

KEYNOTE SPEAKERS

Activity, Activity, Activity: Rethinking our Physiotherapy Approach to Cerebral Palsy

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This presentation will provide a scientific overview of current and perhaps future therapeutic (re)habilitation strategies for individuals with cerebral palsy (CP). The entire field of neurorehabilitation is experiencing tremendous change and excitement that is spilling over into pediatric rehabilitation. Evidence has been accumulating in recent years that strongly supports the role of therapists in helping patients improve their motor functioning and consequently enhance their levels of activity and participation. Many of these interventions have demonstrated efficacy in patients who had reached a plateau after more traditional approaches. Proactively emphasizing early and frequent motor activity for those with physical disabilities will be highlighted. A case will be made for a dramatic change in our profession to abandon philosophically-based approaches in favor of evidence-driven practice. Strength training will be featured as an effective strategy that had been, mistakenly, not utilized for many years in neuromotor disorders. Both positive and negative aspects of muscle plasticity will also be discussed. Insights into neuroplasticity of damaged nervous systems and potentially promising interventions will be provided as a basis for further thought and discussion. Take home messages are: (1) based on current knowledge, many effective intervention strategies now exist for improving motor status and lives of patients with physical disabilities such as CP; and (2) the capacity of the neuromuscular system and the central nervous system for change is far greater than previously suspected and it is apparent that therapists will play an integral role in facilitating and directing these changes.

Physiotherapists should be leaders in waging the war against inactivity induced chronic disease

Gosselink R

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Chronic diseases - principally cardiovascular diseases, cancer, chronic respiratory diseases and diabetes - are leading causes of death and disability, but are surprisingly neglected elements of the global-health agenda. They are underappreciated as development issues and underestimated as diseases with profound economic effects. Achievement of the global goal for prevention and control of chronic diseases would avert 36 million deaths by 2015 and would have major economic benefits. The main challenge for this achievement is to show that it can be reached in a cost-effective manner with existing interventions. Most of these chronic diseases are associated with physical inactivity. Numerous data have shown that the level of physical activity is an independent factor contributing to morbidity and mortality in chronic disease. Exercise training is a powerful tool that has been shown to be effective in improving physical fitness and health related quality of life. Physiotherapists do have access to patients in various stages and various modalities of chronic disease. In addition to the treatment of specific health conditions, physiotherapists are well placed to deal with physical inactivity as a treatable, important co-morbid condition in these chronic diseases. Physiotherapists combine expertise in knowledge of the disease condition, medical treatment and exercise physiology, as well as skills in exercise testing and prescription adapted to the specific condition. Physiotherapists should take responsibility to undertake action in the epidemic of inactivity related chronic disease and join the 'Keep you moving' forces in waging this war.

Maori and Rehabilitation: what we know, filling the gaps and moving forward.

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When considering Maori in health disability and rehabilitation, it is important to understand health inequities. Maori have a right to equitable health outcomes, to receive quality health care and to participate in the health workforce (as leaders, clinicians, teachers and researchers). These rights are derived both from human and indigenous peoples' rights as well as a need to address long standing inequalities. The first part of the presentation will cover 'what we know,' in particular; the frameworks used in Maori health and disability issues and an update of recent health data (including differences in health outcomes, in exposure to determinants of ill-health and in the health workforce). In the second part, current research projects and initiatives in rehabilitation that aim to 'fill the gaps' in knowledge and reduce disparities will also be presented. Finally, the potential for those working in rehabilitation to lead the way in 'moving forward' will be discussed.

Autonomy and the Future of Physiotherapy

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While the roots of physiotherapy are surely in prehistory with touch, massage, manipulation, heat and ice, the first organizations that could truly be referred to as physiotherapy arose in 18th century Scandinavia and were essentially masculine and independent of medicine thus autonomous. Subsequent events in Scandinavia and elsewhere led to medicine dominating physiotherapy where it existed and in many other cases bringing about its existence, dictating the educational content, licensure, and practice and controlling access to patients along with a prescriptive relationship. Referred to as "allied health professions" physiotherapy along with other so labelled disciplines were often and still remain subservient to the medical establishment. Today however, in most western nations, the emerging profession of physiotherapy finds itself at varying degrees of autonomy and preparedness for professional independence. With the advent of the clinical doctorate the profession needs to reflect on its preparedness to be a doctoring profession, its scope of practice, evidenced based research and what it needs to do in order to address any shortcomings. Our profession is at a crossroads. Does it shuffle along meeting expectations and accountability as defined by others, or does it take the step of an in-depth assessment of a future role, a role designed that would assure that we become the profession of choice for all citizens when it comes to the restoration, maintenance and enhancement of the physical functioning. In taking such a step we must prepare for resistance and must be prepared to self promote our abilities once proven. This presentation will advocate that we take such a course for it is in the best interest of the client/patient.

We acknowledge with thanks ACC for their sponsorship of Dr Stanley Paris

INVITED SPEAKERS

Advice, exercise and opinions in effective management of low back pain: mens sana in corpore sano?

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Low back pain is a prevalent condition, characterised by recurrence and associated with increasing levels of disability and costs in most developed countries. While recent evidence-based guidelines have highlighted the important role of physiotherapy in managing the condition effectively, there is increasing recognition

of the importance of classification of back pain in targeting treatments, and the role of psychosocial factors in contributing to recovery and preventing chronicity. This paper will focus on one area of physiotherapy practice, and review recent research evidence on exercise and advice in the effective management of low back pain, particularly within the context of current recommendations from clinical guideline recommendations. Recent evidence on the potential role of opinions and beliefs to treatment will also be considered, as well as the potential influence of these upon evidence-informed practice. The paper will argue that while there is convincing evidence to support some types of physiotherapy as effective in the management of low back pain, a better understanding and recognition of psychosocial factors, including opinions and beliefs, in development of disability and chronicity is essential to better management of such patients in the longer term.

Knees up: the role of physiotherapy in managing knee osteoarthritis

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Knee osteoarthritis (OA), particularly of the medial tibiofemoral compartment, is a common chronic joint disease leading to pain, loss of functional independence and reduced quality-of-life. In the absence of a cure for knee OA, alleviating symptoms and improving function have been the primary aim of physiotherapy intervention and many different techniques are used including exercise, knee taping, manual techniques, gait aids and electrotherapy. However, there is increasing attention being paid to identifying treatments that can also slow disease progression in those at risk. There is evidence that mechanical loading at the knee joint plays an important role in predisposing to both symptoms and structural change. Thus, it is feasible that certain physiotherapy interventions could influence structural disease by reducing knee load. Interventions with this potential include specific exercise, lateral wedge insoles, shoe modifications, knee braces and gait retraining. Biomechanical studies support a reduction in knee load with many of these therapies but whether this translates into long-term structural benefit needs to be further evaluated. It is also apparent that effects are likely to differ according to the type of intervention and the local mechanical environment operating within each individual.

Breathing Works and Matters: Challenges and opportunities for physiotherapy

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Recent evidence points to the important role breathing pattern assessment and management has in all areas of current physiotherapy practice. Nowhere in the human body is the axiom of structure governing function more apparent than in its relation to breathing. Prolonged alterations of function as seen in chronic breathing pattern/ hyperventilation disorders inevitably leads to structural changes. These commonly involve orofacial and accessory breathing muscles as well as cervical, thoracic and lumbar muscles and articulations, neural tensions and fascia. Structural adaptations can prevent normal breathing function, and abnormal breathing function ensures continued structural adaptation. These biomechanical malfunctions trigger physiological imbalances as well as expressions of psychological distress. This commentary begins with a brief account of the establishment of an independent breathing pattern disorders clinic. Notes follow this on the evolution of specific BradCliff treatment methods and research projects within the practices. The commentary concludes by urging all physiotherapists to up-skill and add this under-represented area of physiotherapy to their diagnostic repertoire to add value both to their patients' treatment outcomes and to their clinical code-of-practice.

The paediatric athlete: recognising the potential for serious musculoskeletal injury

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Children possess a huge potential for movement. Spontaneous play and a physically active lifestyle are essential for neuromuscular and motor development. All skeletal tissues respond favourably to gravitational influences and bone in particular demands the stimulus of weight-bearing activity to attain architectural integrity. This assumes appropriate nutrition and essential hormonal influences especially in the young female. This presentation will address unique developmental characteristics of the immature musculoskeletal system and the potential insult from repetitive biomechanical stresses of sport. It will offer a clinical perspective of dysfunction in the young athlete and provide cues to the recognition of common examples of paediatric sports injury. Sensitive musculoskeletal development is recognised at sites of developing articular cartilage, growth plates (epiphyses) and tendon attachment (apophyses). The potential for damage in the young is frequently the consequence of disregard for acute or chronic symptoms. Examples of injury including traction apophysitis, spondylolysis of the lumbar spine and rotator cuff tendinopathy will be described. Common biomechanical influences linked to specific sports injury will also be highlighted. The conditions of the young "fast bowler's back", "breaststroker's knee" and "swimmers' shoulder" will be discussed. Reference will also be made to indications for the use of high technology imaging to confirm diagnostic suspicions and rule out more sinister pathology in the young patient.

Shared views of treatment and treatment adherence: exploring perceptions of women with urinary incontinence and their health professionals

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Perceptions of conservative management in health professionals (HPs) and patients were explored to find out to what extent views were shared (coherent); coherence might affect treatment adherence. Six women (40 years or more) referred for conservative management of urinary incontinence, and the four physiotherapists and two continence advisors who had provided treatment, were interviewed twice (beginning and end of treatment). The in-depth audio-taped interviews were transcribed verbatim, and the data explored using Interpretative Phenomenological Analysis. Three levels of analysis occurred: (1) content analysis gave insight into participants' experiences to produce emergent themes, (2) in iterative process developed the themes with in-depth, case by case analysis, and (3) verification of themes with an independent researcher. Four main themes emerged from the analysis. 'The special specialist' refers to how patients' and HPs' perceive the HP role in this highly personal service and how HP motivate and support women during treatment. 'Seeking and regaining control' relates to women's concerns about seeking help for an essentially inside (private) problem that shows outside (publicly) because of a loss of control. 'Seizing the moment' captures the need of HP to make the most of their potentially only opportunity to educate and inform and reach the patient. 'Expectations of outcome' revealed differences in perceptions between women and HPs about the time line for observable benefit with treatment adherence. Overcoming barriers to help-seeking and doing exercises long-term is difficult, suggesting potential for cognitive-behavioural approaches in further research for rehabilitation of urinary incontinence.

