One of the biggest strengths of this book is its strong evidence base. The evidence, along with citations, is presented right along side of the instructions for each individual technique, also linked to the appendix at the back of the book. This system creates a well referenced book, but presented in a really easy to absorb, practical way.

The other strength is the books easy to use format. Presented in landscape format, spiral bound, and colour coded with all the information pertaining to each technique presented on two facing pages, it is easy to imagine this book sitting open, next to a patient during a treatment session.

My only criticism of the book, is that its soft cardboard cover may not stand up to the frequent use this book will undoubtedly see.

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Cancer Rehabilitation

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The guidelines for submission of papers to the New Zealand Journal of Physiotherapy have been revised. The new guidelines and a submission checklist are provided below and are also available on the Physiotherapy New Zealand website (http://www.physiotherapy.org.nz) – Resources & Publications – New Zealand Journal of Physiotherapy.

The *New Zealand Journal of Physiotherapy* is the official academic journal of Physiotherapy New Zealand Inc. The Journal invites authors to contribute papers relevant to any aspect of the science and practice of physiotherapy. Manuscripts are reviewed under the following categories:

a) Research Report

Research reports include original research using quantitative or qualitative methods, including quasi-experimental and single subject designs. Manuscripts should conform to the general principles described in the International Committee of Medical Journal Editor's Uniform requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication, available at wwww.icmje.org/. A research report should not exceed 4000 words.

Papers reporting on randomised controlled trials must provide a CONSORT flow diagram (http://www.consort-statement.org/Downloads/flowchart.doc) and an International Standardised Randomised Controlled Trial Number (ISRCTN).

b) Scholarly paper: clinical perspective

A scholarly paper (clinical perspective) expounds on a specific clinical approach to patient care, either imparting a specific point of view or presenting a theoretical argument. References should be sufficiently extensive to support the opinions presented in the paper. A scholarly paper should not exceed 2500 words.

c) Scholarly paper: professional perspective

A scholarly paper (professional perspective) addresses professional issues in physiotherapy, health care and related areas. The author should develop a specific point of view or present a theoretical argument. References should be sufficiently extensive to support the opinions put forward in the paper. A scholarly paper should not exceed 2500 words.

d) Literature review

Meta-analyses, systematic and narrative reviews of literature on topics of interest to physiotherapists are included in this category. In all cases, authors should conclude with specific recommendations for clinical practice and / or future research. Although authors may wish to further a viewpoint or theoretical argument, this should not be the major purpose of this paper. A review should not exceed 5000 words.

e) Case study

A case study (or report) is an indepth description of an individual's condition or response to treatment. It is often used to report on unusual or unique patients or novel interventions. It allows the clinician to explore and understand those factors important to the aetiology, care and outcome of the patient's problems, through a detailed description of a patient's background, functional status and response to treatment. Current literature, which supports the rationale for treatment and interpretation of outcomes, should be cited and discussed. A case study should not exceed 2500 words.

f) Invited Clinical Commentary

An invited scholarly paper expounding on a specific clinical approach to patient management or addressing professional issues in physiotherapy written by acknowledged experts. Authors may nominate themselves for invitation to contribute under this category through communication with the Editor or relevant Associate Editor. An invited clinical commentary should not exceed 5000 words.

g) Study protocols

A description of proposed or ongoing research, which provides a detailed account of the rationale hypotheses and methodology of the study. The paper should include details of the study design and setting, the participants or materials involved and a thorough description of all interventions and outcome measures to be used. Details of the data analysis to be undertaken should be included, including a power calculation if appropriate. Preference for publication will be given to study protocols for randomised controlled trials. If the study is a randomised controlled trial, it must have an International Standardised Randomised Controlled Trial Number (ISRCTN). A study protocol should not exceed 4000 words.

h) Clinically Applicable Papers (CAPs)

Concise reviews of recently published articles (including randomised controlled trials, diagnostic and prognostic studies, and qualitative research) that are of relevance to physiotherapy practice and have been published within the last year in other peer-reviewed journals. The purpose of these reviews is to enlighten readers about current international research that informs clinical practice decisions. CAPs must include (i) a structured abstract of the reviewed paper (prepared by the CAP author) and (ii) a commentary whereby the clinical implications of the main findings are highlighted, and their importance and applicability are discussed in relation to physiotherapy practice. Reviews are undertaken by invitation of the Associate Editor(s) for CAPS. Individuals wishing to serve as a reviewer should contact the Editor or relevant Editorial Committee member. Together the abstract and commentary should not exceed 900 words in total.

i) Reviews (books, software, videos)

Critical reviews of published papers, books, commercial software and videos of interest to physiotherapists. These reviews are to inform readers about the suitability of these resources for clinical, teaching and reference purposes. Reviews are undertaken by invitation of the Associate Editor(s) for Book Reviews. Individuals wishing to serve as a reviewer should contact the Editor or relevant Editorial Committee member. A review should not exceed 500 words.

j) Letters to the Editor

Letters to the Editor should relate specifically to articles published in the New Zealand Journal of Physiotherapy or to issues of research relevance to the physiotherapy profession. To be considered for publication, letters relating to an article must

be received within eight weeks of publication of the article. Letters may be sent to the Editor via email or post (electronic correspondence is preferred).