The interplay between cognition and motor function during gait: pushing the locomotor boundaries

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Walking is a deceptively complex act, requiring both motor and cognitive flexibility to address gait requirements whilst attending to a range of environmental stimuli and/or concurrent tasks. Evaluation of walking typically involves observation of spatio-temporal parameters and the assessment of underlying impairments such as balance, gait cycle deviations and muscle strength. Assessment takes place in predictable, clinical environments. Rarely do we consider the influence of cognition on gait, or evaluate performance under more demanding conditions that capture the complexity of real-world walking. Yet cognitive impairment and performance on complex walking tasks are significant predictors of mobility decline, falls and adverse health outcomes in both aging and neurological populations. Although the restitution of a normal, rhythmical gait cycle still forms the basis of gait recovery programmes, we need to broaden our evaluation of walking and focus of therapy to retrain locomotor skills that reflect the interaction between the individual and his or her environment. This presentation draws on current research to discuss aspects of cognitive function in relation to gait, the assessment of complex gait, and the clinical implications for treatment.

Understanding injury risk in a rural workforce: helping it to move forward

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Although manual handling tasks are clearly associated with low back injuries in farming many tasks do not exceed safe handling limits. Cumulative spinal loads however will adversely affect the injury tolerance of tissues in the low back resulting in a greater potential for injury. Occupations within wool harvesting (shearing, wool handling, and wool pressing) require prolonged trunk flexion postures and large forces. We hypothesize that the cumulative spinal loads of these occupations are high and a primary factor for the development of low back pain (LBP). We also hypothesize that experience; workload and skill are factors that interact with cumulative load to influence the development of LBP. We recruited 84 shearers and 68 wool handlers classified by different skill levels, videotaped their work tasks, and calculated cumulative spinal forces. The mean cumulative compressive force for the shearers was 85 Mega Newton seconds (MN.s) for a daily workload – consistent with very heavy work. Although mean cumulative compressive forces for the wool handlers was less than shearers the magnitude was still considerable. Skill levels, daily tally, and experience were important co-variables that influenced spinal loading and influenced the working lifetime prevalence of LBP. An increased level skill did not reduce cumulative spinal loading or LBP prevalence but was the major factor for achieving maximum worker productivity (tally). These results indicate the use of alternative or modified harvesting technologies as the direction for reducing cumulative loading to achieve goals of reducing cost and injury in wool harvesting.

“Determinants of health: Are physiotherapists engaged?”

Reid D

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Physiotherapists are considered an important component of the health workforce and key providers of physical rehabilitation. The environment in which the physiotherapy profession will work in the next 20 years is likely to change dramatically. This change will be brought about by the changing demographics of the New Zealand population. People are living for longer

and living with more complex and chronic diseases. In order to cope with these changes, the profession needs to consider the following; does the physiotherapy profession have a role to play in the broader aspects of health care? Do physiotherapists have a good understanding of what are the key determinants of a healthy population and are physiotherapists engaging with the NZ Health Strategy? In order to reduce the burden of these chronic diseases physiotherapists will need to consider health care programmes that reduce the chronicity by engaging in early intervention and health promotion programmes in keeping with the NZ health strategy. Physiotherapists will also need to consider new ways of working with those who do have chronic disease and reflect on aspects of care that will be beneficial to the long term management of these conditions.

A person-centered approach for rehabilitation professionals to promote exercise and reduce secondary conditions in people with disabilities across the lifespan

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People with disabilities frequently experience significant long-term physical and psychological secondary conditions such as obesity, decreased mobility, deconditioning, and depression. Many people with disabilities live with significant functional limitations, which often place a substantial burden on the individual and/or the individual's caregiver and can have negative social and economic consequences. People with disabilities are typically less physically active than the general population, thus putting them at substantially greater risk of morbidity and mortality from poor health practices. This presentation will focus on current research in the Center on Health Promotion Research for Persons with Disabilities at the University of Illinois at Chicago that uses a person-centered approach to tailor exercise recommendations to the individual based on: a) the person's motivational level, b) physical activity profile, c) health and mobility limitations, and d) barriers to participation. The key benefit of the person-centered approach is that the program is dynamic, occurs in real-time, and can change frequently to accommodate changes in the life and/or health status of the participant. This research meets a critical need within the rehabilitation profession to develop effective health promotion interventions for people with disabilities that are personalized, contextually relevant, cost-effective, and culturally sensitive.

Physiotherapists delivering what the people want in rural health with primary health care

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Physiotherapists working in rural areas want to provide health services that are accessible, affordable and feasible. To do so a commitment to primary health is the focus in health care. As a rural physiotherapist knows the community well, this gives an opportunity to develop discrete and integrated programs which aid the particular health needs of the community. The rural physiotherapist can adopt a leadership role in the community by leading these changes. Physiotherapists are well placed to demonstrate key skills needed to increase the focus on primary health care. As other professions change, physiotherapists can respond to expectations for a new way of working, across organizational and professional boundaries in different teams. By participating in workforce planning based on the needs of patients, such as a focus on chronic diseases rather than providing services within a defined role of particular profession, primary health care approaches can be implemented. Welcoming new service providers who will emerge to achieve integrated community care such as therapy assistants or triage experts will facilitate these changes. Physiotherapists can continue to develop important skills in community development, primary health care and assessing and responding to the total determinants of health to achieve increased appropriate health care.

“I just fell over – keeping people with an intellectual disability moving safely.”

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Preliminary research indicates that adults with intellectual disability frequently fall and injure themselves but the reasons for this and the actual incidence of falling and injuries from falls in people with intellectual disability are unknown, precluding the development of prevention strategies. This paper will describe a series of studies aimed at understanding why people with intellectual disability are at risk of falling; namely (1) investigations of the balance capabilities of people with intellectual disability using both clinical measures and posturography, (2) development of a video based balance measure, (3) the effectiveness of a student placement focused on improving balance, (4) preliminary studies investigating the prevalence of falls and fall injuries and identifying possible fall risk factors. Results highlight the complexity of the problem. Falling is frequently considered a “normal” occurrence for some people with an intellectual disability. Multiple risk factors have been proposed by this research including concurrent medical problems (such as stroke or epilepsy), medication (including those with a psychiatric basis), the context and environment of falling, movement impulsiveness, distractibility, visual deficits and abnormal walking patterns. The incorrect use of balance strategies and delayed motor responses to postural perturbations were interesting findings. In a small three month prevalence study of 28 people, 7 people fell with one participant falling 30 times. Falling is a problem for people with intellectual disability and physiotherapy is well placed to address many of the reasons why they may fall but is an area not presently well serviced by our profession.

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Musculoskeletal Clinical Assessment and Imaging

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Physiotherapists are increasing their use of ultrasound imaging (USI) in research and diagnosis in the musculoskeletal arena. For many USI is associated with pregnancy scans. A recent Ultrasound Symposium established the term ‘Rehabilitative Ultrasound Imaging’ (RUSI). In New Zealand it is unclear whether physiotherapists are permitted to use USI for ‘diagnosis’ of musculoskeletal conditions. However, in the UK, one can undertake training and practice in this area. Further evaluation as to the ability and potential to compliment physio clinical diagnostic skills with US is required. Research related to USI has predominantly been made up of case studies and research with limited methodology. However, quality studies are on the increase. The major beneficial factor of USI is that it has an enviable record for safety. This has allowed ultrasound to expand as a popular imaging tool. Ultrasound’s non-invasive and dynamic attributes, coupled with improvements in technology, will lead to an increase in the utility of USI. This has been reflective in a reduction in price and increased affordability of ultrasound machines. USI research needs to establish its validity and reliability. A number of USI research projects will be presented. Research relating to the Clinical Examination and Diagnostic Accuracy of examining the shoulder will also be presented. Shoulder pain presents a significant challenge and effective management is currently limited by the inability to reach an accurate diagnosis. USI is a pivotal component of an accurate diagnosis of the shoulder.

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Understanding the human head and neck movement system

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Strategies for movement co-ordination of the head and neck in various postures depend on the specifics of muscle architecture that differ substantially among species. Interpretation of surface cervical posture measurement is also confounded by lack of knowledge about the extent of underlying positional adjustments among the upper cervical vertebrae that may accompany variation in head and neck posture. In an attempt to verify the architectural arrangement of the dorsal musculature in the human spine an anatomical dissection on eight human cadavers was carried out in conjunction with microscopic examination of serial horizontal thin (2.5mm) plastinated slices of an adult human cadaver. Results showed that the tendinous attachments of trapezius, rhomboideus minor, splenius capitus and serratus posterior superior form a sling which is more substantial in the lower cervical spine compared to the upper cervical spine. In a second study the association between sets of angles (degrees) describing anatomic positions of the four upper vertebrae on lateral cephalometric radiographs and the surface measurement of head and neck posture (craniovertebral angle) were studied in young healthy subjects (n=34), mean age 24.5 ± years. No significant correlation was identified between the angles measuring cervical lordosis, orientation of the atlas, vertebral inclination and the craniovertebral angles. Anatomic alignment of the upper cervical vertebrae cannot be inferred from surface measurement of head and neck posture even in the case of extreme postural tendencies. Knowledge of both these anatomic and postural complexities in the cervical spine has relevance to the physiotherapy clinical reasoning process.

Obstructive sleep apnoea – an age-old problem that will not go away

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References to apnoea and sleepiness were made in the writings of Hippocrates around 400BC but descriptions of obstructive sleep apnoea (OSA) and its pathogenesis have only evolved over the past 50 years. The prevalence of OSA together with daytime hypersomnolence (OSAHS) affects 4% of the world’s population. Obesity and phenotypic traits including upper airway anatomy are key risk factors but hypertension, acute cardiac events and insulin resistance are also independently associated. The first line therapy for management of OSAHS is nasal continuous positive airway pressure (nCPAP), however compliance limits its effectiveness in some patients. In three randomized cross-over studies involving volunteers referred from the local sleep unit the effects of conservative therapies for the management of OSAHS were compared with nCPAP therapy, using apnoea-hypnoea index (AHI) as the primary outcome. Each investigation involved a device designed to influence the anatomical and postural relationships of the head and neck and/or sleep position. As the effect of each of the conservative therapies on AHI was unknown each study included a mid-trial review. At review the superiority of nCPAP therapy over each of the other therapies was significant (p>0.01). Although each device met its design objectives the results demonstrated that control of head and neck posture and sleep position are not in themselves sufficient to maintain airway patency during sleep and thus control OSA. It is conceivable that addressing the growing epidemic of obesity and cardiovascular disease may also go some way to managing the risk or at least the severity of OSAHS.

Acknowledgements: Otago Respiratory Research Trust, NZSP Scholarship Trust Fund, University of Otago School of Physiotherapy

Plantar fasciitis – treat inflammation or underlying impairments?

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Plantar fasciitis is a common complaint in adults. Two common approaches to keep these patients moving are: to use electrophysical agents (EPA) such as ultrasound, iontophoresis of dexamethasone and ice to target the inflammation and pain; or to use manual therapy and exercise prescription (MTE_x) to target underlying physical impairments implicated in causation. This randomised clinical trial compared the effectiveness of these two treatment approaches. Therapy consisted of 6 sessions over 4 weeks. Outcome measures were the Lower Extremity Functional Scale (LEFS), Numeric Pain Rating Scale (NPRS), and Global Rating of Change (GROC). At the time of reporting 37 participants with clinical diagnosis of plantar fasciitis were randomly assigned to receive either EPA or MTE_x. 37 completed the course of therapy, with 1 participant lost to follow-up. The groups did not differ at baseline. Both groups improved by clinically significant changes in all outcome measures, except for the EPA group GROC score at discharge. We were unable to find significant differences between the groups at discharge or 6 months for any outcome measure. Improvements seen at discharge were maintained or further improved at 6 months follow-up. At 6 months, the EPA group had improved by 12.0 points on the LEFS, 2.1 points on the NPRS, and reported an outcome of 12.2 points on the GROC. The MTE_x group had improved by 10.6 points on the LEFS and 2.0 points on the NPRS, and reported an outcome of 12.7 points on the GROC. At discharge, our data indicate some evidence of clinically important differences in GROC score between the groups in favour of MTE_x (12.9 vs 11.1 for EPA), but not at 6 months. However in this interim analysis sample size was too small to detect statistically significant differences. We cannot conclude that either treatment approach is superior, however it appears that the significant improvements gained can be maintained through to 6 months follow-up. Further research is required to establish whether these interim changes are maintained in a larger sample and at longer term follow-up.

Does pain drawing area predict psychological status at one year in patients with recurrent or chronic low back pain?

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There is a growing consensus that psychological states such as somatisation, distress, and depression are risk factors in recurrent and chronic low back pain (RCLBP). Some authors have found an association between psychological state and pain drawings; however the ability of pain drawings to predict future psychological state has not been described. A one year cohort study of 138 RCLBP participants was carried out to investigate the ability of pain drawings to predict future psychological status. At entry into the study, participants completed a blank pain drawing, the modified Zung Depression Scale, the Modified Somatic Perceptions Questionnaire, and the Distress and Risk Assessment Method. The pain drawings were analysed quantitatively using the Pain Sites Score system (PSS) and the Simple Body Region method (SBR). This was repeated at 1 year follow-up. Spearman's Rho correlations and relative risks were calculated. Eighty one participants (59%) had complete data, with 47% female (mean age 42); 19.8% reported chronic LBP and 80.2% recurrent LBP. Pain drawing area at baseline was associated with depression and somatisation at one year follow-up ($p=0.022$, $p=0.006$ respectively). Patients with abnormal PSS pain drawings are at four times greater risk of demonstrating positive somatisation at 12 months. Our results indicate that

patients with RCLBP who have abnormal baseline pain drawings are at significantly higher risk of having abnormal psychological states at one-year follow up, particularly when analysed using the PSS. However we recommend that these preliminary findings be repeated independently.

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NSAIDs and Paracetamol for sprains and strains: a survey of physiotherapists' knowledge and behaviours

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Clinical guidelines recommend medications as first line treatment for many musculoskeletal injuries. As first line health professionals for many musculoskeletal conditions, including sprains and strains, physiotherapists may be asked to recommend suitable medications. Currently recommending medications is outside of the physiotherapist's scope of practice. However there is evidence that physiotherapists often do recommend medications, mostly simple analgesics and non-steroidal anti-inflammatory drugs (NSAIDs). The aim of this study was to determine musculoskeletal physiotherapist's current knowledge and behaviour regarding recommendation of non-prescription medications for the treatment of musculoskeletal sprains and strains. 2438 physiotherapists were surveyed, of whom approximately 1013 work in musculoskeletal physiotherapy. Of 283 respondents (27.9% response rate), 213 (76.6%) sometimes or often recommend oral NSAIDs to patients, and 216 (77.7%) recommend oral paracetamol. Most respondents (225, 82.7%) report that they routinely provide information on potential side effects, 181 (69.3%) on potential risks. Many refer to a pharmacist, however 146 (55.5%) make recommendations on dose, and 119 (45.6%) recommend specific brand names. When asked what the risks associated with NSAIDs were, most respondents (>70%) were able to name at least gastrointestinal upset, ulcers or bleeding, while the proportion able to name respiratory, renal or allergic risks was low (<31%). These data indicate that a large proportion of musculoskeletal physiotherapists are practicing outside of the general scope of physiotherapy practice with regards to recommending medicines to patients. While a large proportion has a good knowledge of potential side effects and risks, the knowledge is incomplete and inadequate for this practice.

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Adolescents with physical disabilities – what matters most?

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Improving quality of life (QoL) is increasingly identified as an important outcome of health and social care. Research exploring QoL from the perspective of adolescents with physical disabilities is limited. This study aimed to explore the most important aspects of QoL for New Zealand adolescents with physical disabilities. The recruitment process used purposeful sampling aiming to get variation in age, gender, ethnicity, type and severity of disability. Six focus groups were held: two with adolescents (including one group of Maori and Pacific adolescents), parents, teachers and therapists. Focus groups were tape recorded and transcribed verbatim. Data was analysed manually using content analysis, constant comparison and negative case analysis to establish themes and categories. Four key themes emerged from the data regarding the most important aspects of QoL for adolescents with physical disabilities: (1) to have autonomy; (2) to be recognised as an individual; (3) to have meaningful relationships; and (4) to have purposeful opportunities. These findings had some overlap with existing measures of adolescent QoL. However, some important aspects of QoL such as autonomy, having a voice, culture and participation were identified that have not been adequately addressed by current measures. The clinical significance of the findings for physiotherapists is that service delivery must move away

from a biomedical model that is functionally based, to a model that facilitates autonomy for adolescents with physical disabilities.

Perceptions of the effects of fatigue on daily physical activity in people with Multiple Sclerosis

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Fatigue is a disabling symptom of multiple sclerosis (MS). Most studies have investigated this symptom by specifically asking participants about fatigue, assuming that fatigue was experienced by and important to individuals with MS. This study explored the perceptions of how fatigue affects physical activity in the daily life of people with MS, without directly introducing the concept of fatigue in the interview schedule. Eight people with MS, recruited via the MS Society, volunteered to participate in an in-depth semi-structured interview. Participants were encouraged to discuss their perceptions by the use of a single open ended question: "Would you tell me a story about how MS affects your life?" Interviews were transcribed verbatim and, using a modified grounded theory approach, a conceptual framework of the impact of fatigue on daily life was developed from the emergent themes. All participants discussed in extensive detail the overwhelming effect of fatigue, notably how fatigue *altered function* and led to *paying for it*. Participants discussed feelings of *fug* and that *heat exacerbated* fatigue whereas *exercise could help*. To manage fatigue, *coping strategies* were developed and *learning to balance* energy and activity was stated as essential. Aside from fatigue, the *fear of falling* reduced levels of physical activity. The study emphasised the significant effect of fatigue on physical activity in people with MS, highlighting the importance of understanding fatigue to ensure physiotherapy intervention included assistance in the development and implementation of individualised coping strategies.

Home-based physiotherapy versus clinic-based physiotherapy rehabilitation for people with acute ankle sprains.

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Patients who do not attend all their clinic appointments have been found to have significantly poorer treatment outcomes than those who do attend all appointments. This study investigated the effects of a standard physiotherapy programme delivered primarily either at the clinic or at home on ankle function, rehabilitation adherence and motivation in ankle sprain patients. Prior to commencement of treatment, 47 patients were randomly assigned to either the clinic or home intervention groups. The home group were given a treatment booklet, cognitive-behavioural adherence enhancing strategies, and loaned necessary treatment equipment. In contrast to the usual eight clinic treatments for ankle sprains, the home group were scheduled four appointments coinciding with key treatment progression times. Clinic attendance and adherence to clinic- and home-based physiotherapy were assessed throughout the rehabilitation. Ankle function and motivation were measured before and after the physiotherapy rehabilitation. Compared to the clinic group, the home group required significantly less appointments ($p < 0.005$), had a higher percentage of attendance ($p < 0.031$), and a significantly better treatment completion rate ($p < 0.004$). Groups had similar scores (all p values > 0.05) for clinic- and home-based adherence, motivation and post-physiotherapy ankle function. Significant relations existed between home-based adherence and motivation ($p < 0.05$). Results suggest patients are likely to attend clinic appointments if a limited number are scheduled, and if each has a predetermined purpose, as happened with the home group. While physiotherapy undertaken predominantly at home does not disadvantage patients functionally and psychologically, it appears motivated patients may fare better.

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Does Tai Chi improve strength and balance in people with Multiple Sclerosis – the current literature

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Deficits in strength and balance are two common impairments in people with Multiple Sclerosis (MS), which have a significant impact on an individual's functional ability. Improving strength and balance may result in the improvement or maintenance of functional independence and may have a positive impact on quality of life. Tai Chi is becoming increasingly available to, and accepted by, the general public as a form of exercise with positive health benefits. Some of the reported benefits include gains in strength and balance in other populations including older adults and people with osteoarthritis. Therefore, the aim of this narrative review was to consider the evidence for the effect of Tai Chi on strength and balance in people with MS. An electronic search using MEDLINE, Scopus, ERIC and Expanded Academic search engines was undertaken. A total of eight papers were identified which discussed Tai Chi as a treatment intervention for people with MS. Of the eight papers identified none were randomised controlled trials, three were pilot studies and the remaining five were expert opinion. Key findings from the evidence reviewed include improvements in depression, quality of life and balance. However these findings should be interpreted with caution due to the small number of participants in each of the pilot studies. Further research which evaluates strength and balance is warranted before Tai Chi is adopted as an efficacious treatment intervention in this population.

Finite centre of rotation of lumbar spine segmental motion in the sagittal plane.