SUBMISSION OF MANUSCRIPTS

Papers are accepted for consideration on the understanding that they have been offered to the New Zealand Journal of Physiotherapy alone, and must be accompanied by a signed declaration to this effect. Manuscripts published in the

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All manuscripts must be electronically submitted. Please email a single file (in Word format), including all text documents, tables and figures to the manuscript administrator at nzsp@physiotherapy.org.nz. A single file is preferable, however figures maybe submitted as separate files, should a single file be too large for submission.

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1. Unblinded title page
2. Blinded title page
3. Abstract and key words
4. Main text
5. Key points
6. Acknowledgements
7. References
8. Appendices
9. Tables
10. Figures

Manuscript categories (a)-(g) require an abstract, manuscript categories (a)–(f) also require a 'key points' text box. All manuscripts should be prepared with 2.5 cm margins. Beginning with the title page, pages should be numbered consecutively on the bottom right hand side. A 12 point Arial font size and double spacing should be used throughout, including title page, abstract, text, acknowledgements, references, tables and legends for illustrations. Pages and lines should be numbered.

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Any citation within the text of a document should be linked to the corresponding bibliographical reference. In the text, refer to a particular document by using the author's surname and year of publication. Please note that citations are separated by commas, and there are no commas between author's names and the year of publication.

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Journal reference

- There are no spaces between the authors' initials
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- Only include the volume of the journal and give page numbers in full, that is 82-87, not 82-7.
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Example:

Schoo AMM, Morris ME and Bui QM (2004). Influence of home exercise performance, concurrent physical activities and

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- Include the author's surname and initials, title of the book and edition (if not the first), name of the publisher and place of publication.
- Use initial capitals for the title of the book, but not for chapters contained within it.

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Portney LG and Watkins MP (1993): Foundations of Clinical Research: Application to Practice. Connecticut: Appleton and Lange, pp. 210-220.

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Levangie PK and Norkin CC (2005): Joint Structure and Function: A

Comprehensive Analysis (4th ed.) Philadelphia: FA Davis Company, pp. 15-17.

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Example:

Lou JQ (2002): Searching the evidence. In Law M (Ed.): Evidence Based Rehabilitation. New Jersey: SLACK Inc, pp. 71-94.

Thesis reference

Example:

Avery AF (1996): The reliability of manual physiotherapy palpation techniques in the diagnosis of bilateral pars defects in subjects with chronic low back pain.

Master of Applied Science thesis, Curtin University of Technology, Perth,Western Australia.

Reference to a conference publication

Example:

Ada L (2004): From research to practice: new directions for intervention after stroke. Proceedings of the National Conference of Physiotherapy New Zealand, Christchurch, pp. 1.

References to websites

- State the date the site was accessed.

Example:

New Zealand Guidelines Group (2003): The Management of Soft Tissue Knee Injuries: Internal Derangements. http://www.nzgg.org.nz/guidelines/0009/ACC_Soft_Tissue_Knee_Injury_Fulltext.pdf (Accessed January 31, 2006).

Reference to a publication from a corporate body

Example:

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8. APPENDICES

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- Tables capture information concisely and display it efficiently; they also provide information at any desired level of detail and precision. Including data in tables rather than text frequently makes it possible to reduce the length of the text.
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- Identify statistical measures of variations, such as standard deviation and standard error of the mean.

Example:

Table 1: Measure A and B Results

Participant	Measure A	Measure B
A	One	1
B	Two	2
C	Three	3
D	Four	4

10. FIGURES

- Figures must be provided in an electronic format that will produce high-quality images (for example, JPEG or GIF). Authors should review the images of such files on a computer screen before submitting them to be sure they meet their own quality standards.

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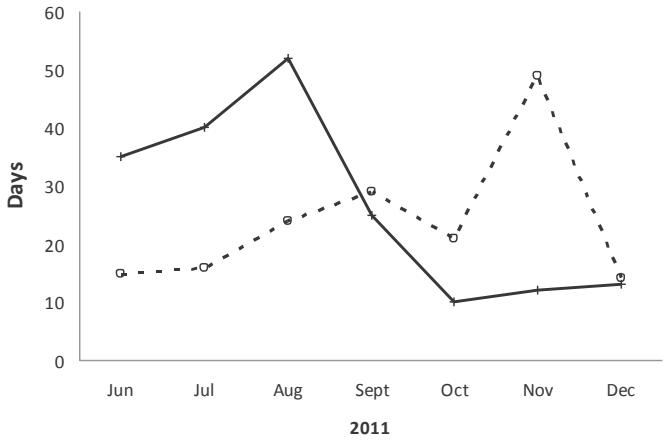

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ACKNOWLEDGEMENTS

We acknowledge reference to the guidelines developed by the International Committee of Medical Journal Editors of Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication http://www.icmje.org/index.html (Last accessed January 2012) and the Journal of Physiotherapy guidelines for authors when preparing these guidelines.

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