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Abnormal lumbar spine segmental motion is associated with patients suffering from recurrent or chronic low back pain. The location of the Finite Centre of Rotation (FCR) is one method of identifying abnormal segmental motion, and may be of diagnostic value. Lateral flexion-extension (FE) radiographs of 33 asymptomatic and 123 patients with low back pain (LBP) were digitally analysed. The kinematic parameters investigated were the FCR and sagittal rotation variables. The reference range for normal motion was defined by the mean and 2 standard deviation reference ranges from the asymptomatic sample. The location of the FCR in patients with LBP was described, and the proportion of segments outside of the normal reference range was calculated. The FCR for both the LBP and asymptomatic samples was situated in the posterior half of the vertebral body, slightly below the superior endplate of the inferior vertebrae. The prevalence of abnormal FCRx location in the LBP sample was 17.9% ($p < 0.001$), and 9.0% ($p < 0.001$) for FCry. The LBP sample displayed a smaller degree of rotation (6.5° , $p = 0.013$) compared to the asymptomatic sample (8.7°), with a prevalence of abnormal segments of 2.4% ($p = 0.825$). This research supports the concept that the location of the FCR for affected motion segments is altered, and consequently may be of diagnostic value, however large variability of asymptomatic values results in a low prevalence of quantifiably abnormal results.

Group exercise: an initiative to improve access to physiotherapy services for people with brain injury.

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Limited resources and an increasing outpatient waiting list provided an opportunity to review the service delivery in a neurological physiotherapy setting in 2005. Three groups of participants with stroke aged 16-65 years participated in a group circuit programme implemented for one hour, once a week, for

eight consecutive weeks. Lower limb standardised measures of balance (Timed Up and Go, Functional Reach and the Step Test), walking velocity (10 Metre Walk Test), endurance (6 Minute Walk Test) and quality of life scores (Stroke Adapted Sickness Impact Profile 30) were evaluated pre and post programme. All participants improved or maintained their 6 Minute Walk Test Score. In addition, all other measures had positive outcomes as follows: Timed Up and Go 95%, Functional Reach 79%, Step Test 74%, Gait Velocity 95% and the Stroke Adapted Sickness Impact Profile 30, 87% (where the number of participants who maintained or improved their score is shown as a percentage in parenthesis). Participants answered a written survey to determine the programmes value to them with a 93% positive response. The group circuit programme has been continued in this facility with positive impact on waiting times (by January 2006 all participants on waiting list had accessed the outpatient service within the targeted 6 month period). Such an initiative demonstrates desired functional gains as well as improving access to the service within appropriate timeframes.

A review of career pathways undertaken by Bachelor of Physiotherapy graduates who identified as Māori at university

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There is a shortage of health professionals who identify as Māori in New Zealand. At the University of Otago from the time the first cohort graduated with a Bachelor of Physiotherapy (BPhy) in 1993 to 2006 there have been 62 graduates (5.6% of all BPhy graduates) who identified as Māori whilst enrolled at the University. This is higher than the data from national physiotherapy workforce statistics indicate are in the profession. The purpose of the project was to document the career pathways undertaken by graduates from the BPhy programme, who identified as Māori and explore their involvement with health of the Māori as well as factors that may contribute to ongoing development of cultural competence in the undergraduate programme. Twelve female and eight male graduates responded to the computer-based survey. They identified with a wide range of iwi and 25% were fluent in Te Reo Māori. Participants are working in a mix of clinical situations. All participants acknowledged that there are areas where physiotherapists can work to improve Māori health, and nine indicated an intention to be involved in specific Māori health programmes, research or developing workplace cultural competence in the future. Feedback including the need for more lectures from Māori health professionals and opportunities for clinical experience in working with Māori will assist the development of the School's own Māori strategic framework and ongoing development of cultural competence amongst students and staff.

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Designing a normative model for physiotherapy service delivery in a District Health Board setting and testing perceptions around implementation

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Physiotherapy as a component of healthcare has been increasingly able to demonstrate the benefit intensive input in traditional roles or development of non-traditional roles can have on patient care. This benefit often goes unfulfilled in a District Health Board (DHB) setting due to ongoing vacancies and change processes that have yet to fully realize the potential of physiotherapy. This descriptive study was undertaken to develop a model of physiotherapy service delivery that reflected the best available evidence on physiotherapy staffing, and the current employment environment. Perceptions around the potential implementation of this model were then tested. This was achieved via secondary data analysis and qualitative analysis respectively. For the qualitative analysis, ten subjects were interviewed with strategic and managerial oversight for physiotherapy within a DHB. Interviews were then analyzed using inductive thematic analysis. The secondary data analysis used to develop the service delivery model provided guidance for staffing ratios to patient

populations and population density, and the associated skill mix of staff. The qualitative analysis revealed three dominating themes around perceptions relating to implementation; the use of an alternate skill mix in providing services, how teams should be utilized to provide services, and the management of change. While the concept of change was not explored fully in this study, it was recognized that any change process needs to be managed appropriately, especially with regards to providing services via an alternate skill mix, or an alternate team structure within a DHB. This can be considered an evolutionary change process for how physiotherapy services are delivered which is best achieved via a consultative and collaborative approach between managers and staff.

The feasibility of the role of the allied health assistant in the rural health delivery model

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Healthcare professionals within New Zealand including the Allied Health (AH) professions are under increasing pressure to deliver services. The pressure is often more acute in the rural setting. This project was undertaken to describe the role of the AH assistant, and the feasibility of increased utilization of this role in the rural health delivery model. A literature review revealed common themes: the need to clarify delegation of tasks, supervision of the assistant, professional oversight, and the need for AH professional staff to be adequately prepared for any change in skill mix. Interviews were conducted with AH professionals in a range of roles and Primary Health Organizations in the District Health Boards of Otago, Taranaki, Waikato and West Coast. Themes emerging from the interviews confirmed those found in the literature review; however a new concept that of "unburdening" emerged whereby utilization of the assistant in performing appropriate clinical and non-clinical tasks has the potential to allow for greater scope of the allied health professionals practice to be realized. Alternative funding arrangements were identified, with potential for AH professions to work more closely with the primary sector, and the ability to improve services within current arrangements. A scope of practice for the AH assistant was developed which clarifies the ability of the assistant to provide supportive tasks for the AH professional and providing the prescriptive portions of care to the client. The scope of practice also clarifies the concepts of delegation, supervision, and professional oversight.

The hypoalgesic efficacy of TENS parameters on experimental pain models in healthy humans: A systematic review

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This study aimed to systematically review the evidence concerning the hypoalgesic effect of TENS parameter combinations on experimental pain models in healthy humans. The electronic databases Ovid MEDLINE, CINAHL, AMED, and Science Citation Index were searched for trials published in English, covering the period 1966 to 2006. Grey literature was also sought and manual searches were also performed. Trials were included if they were: randomised trials conducted on healthy humans, compared TENS to placebo and/or control, used an experimental pain model, and had pain as the primary outcome measure. Trials were rated using the validated Jadad scale. The effect of individual quality components (i.e. randomisation and blinding) on the results of the review was also explored. Studies were categorised as high quality (≥ 3 points using the Jadad scale) or low quality (≥ 2 points). Studies were also categorised by the stimulation parameters employed. Studies with a high methodological quality demonstrated a tentative association with a positive outcome. High quality trials showed that low intensity ('strong but comfortable') stimulation had maximal hypoalgesic effects during stimulation, whereas high intensity ('to tolerance') stimulation had maximal hypoalgesic effects,

during and post-stimulation. The frequency and stimulation site were also important considerations with high frequency (110Hz) segmental, and low frequency (4Hz) extrasegmental TENS being required with efficacious applications. 200ms pulse durations and 30 minutes stimulation were also shown to be important parameter selections. These findings demonstrate the importance of selecting appropriate TENS 'dosages'. The findings from this review can be tentatively applied in clinical applications of TENS.

Establishing a task-related circuit group in an inpatient rehabilitation setting: a critical reflection.

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Functional recovery following neurological events has been linked to the intensity of practice of functional activities. In the current climate of constrained health expenditure, rather than expecting increases in staff numbers, alternative solutions for providing clients with increased opportunities for supervised therapeutic activity need to be utilised. One such strategy recommended in the contemporary literature is task-related circuit groups. This presentation critically reflects upon the implementation of a task-related circuit group at the ISIS Centre, an inpatient interdisciplinary rehabilitation unit. Specifically, this presentation identifies theoretical differences between the rehabilitation philosophies of the physiotherapists and occupational therapists that contributed to conflict in establishing the circuit group, and strategies that were employed to resolve this conflict. A physiotherapy circuit group was introduced at the ISIS Centre in 2005. However, occupational therapy colleagues raised concerns about clients practicing tasks out-of-context in the gym, for example doing up buttons on a shirt, and interprofessional debate on functional rehabilitation strategies ensued. The circuit group was re-established following a constructive process between the two professions including group supervision, review and modification of the circuit group activities to encompass the rehabilitation philosophies of both professions. The redesigned interdisciplinary circuit group continues successfully and is supervised by either a physiotherapist or occupational therapist, and a rehabilitation assistant. Other services contemplating the introduction of a circuit group would benefit from involving occupational therapy colleagues to establish a more holistic approach to group circuit training.

Determining differences between novice and expert physiotherapists in the emergency on-call environment: A vignette based study.

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Emergency on-call duties have been highlighted as key stress factors in newly qualified physiotherapists and job performance may be altered as a result. The purpose of this study was to determine what differences exist between novice and expert physiotherapists within the emergency on-call environment. A purpose-designed postal questionnaire was administered to emergency on-call providers in New Zealand. The questionnaire investigated participant's attitudes towards emergency on-call service provision and presented a vignette-based clinical scenario. A response rate of 78.8 % (n = 56) was achieved. Significant differences between novices and experts were determined in scores for confidence ($p = .0001$), stress ($p = .001$) and support required ($p = .001$). Factors which particularly influenced both novice and expert stress levels when working as emergency on-call physiotherapists emerged as being working in isolation and working with a higher complexity of patients. A relationship was determined between confidence, level of support required and amount of stress felt ($p = .001$). Differences were demonstrated between novice and expert physiotherapists in their answers to a clinical case scenario particularly in the areas of prioritisation, problem definition and in the interpretation of analysed results. A need for novices to gain the type of experience which has the facility for independent problem solving and guided reflection was

determined; the use of vignette based case studies may be one method which could be further exploited to meet these needs.

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Measurement of sciatic nerve movement, using ultrasound imaging, in a neural pre-loaded sitting position compared to an unloaded prone position

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Peripheral nerve movement exhibits different characteristics when the neural system is under tension (pre-loaded) compared to no tension (unloaded). Neurodynamic theories suggest that there should be more excursion of peripheral nerves seen earlier in limb movements as the neural connective tissues are exposed to less tension and therefore have greater capacity to glide. Sciatic nerve movement was measured, using ultrasound imaging, in a neural pre-loaded position (sitting, hip flexion 90°, knee fixed 50°) compared to an unloaded prone position (inverted prone, hip flexion 50°, mobile knee). Data from healthy subjects were obtained from two different cohorts (n=27 for sitting group; n=17 for prone group). Descriptive analyses were calculated for each of the two groups. In all movement directions assessed there was greater sciatic nerve movement in the unloaded compared to the pre-loaded position. Average longitudinal movement in the unloaded position was 4.19mm (± 0.87 , range 0.43 – 13.45mm) compared to the pre-loaded position with an average of 3.47mm (± 1.60 , range 0.45 – 8.61mm). Measurements for average lateral-medial movement in the unloaded position (6.53mm, ± 1.61 , range 0.50 – 23.90mm) was greater compared to the pre-loaded position (3.54mm, ± 1.01 , range 0.01 – 12.30mm). Measurements for average vertical movement was greater in the unloaded position (2.83mm, ± 0.91 , range 0.30 – 7.40mm) compared to the pre-loaded position (1.61mm, ± 0.62 , range 0.02 – 4.19mm). In support of neurodynamic theories, these results suggest greater movement of the sciatic nerve at the posterior mid-thigh, both in transverse and longitudinal planes when the nerve is in an unloaded position. In an unloaded position there is less tension within the sciatic nerve and therefore it has greater capacity of movement. There is also less tension, and therefore more capacity for movement, within the mechanical interface in the unloaded position, for which the nerve must accommodate.

Landing patterns in elite netball

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Netball is the major team sport played by New Zealand females. It generates a significant number of accident compensation injury claims. The actions most implicated in netball injuries are jumping and landing. The purpose of this study was to quantify the exposure of netballers to landing stress. Video tape was utilised to analyse the landings of elite New Zealand netball players aged between 18-38 years during the National Bank Cup Competition. Six games were analysed for number and type of landing for goal shoot, goal attack, goal defence and wing attack positions.

The most frequently performed landing was a one –two foot landing 39% followed by a double foot landing 38%. When positions were independently analysed goal defence had a 47% level of one-two foot landings compared with goal shoot with a 28% level. Single foot and run through landings were used least frequently at 5% and 10% respectively. Wing attack scored the highest mean number of landings per game at 74. The pattern of landing numbers per quarter was different for each position. Video tape observation also revealed a wide variance in style between individual players in the same position. In light of the landing demands on elite players it would be beneficial to consider an analysis of training methods to ensure task specific emphasis on jumping and landing technique during practice. This would have the potential to reduce jump related injuries. Elite netballers are exposed to a significant amount of landing stress; the degree of exposure varies between positions, between individuals and between quarters.

Recertification Programme - Reflection and direction

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Continuing Professional Development is at the heart of best practice for physiotherapists and as such is to be nurtured, supported and monitored by the Physiotherapy Board in its public protection role. The Physiotherapy Board's Recertification Programme, implemented under section 41 of the Health Practitioners Competence Assurance Act 2003, commenced in January 2005 with the first three year (pilot) cycle being completed in December 2007. The crux of the Recertification Programme required all physiotherapists who hold an Annual Practising Certificate (APC) to participate in relevant Continuing Professional Development (CPD). Audit of selected practitioners was the tool used to evaluate CPD in the profession. Analysis of statistics from the first three year cycle coupled with feedback from practitioners and professional groups influenced the content and direction of the programme from 2008 onwards. Evaluation of this information resulted in significant modifications to the recently completed Recertification Programme and audit cycle including the specifics of timing of the audit cycle, plus the requirements of the programme such as the formal CPD and practical hours, activity groupings, peer review, reflective statements and acceptable evidence of activities. The Recertification Programme from 2008 onwards is broader to accommodate our divergent profession but remains focused on CPD as one indicator of competence to practise physiotherapy. The Recertification Programme is reviewed regularly to provide for quality improvement and to maintain the integrity and is now an established component of CPD for all holders of an APC.

Does calculating the minimal important difference using the relative score change have less ceiling effect than using the absolute score change? - A pilot study

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Outcome measurement in the clinical setting needs to be simple to administer, easy to calculate, and meaningful. Minimal Important Difference (MID) calculation may be more responsive when using relative score changes. Data was collected from all patients who presented for physiotherapy assessment and treatment of musculoskeletal injuries at a student health physiotherapy clinic for a 3 month period. Participants completed the patient-specific and a relevant region-specific outcome measure (OM) at the initial and follow-up visits. MID was obtained using Receiver Operating Characteristic (ROC) curves for each outcome measure. Area Under the Curve (AUC), and floor and ceiling effects were compared for absolute and relative changes in score. There were 164 complete data sets for the region-specific OM and 237 for the patient-specific. For the region-specific OM the ceiling effect was 26% using absolute score changes and 14% using relative score changes. For the patient-specific OM the ceiling effect was 12% using absolute score change and 15% using relative score change. The AUC for both OM was $>.864$ which indicated good accuracy for responsiveness. There was less ceiling effect for the region-specific OM when using relative MID, whereas for the patient-specific OM the ceiling effects for the absolute and relative MID were similar.

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Validity and reliability of the Spineangel® clinical device for quantifying spinal mobility

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Spineangel® is a recent clinical device that provides trunk flexion and extension feedback to assist in the management

of back flexion to reduce spinal loading and facilitate recovery from lower back injury. This study examined the reliability and validity of Spineangel® when compared to 3D Motion Analysis. In a repeated measure, randomized study, angular displacement of the hip and trunk were gathered during bending to either the knee, mid lower leg, full flexion and full extension. Participants were 18 healthy males with no recent history of low back pain. Their mean age was 26.78 years (18-42 yr), height 175.23 cm (168-184.5 cm), and weight 70.74 kg (56.2-82.2 kg). Results show Spineangel® intraclass correlation coefficients for trunk flexion and extension data were excellent, (ICC = 0.90-0.97 for flexion and ICC = 0.94 for extension). The coefficient of repeatability was 4.5° to 5.2° in flexion and 3.4° in extension. Spineangel® showed highest correlations with pelvic tilt in flexion ($r = 0.93$) and extension ($r = 0.81$). With no mean differences when bending to the knee (+1.7°, CI = $\pm 3.3^\circ$) and mid lower leg (+4.2°, CI = $\pm 4.3^\circ$), but differences in full flexion (+5.7°, CI = $\pm 4.7^\circ$) and full extension (-2.8°, CI = $\pm 2.4^\circ$). With healthy, non-obese population and careful device placement, this study suggests Spineangel® can be used to provide feedback on trunk flexion and extension due to excellent reliability. The device was a valid measure for pelvic tilt when bending to the knees although bias increases with flexion.

Physiotherapy education keeps moving

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Changes to the undergraduate curriculum at the AUT School of Physiotherapy have reflected broader social shifts; from the biomedically-dominant curriculum of the 1970s inherited from the Chartered Society of Physiotherapy (CSP), through the development of clinical decision-making based on research, and the move into higher education in the 1990s, and, more recently, the trend towards evidence-based practice. Despite these changes, a number of structural facets of undergraduate education persist; notably the clinical subdivisions of cardiorespiratory, neurology and musculoskeletal practice, and the use of block placements devoted to specific disciplinary areas. In reviewing the current curriculum, it has become clear that a number of these practices need to be challenged. Given the rapidly changing face of contemporary health care, the school undertook to review its undergraduate curriculum beginning with a review of existing models of health and curriculum delivery. It became clear that it was important to retain the core strength of physical rehabilitation but a greater emphasis should be placed upon psychosocial aspects of health and illness, health promotion, community and population models of health, including some new areas of curriculum content not previously explored. This presentation highlights some of the changes made to the delivery of clinical education to best prepare students for future clinical practice. Using a 'clinical schools' model, we will show how we are addressing some of the tensions present in the undergraduate clinical experience, whilst offering a more flexible, inclusive form of education that allows students to move beyond the present constraints on physiotherapy practice.

Comparing patient perception of year four physiotherapy students' clinical performance with faculty grade

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The main purpose of this study was to compare patient perception of clinical performance with the physiotherapy student's grade ascribed by the clinical instructor, to determine whether patients judge students the same way as the faculty. A questionnaire was designed by the researchers using patient perceptions of good physiotherapy, previously determined from interview analysis. The questionnaire was given to patients of these students to measure the patients' perception of the clinical performance of their student during their recent course of treatment. The data was collected at the completion of the students' grading process, and the patient perception score compared with the provisional faculty grade to determine any correlation ($p < 0.05$). Ninety-three percent ($n=40$) of eligible students from four musculoskeletal clinics administered the questionnaire to 57% ($n=475$) of their

patients. The patient perception score showed a moderately strong correlation ($r = 0.436$, $p = 0.005$) with the student's grade. Clinical assessment of year four physiotherapy students, which currently excludes patient opinion, may be augmented or in part replaced by patient perception scores, using the patient perception questionnaire, to alleviate the assessment burden on the faculty. Since assessment has been shown to motivate student learning, inclusion of patient perception as an assessment tool may also encourage physiotherapy students to focus more on the characteristics of clinical performance that are valued by the patient.

Evidence for the effect of laser phototherapy on lateral epicondylalgia (tennis elbow).

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Previous studies have demonstrated disparate results for the effect of laser phototherapy on tennis elbow pain; and a clear mechanism of effect remains elusive. To investigate a possible descending mechanism of effect, two subjects with tennis elbow were recruited (Study 1: female aged 49yrs treated with 780nm, 50mW continuous laser @ 3 J/cm² to 11 points; Study 2: male aged 39yrs treated with 780nm, 50mW continuous laser @ 2.5 J/cm² to 13 points). A blinded, single case research methodology was employed, with the addition of placebo in Study 2. Grip strength, pain pressure threshold (PPT) and sympathetic outflow (skin conductance (SC), skin temperature (ST) and blood flux (BF)) were measured at the affected limb before, during and after interventions. Serial dependency was calculated (autocorrelation coefficient and First Difference Transformation) before calculating the celeration line, and trends. In Study 1, the results demonstrated a statistically significant increase ($p = 0.01$) in pileous ST, and reductions ($p = 0.01$) in cutaneous BF, glabrous ST and ulnar SC on the affected side thus representing sympathoexcitation (or non-opioid-based analgesia). In Study 2, the results demonstrated increased PPT and grip strength, and decreases in other sympathetic measures post-laser (compared to the placebo period) representing a mixed opioid/non-opioid response. The results support the expectation of a clinical response after one application of laser phototherapy, and in particular a reduction in painful symptoms of lateral epicondylalgia via a sympathetic nervous system response. To clarify dose-response factors, future research with greater subject numbers will investigate laser stimulation thresholds.

Evidence-Based Recommendations for Hand Hygiene for Health Care Workers

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The aim of this systematic review was to establish evidence-based recommendations for hand hygiene for health care workers in New Zealand. Using a systematic approach to literature searching, relevant studies were retrieved and evaluated using a standardised tool. The twenty-three studies that met the inclusion criteria were categorised into subgroups depending on the type of comparison: hand hygiene product; skin condition; hand drying method; glove types. A 'best-evidence synthesis' was utilised for classifying the evidence. Included studies provided evidence to support the use of alcohol based hand rub and latex or nitrile gloves as preferred hand hygiene products. There was conflicting evidence for the use of medicated or plain soap, or any particular method to dry hands. Hand hygiene is a crucial component of risk management for both health care workers and their patients. It is important that hand hygiene practice is based on the best current evidence. As a result of a systematic review, evidence-based recommendations for hand hygiene for health care workers are proposed.

Exploring Actical accelerometers as an objective measure of physical activity in people with Multiple Sclerosis

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Accelerometers are increasingly accepted as an objective measure of physical activity. However, research investigating psychometric properties in people with chronic neurological conditions is limited. This study explored test-retest reliability and validity of Actical omnidirectional accelerometers in people with Multiple Sclerosis (MS). Participants were recruited through Auckland District Health Board and local MS Societies. Thirty-one participants (ambulatory with or without an aid) were purposefully selected reflecting diversity in time since diagnosis, impairment level, age and gender. Participants attended two testing sessions, seven days apart. They completed series of activities at various intensity levels (reading newspaper, vacuuming, 30 second sit-to-stand, climbing stairs, hanging washing and six-minute-walk test), whilst wearing a heart-rate monitor and accelerometer. After each activity participants completed Borg rating of perceived exertion (RPE). Test-retest reliability was poor for sedentary and free-living activities, with low Intraclass Correlation Coefficients (ICCs: 0.01 – 0.38), but better for standardised activities or ones requiring purposeful movements, such as climbing stairs (ICCs: 0.75 – 0.90). Bland-Altman 95% limits of agreement were wide, ranging from ± 16 for reading newspaper to ± 1330 for six-minute-walk test. Validity was not established; neither percentage heart-rate-reserve (HRR) nor Borg RPE were accurately predicted by activity counts. While accelerometers may be an appropriate measure of walking-based activities in people with MS, they do not appear suitable for measuring a broader range of free-living activities. Furthermore they do not predict physiological (HRR) or self-reported (RPE) activity intensity well. Our findings suggest that Actical accelerometers are unsuitable as an objective measure of general physical activity for people with MS.

Navigating the borderlands of patient-centred goal planning: a grounded theory investigation

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This study employed constructivist grounded theory to investigate the application of goal planning to multidisciplinary inpatient rehabilitation for people with stroke. Data was collected from two hospitals and involved 42 participants (nine patients, five family members, and 28 health professionals). Participants were selected by purposeful and theoretical sampling. Audio-data from recordings of participant interviews, team meetings, family meetings, and patient-clinician interactions were transcribed and analysed along with field notes using constant comparative methods. The findings revealed that certain goals (characterised by short timeframes, small 'realistic' steps, and an orientation to physical function) were prioritised or 'privileged' over others. Involvement of patients and family/wh nau in goal planning appeared to result in interactional dilemmas for health professionals when the objectives, skills and perceived capacity of patients or family/wh nau did not align with these privileged goals. Clinicians attempted to resolve these dilemmas by navigating their way through a discourse of patient-centred therapy while retaining control of the documented goals of rehabilitation. Furthermore, when privileged goals did align with the objectives and capacity of patients, greater patient involvement in goal planning still did not always influence clinical reasoning or change the course of interventions provided. This study raises questions about how 'patient-centred' current goal planning practices are in inpatient rehabilitation and whether a 'patient-centred' approach is possible in inpatient rehabilitation for stroke given the way it is current funded and structured.

Clinical factors influencing adverse reaction to acupuncture reporting

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The decision to report an adverse reaction to acupuncture warrants careful consideration. The aim of this study was to ascertain the impact of factors of clinical importance in the decision making process to report an adverse reaction. The participants, recruited from the Physiotherapy Acupuncture Association of New Zealand (PANNZ) (n=287) and the Medical Acupuncture Society of New Zealand (MASNZ) (n=58), were mailed a questionnaire which had been specifically designed and validated for the purposes of this study. Respondents were asked to rank six key factors (duration, severity, patient's perceptions of symptoms, the need for medical intervention, loss of function and permanence of the adverse reaction), which could potentially influence their decision to report an adverse reaction to acupuncture. In the data analysis, levels of endorsement were calculated for the six factors by calculating its absolute frequency, utilizing a cumulative points system to weight each ranking accordingly. A 42% (n=135) response rate was achieved for the postal survey. The results showed that the PANNZ respondents (n=123) considered the need for further medical intervention as the most important factor in the determination to report (56%). However the opinion of the MASNZ respondents' (n= 12) differed and they ranked permanence (50%) and loss of function (50%) above the need for treatment. Both groups ranked "patient perception" as least important factor (66%). The results suggest the need for redress of patient input in the reporting process and the development of an adverse reaction to acupuncture reporting policy that establishes decision rules acceptable to both member organisations.

Retraining mobility in a patient following spinal cord infarction: a case report

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This case report presents the physiotherapy management and mobility retraining of an 81 year old, female patient with a non-traumatic incomplete spinal cord injury, secondary to spinal cord infarction. There is little evidence to direct mobility retraining following spinal cord infarction and non-traumatic incomplete spinal cord injury, and so a functionally-based approach to retraining mobility was employed. Initially wheelchair-bound and hoist-transferring, the patient regained limited independence with mobility, walking with a frame and assistance of one person, over eleven weeks of inpatient rehabilitation. Ongoing research is required to establish optimal mobility retraining intervention for patients following spinal cord infarction and non-traumatic incomplete spinal cord injury.

Management of balance impairment, guided by the Balance Evaluation-Systems Test, in a patient following cerebellar infarct: a case report

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There is little evidence to guide physiotherapy intervention for patients following cerebellar infarction. This case report describes the use of a new balance assessment and measurement tool, the Balance Evaluation-Systems Test, in the physiotherapy management of balance and mobility impairment in a 62 year old man following left cerebellar infarction. The Balance Evaluation-Systems Test was used to identify which subcomponent of balance was most affected. Stability in gait was identified as the most affected subcomponent of balance and a functional approach to retraining balance and mobility was employed. The patient made excellent, rapid gains, discharging home within seventeen days of admission, independently mobile and progressing towards graduated return to work. The Balance Evaluation Systems Test is an effective measure for the determination of focus for balance intervention in a patient following cerebellar infarction. Considering the likely contribution of spontaneous

recovery, rehabilitation may enhance potential for functional gains in patients with cerebellar infarction. Ongoing research is required to further establish psychometric properties and clinical usefulness of the Balance Evaluation-Systems Test, and to identify optimal physiotherapy intervention strategies for targeting balance and mobility impairment for patients following cerebellar infarction.

The life, times and tensions of a modern-day clinical educator in New Zealand: A critical inquiry.

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Clinical education (CE) is a core component of undergraduate physiotherapy education and is also essential for professional registration and socialization (internalizing of professional attitudes and values). It is dependent on senior physiotherapists supervising students within the clinical environment. However, many stakeholders have a vested interest in CE including university staff (obtaining sufficient placements and clinical hours) and managers (recruitment opportunities), which may impact on the senior physiotherapist. There is limited research to date which has sought to understand the pressures on clinical educators and the tensions that may exist. This presentation draws on research undertaken as part of a Doctor of Health Science which explores the interplay of power within CE as perceived by clinical educators. The research is underpinned by the work of Bourdieu (French philosopher) who provides a critical framework. Eighteen clinical educators were interviewed throughout New Zealand in 2007 using semi-structured interviews. Analysis is framed by Bourdieu and Wacquant who explore how the field of practice (CE) interplays with the social group (clinical educators) and uncovers the tensions between the discipline culture and their position, and the power they possess. In light of the growing pressures and demands from service and education providers, and dwindling numbers of senior staff, it is timely to explore the research to ensure that the perceptions of these key players are heard. Clinical educators are pivotal to the profession, workforce and the education continuum; they are essential to the movement of physiotherapy into the future and are therefore worthy of a voice.

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The real cost of effective treatment. A single case study of a patient with hyperventilation syndrome.

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Chronic hyperventilation syndrome (HVS) is an abnormal breathing pattern which is often undiagnosed due to the extensive and often seemingly unrelated symptoms. Patients with HVS often undergo extensive yet inconclusive costly investigations and are perceived to be high healthcare users. This retrospective single case study investigated the direct costs and physiotherapy management of a 39 year old woman (SS) who presented to the Emergency Department (ED) on three occasions within 10 days. Each presentation at ED resulted in SS undergoing a battery of tests (total cost: \$1,852.53). Following a respiratory consultant review (total cost: \$220.00), a referral was made to the Physiotherapy HVS Clinic. She was assessed using the Nijmegen questionnaire, a validated screening tool for HVS, and found to have a score of 37/64. Her symptoms directly impacted on her job (12 days of sick leave: approximate cost \$1,038.46). After seven physiotherapy sessions (in total four hours) over a three month period (total cost: \$416.76), her Nijmegen Score was reduced to 5/64. She was back to full time employment, had made lifestyle changes and had not represented to ED. A cost analysis of direct costs to SS and healthcare provider is presented and clearly demonstrates the cost and physiotherapeutic effectiveness of a simple yet specialized physiotherapy intervention. This has financial implications for both healthcare providers and also consumers. The true value to the patient, their family and employer (indirect costs) however remains unknown but cannot be underestimated.

An evaluation of the FarmSafe Awareness workshops

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Farmers have some of the highest work-related injury rates in New Zealand. In response to this, a national farm safety programme (FarmSafe) was implemented in 2002. The FarmSafe Programme will be described. This study evaluated the effectiveness of the FarmSafe Awareness Workshop in improving attitudes to and practice of safety in farming. Implementation, participation and perceptions of the workshop, and the impact on attitudes and practice of attendees were assessed. Methods included: assessing course evaluation forms (n=8758); interviews with 30 workshop participants from three different areas in New Zealand; and baseline and post-intervention surveys with a FarmSafe participant group (n=111) and two non-participant comparison groups (n= 409 & 78). The evaluation showed improvements in safety attitudes among those attending the workshop; some indication that personal safety practice changed; although there was no difference between the groups in the changes they made to the safety environment of their farm.

Influences on participation in active recreation for people with disability

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Government bodies encourage physical activity through recreation in both the general and disabled populations to combat lifestyle diseases such as heart disease, obesity and diabetes. People with disability are relatively inactive compared to the able bodied population, despite evidence to suggest the benefits of exercise to their health. The aim of this study was to explore the views of people with disability about issues related to active recreation. Adults with disability related to chronic neurological conditions who participate in active recreation were recruited through disability organizations in the Christchurch area. In-depth semi-structured interviews were used to investigate perceptions of factors that influence participants' choice and uptake of active recreation. An interpretive approach was used to identify codes or patterns of meaning in the raw data for prevalence of themes. Preliminary findings from the first 10 participants suggest that people with disability exercise to minimize the effects of their neurological condition. Factors such as personal experience; the value placed on physical activity by the individual and access to suitable activity may influence choice, uptake and maintenance of physical recreation in this population. While people with disability perceive benefits of being active, a prescribed therapeutic programme can be an important stimulus, but usually requires impetus from others (such as a group setting) or by attendance at an exercise facility to be maintained. Findings from the study could inform health professionals and recreational and disability organisations to influence change, in order to increase levels of physical activity by people with disability.

Unloading mechanism in the more affected side during stair ascent in bilateral knee osteoarthritis: Implications for the less affected knee

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Knee load in the more affected knee of patients with bilateral knee osteoarthritis (OA) was compared to the load in their less affected knee and to the load in the right knee of healthy control subjects to determine the implications of an unloading mechanism for the more affected knee during stair ascent. The

more affected knee in patients was determined as the knee with a higher Kellgren-Lawrence grade and lower pain and lower function scores (Hospital for Special Surgery Knee Analysis Form). A seven camera optoelectronic system, force plate and an inverse dynamics approach were used to quantify peak external knee flexion moments during stair ascent in 18 patients with bilateral knee OA (6/12 m/f; 62±7yrs; 165±8cm; 70±14kg) and 17 healthy control subjects (8/9 m/f.; 57±8yrs; 171±12cm; 74±12kg). Moments were normalized to body weight (Bw) and height (Ht). Peak knee flexion moments in the more affected knee were 19% lower than moments in their less affected knees and in control knees (4.1±1.5%Bw*Ht versus 5.0±1.5%Bw*Ht and 5.0±1.2%Bw*Ht, respectively; P=0.046 and P=0.028, respectively). No difference in peak knee flexion moments between less affected knees and control knees was observed (P = 0.954). These results indicate the presence of a protection mechanism that reduces the load only on the more affected knee. Peak knee flexion moments in the contralateral knee were within values of control subjects indicating the possibility of a faster rate of progression of the disease in the less affected knee due to a lack of unloading in these knees.

What is life like for New Zealand adolescents and adults with cystic fibrosis?

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The purpose of the study was to describe the quality of life (QOL) for New Zealand adolescents and adults with cystic fibrosis (CF). The study involved the completion of two paper-based questionnaires. The first questionnaire was an internationally validated quality of life questionnaire, the cystic fibrosis questionnaire (CFQ). The second was a health and lifestyle questionnaire (HLQ) designed to gather information about activity levels, treatments, and health issues associated with CF, as well as anthropometric data that were not available from the CFQ. Responses were received from 41/158 subjects (mean age 34y; mean body mass index 21kg/m²) listed on the database of the national Cystic Fibrosis Association. The QOL was highest in the domain for eating disturbances indicating that CF only had a small impact on the subjects' ability to enjoy eating. The lowest scores were in the vitality, weight and respiratory domains, indicating that domains linked to physical performance were the ones most affected. The results were similar to populations with CF from other countries. Self rated health status was a predictor in 10 out of the 12 domains of the CFQ. Despite an older mean age of the population in the current study domains affecting quality of life were similar to those in international studies. The lowest levels of quality of life were related to the respiratory and vitality domains. It would be of clinical benefit for physiotherapists to monitor the quality of life of patients with CF over time, especially as longevity is increasing with improved medical management.

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Competent to practice? Does the New Zealand Physiotherapy Board's new competency framework reflect changes in modern health care?

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The Physiotherapy Board's competencies for registration provide a template for undergraduate curricula and a framework for evaluating the suitability of applicants for re-registration. These competencies play an important role therefore in defining physiotherapy in New Zealand. Since 2004, the Physiotherapy Board has been re-evaluating its competency framework and has recently published its findings. The framework has significance for the two physiotherapy schools in New Zealand because it provides the basis for their undergraduate programme, and as the framework has been finalised, both schools have engaged in concurrent reviews of their own curricula. Schools of physiotherapy have a dual role in meeting the minimum requirements for registration set down by the Board whilst also

offering undergraduates a rounded academic experience. They must prepare students for professional life and, to some extent, predict the needs of the health workforce in the future. How successfully they are able to achieve this, depends in part on the guidance provided by critical documents such as the competency framework. This paper presents the findings of a study that evaluated the intersection between the Board's competency framework, and the literature emerging concerning the future roles for health professionals in developed countries. We will show that there are some significant discrepancies between the way future health care is being imagined, and the competency framework promoted by the Board, and argue that these have important implications for the physiotherapy profession in New Zealand.

"How active are you?"

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Encouraging activity is a national and international health priority due to the strong relationship between activity and health. However, use of instruments which accurately determine activity and improvement from activity enhancing rehabilitation is not yet in common practice. This study investigated the validity of three activity questionnaires and participant preference for each questionnaire compared to the RT3. A convenience cohort (six males, five females) aged between 20 and 50 and with varying activity levels were recruited from the Wellington region. A triaxial RT3 accelerometer was worn for seven days over the right hip. Total weekly RT3 counts were compared to the Seven Day Activity Recall (7DRQ), the International Physical Activity Questionnaire (IPAQ) and the Occupational Physical Activity Questionnaire (OPAQ). A separate questionnaire explored utility. The 7DRQ demonstrated the best association with the RT3 $r = 0.44$ ($p > 0.05$), followed by the OPAQ $r = -0.13$ ($p > 0.05$) and IPAQ $r = 0.11$ ($p > 0.05$). Participants preferred the self-administered IPAQ (55%). The 7DRQ was thought to interpret intensity (82%), frequency (55%), and duration (73%) of activity better, but took 15 minutes to complete. No published studies have investigated the concurrent validity of these questionnaires to the RT3 previously. Activity is an important outcome and physiotherapists should evaluate activity objectively however further research is required before specific recommendations can be made. The population under investigation may influence choice and validity of questionnaire. The 7DRQ demonstrates the best association to the RT3 and was considered better at reflecting frequency, intensity and duration of weekly activity.

Training spinal stability in neutral spine vs neutral zone — is there a difference?

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Exercising specific stability musculature with a "neutral spine" became popular in the 1990s with subsequent research identifying that specific exercises can lead to effective management of low back pain. The concept of "neutral zone" was initially proposed by Panjabi using the ball-in-a-bowl analogy, with movement controlled by muscle activity in a pain free zone either side of a central/neutral position. Recent research on directionally "matched" vs "unmatched" exercise programmes may provide us with more options to improve the "specifics" of stability exercise programmes. Managing patients homogeneously with a "neutral spine" exercise protocol is unsupported on current evidence as they are a heterogeneous group. Literature comparing the effect of directionally specific exercise programs with non-directionally specific "neutral spine"- type exercises has shown significant improvements in those patients exercising in one preferred direction within a "directional zone" when compared with those exercising in a "neutral spine" or moving in multiple or non-preferred directions. This author proposes that the neutral zone, ball-in-a-bowl model could encompass these recent findings and be extended to include all directions 3-dimensionally around the central point, rather than Panjabi's 2-dimensional flexion / extension model. From there exercises can be prescribed toward the direction of the deficit.

The use of normal saline installation in the intensive care unit by physiotherapists. A review of practice in New Zealand.

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Normal saline installation is used by health professionals during the treatment of intubated patients within the intensive care unit, usually to enhance sputum yield. Its use is controversial; detrimental effects have been documented and evidence of any benefit is limited. Studies have suggested routine use be discontinued. The aim of this study was to investigate the use of normal saline installation in the intensive care unit by physiotherapists throughout New Zealand. A purpose designed postal survey was administered to the senior physiotherapist in all intensive care units in New Zealand ($n = 25$). A response rate of 76% ($n = 19$) was obtained. Installation of normal saline was reported as being practised in 78.9% ($n = 15$) of hospitals, however physiotherapists reported being involved in this practise in only 52.6% ($n = 10$) of cases. Of the respondents who reported never using normal saline installation (47.4%, $n = 9$) the majority of these based this on a lack of supporting evidence (36.8%, $n = 7$). Whilst most respondents reported having the autonomy to use normal saline installation with their patients, three respondents (15.8%) reported requiring permission from an intensivist before use. A written protocol for use of normal saline installation was rare with only 15.8% ($n = 3$) of respondents reporting using these. Techniques used for administering normal saline were ascertained. Despite a lack of supporting evidence of any benefit, normal saline installation continues to be widely practised in intubated patients in the intensive care unit in New Zealand.

The use of manual and ventilator hyperinflation by physiotherapists in New Zealand intensive care units.

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Manual hyperinflation (MHI) and ventilator hyperinflation (VHI) are techniques performed by physiotherapists in intubated, ventilated patients which deliver larger than baseline volume breaths to enhance secretion removal, improve oxygenation and re-expand atelectatic lung tissue. Studies have demonstrated these techniques to be widely used by physiotherapists in other countries. This study aimed to determine current practice of MHI and VHI by physiotherapists in New Zealand, investigating differences in the use of these techniques both nationally and internationally. A purpose-designed postal survey was distributed to the senior physiotherapist of each intensive care unit throughout New Zealand ($n = 25$). The response rate was 76% ($n = 19$). Twelve (63.2%) respondents reported using MHI, with only one (5.3%) respondent using VHI. The specific techniques and dosages used in applying MHI varied widely amongst respondents as did the equipment used to implement the technique. In those respondents using MHI, the incorporation of recommended safety equipment varied, with six (50%) respondents reporting never including airway pressure manometry. The majority of respondents using MHI always included a positive end expiratory pressure valve in the circuit ($n = 8$, 66.7%) and used 100% oxygen whilst undertaking the procedure ($n = 7$, 58.3%). Availability of equipment was the key factor in determining the specific methods used in delivering MHI. This survey has highlighted differences between New Zealand physiotherapists in the administration of MHI. It has also shown differences from those practices and recommendations emerging from overseas. Reasons for these differences should be further investigated.

An audit of current physiotherapy management and patient outcomes in one thoracic surgical unit.

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Limited data are published which consider the physiotherapy management of patients undergoing thoracic surgery. This study prospectively audited patients undergoing open thoracic surgery in one surgical unit, investigating physiotherapy management,

postoperative pulmonary complication rate and length of postoperative stay. Fifty four patients with a mean age of 61.9 years (SD 12.9, range 18-85 years) were studied. The majority of patients underwent lung resection (n = 45, 81.8%). No patient received preoperative physiotherapy. The mean physiotherapy time spent with patients postoperatively in total was 12.6 units (SD 7.1, range 4-39 units), with each unit representing a 15 minute time period. On postoperative day one the majority of patients used forced expiratory manoeuvres (n = 41, 74.5%) with lung expansion manoeuvres used in 25 (45.5%) patients. Ten (18.5%) patients developed a postoperative pulmonary complication. Six (10.9%) patients received early ambulation only and none of these developed a postoperative pulmonary complication. The median (IQR) postoperative length of stay was 7 (3) days. Twenty one (38.2%) patients had a length of stay over nine days. Most common reasons for an increased postoperative length of stay were persistent air leak from the chest drains (n = 9, 16.7%) and respiratory complications (n = 4, 7.3%). The median (IQR) length of postoperative stay in patients developing a pulmonary complication was 10 (2.3) days which was significantly higher than those not developing a pulmonary complication (p = 0.003). Despite limited supporting evidence, this patient group utilizes considerable physiotherapy resources. Future studies should consider the efficacy of these interventions.

The effects of a 6 week stretching intervention on range of motion, torque and stiffness in people with osteoarthritis of the knee

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Osteoarthritis (OA) leads to a loss of knee range of motion (ROM) due to pain and swelling. Stretching to improve knee ROM has been included as part of the management, but few studies have looked at the effects of periodic stretching interventions in isolation. A randomised control trial design was undertaken with forty two (21 OA and 21 non OA) subjects recruited from the local population. Subjects were randomly allocated by condition to a stretch or control group. Hamstring flexibility was assessed using a Kincom isokinetic dynamometer following the 6 week intervention. Subjects in the intervention groups stretched the main lower limb muscles 2 x 60 secs, 5 days a week for 6 weeks. The control groups did not stretch. The variables of interests were maximal knee extension, peak torque and stiffness. The Western Ontario and McMaster University (WOMAC) Osteoarthritis Index and the Lower Limb Task Questionnaire (LLTQ) were also used to assess functional change. The results showed no significant difference between the OA and Non OA subjects however there was a significant interaction for group (stretch and control) by time, for knee extension ROM, peak torque and stiffness. There was no significant difference for group or time for the WOMAC or LLTQ scores. The study demonstrated that knee extension ROM, torque and stiffness can increase with a 6 week stretching programme. These changes are similar for OA and non OA subjects.

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Swelling in the knee joint: The effect of cryotherapy on arthrogenic muscle inhibition of the quadriceps.

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Following knee injury, patients are often unable to fully activate their quadriceps muscles. This neurogenic, inhibitory response occurs despite full structural integrity of the muscles and is termed arthrogenic muscle inhibition (AMI). As well as inducing quadriceps muscle atrophy and weakness, AMI may prevent the active strengthening of weakened quadriceps muscles, thereby delaying effective rehabilitation and predisposing the knee to further damage. The purpose of this study was to examine the efficacy of cryotherapy in temporarily reducing AMI. Sixteen subjects without knee pathology participated, and were randomly assigned to an experimental (n=8) or control (n=8) group. All

subjects received an experimental joint infusion, whereby saline and dextrose was injected into the knee until intra-articular pressure reached 50mmHg. Maximum voluntary quadriceps torque, muscle fibre conduction velocity (MFCV) and root mean square (RMS) of electromyographic signals from vastus medialis declined significantly following joint infusion (p < 0.05). The experimental group then had cryotherapy applied to the knee joint for 20 minutes while the control group did not receive an intervention but remained seated for an identical period of time. Cryotherapy led to a significant increase in quadriceps torque and MFCV compared to control subjects (p < 0.05). There was a trend for RMS to increase more in the cryotherapy group relative to the control group but this did not reach significance (p = 0.09). The study demonstrated that cryotherapy is effective in temporarily reducing AMI. This has important clinical ramifications as it may allow earlier and more effective quadriceps strengthening to take place after knee injury.

Reflex connections of the infraspinatus muscle in healthy humans

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Dysfunction of infraspinatus may contribute to musculoskeletal and neurological shoulder pain, however, there is little understanding of the neural mechanisms controlling infraspinatus. With ethical approval and informed consent, experiments were performed using 17 healthy subjects. Surface EMG recorded infraspinatus H reflexes, which were elicited by electrical stimulation of the suprascapular nerve in the suprascapular fossa. The reflexes were evoked at rest and during a weak voluntary contraction of infraspinatus. In addition, heteronymous reflexes of infraspinatus were investigated by stimulating the ulnar, median and radial nerves at the elbow. These heteronymous reflexes were evoked during a weak voluntary contraction of infraspinatus. EMG was rectified, averaged and the latency of any reflex evoked measured from the first clear deflection from baseline. An H-reflex was elicited in infraspinatus at 8.3ms ± 0.9ms (n=14). The H-reflex amplitude increased (p=0.012) and latency decreased (p=0.003) with homologous muscle contraction. Surprisingly, a contralateral, facilitatory reflex was also evoked at 12.8ms ± 2.4ms (n=8/14) along with an inhibition (43ms ± 7.3ms; n=9/14). Heteronymous facilitatory reflexes were evoked following stimulation of the ulna nerve (40.6ms ± 9.9ms; n=8/17), median nerve (40.0ms ± 5.2ms; n = 4/10) and radial nerve (14.2ms ± 2.0 ms (n=8/16) and 37.9ms ± 5.2ms (n=9/16)). The long latency reflexes may be transcortically mediated however, radial nerve stimulation also evoked a group I monosynaptic response. Understanding these previously unknown neural connections will underpin future work exploring altered reflex mechanisms in people with shoulder dysfunctions.

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The development of normative data for three measures of motor performance used in the identification of sport related concussion

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Physiotherapists working with athletes who suffer concussion have little in the way of objective diagnostic tests to assist them in making a decision as to whether to withdraw a player from sports participation. Reported physical signs of concussion include impaired coordination, unsteady gait, and poor balance and these markers are qualitatively employed in

current concussion assessment tools. In order to determine the value of motor performance tasks in identifying a concussion, objective measures are required. One hundred and seventy-two young physically active males and females were recruited into a descriptive prospective cross-sectional study in order to develop normative values for four timed motor performance tasks: Finger to Nose (FTN), Tandem Gait (TG), and Single Leg Stance (SLS) on both a firm and foam surface. The results of this study developed normative mean and standard deviation (SD) values in seconds for: a return 3 metre TG, 11.41 (2.36). Five repetitions of FTN for the left arm, 3.08 (0.49) and the right arm, 2.95 (0.45). SLS on foam for the left leg, 3.69 (2.81) and the right, 3.80 (SD 2.74). SLS on a firm surface for the left leg was 34.53 (46.18) and the right, 35.04 (56.84). The results demonstrate a sex effect for FTN and evidence of learning effects for all tests. The establishment of normative data on common motor performance tasks, while understanding the limitations of each test, will provide physiotherapists with a frame of reference with which to interpret clinical measures obtained from athletes suspected of having been concussed.

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The relationship between fatigue and depression in people with Multiple Sclerosis

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People with multiple sclerosis (MS) frequently report feelings of fatigue and depression, which may have a significant impact on their ability to participate in physiotherapy interventions. However the relationship between fatigue and depression in people with MS is unclear. The purpose of this narrative review was to consider the relationship between fatigue and depression in people with MS, and the clinical implications of these findings for physiotherapists. An electronic search of the Ovid, EBSCO and CINAHL databases was conducted using keywords. Six studies were identified which investigated the relationship between fatigue and depression in people diagnosed with MS. The main findings of the studies reviewed suggest that fatigue and depression are independent symptoms in people with MS. However, the incidence of depression significantly correlates with the incidence of fatigue. It was also identified that the higher levels of depression significantly correlates with a higher level of fatigue. The cause of the relationship remains unclear, however it is possible that each symptom amplifies the other or that fatigue is a symptom of depression. A number of pathophysiological causes have been hypothesised including; alterations in the immune systems' response and, local demyelination and axonal damage in specific areas of the central nervous system. Consideration for physiotherapy management includes the identification of depression and fatigue in people with MS and strategies to address these symptoms such as aerobic exercise programmes.

The relationship between voluntary activation, strength and physical function in people with stroke.

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Central nervous system changes are frequently cited as the primary cause of strength deficits in people following stroke, and by implication, a significant contributor to limitations in function. However this concept has received limited investigation. The aim of this study was to investigate the relationship between voluntary activation (the extent to which the nervous system is driving the muscle at the time of muscle contraction), strength and physical function in people with stroke. 15 people with chronic stroke who had mild to moderate physical disability volunteered to participate. Physical function was evaluated using the 30s Chair Stand Test, Comfortable Paced and Fast Paced Walking Speed. Neuromuscular function of the quadriceps was measured using maximal voluntary isometric contraction force (MVC) and voluntary activation. Statistical analysis revealed a large, significant relationship between voluntary activation and

MVC, indicating that high levels of voluntary activation were associated with high levels of strength. This finding supports the theory that muscle weakness following stroke is related to central nervous system changes. MVC was strongly correlated with walking speed; however, there were no statistically significant correlations between voluntary activation and any of the measures of physical function. Therefore, despite a strong relationship between voluntary activation and muscle strength, and a strong relationship between muscle strength and physical function following stroke, there does not appear to be a relationship between the level of voluntary activation and physical function. This may reflect the need to reach an absolute level of force generation to achieve a given level of function.

Identification of problems in functioning related to spinal cord injury from the individuals' perspective: an international focus group study – the New Zealand perspective

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The objective of this qualitative study was to explore the aspects of functioning and health relevant to individuals with spinal cord injury (SCI) using the focus group technique. The specific aim within the project 'International Classification of Functioning, Disability and Health (ICF) Core Sets development for SCI' is to identify candidate categories for the ICF Core Sets for SCI for the early post-acute situation and the ICF core set for chronic SCI, respectively. We used six open-ended questions asking for the problems of individuals on body functions and body structures, activities and participation. In addition, the individuals were asked about environmental factors and personal factors affecting their every-day life. The focus groups were digitally recorded and transcribed verbatim. The meaning condensation procedure was used to identify the meaningful concepts contained in the focus groups. In a next step, the meaningful concepts were linked to categories of the World Health Organisation's ICF taxonomy according to established linking rules. Final results from the New Zealand focus group enquiry will be presented in relation to the available results from the three other study designs used for the development of the ICF core set for SCI. Focus groups are a useful method to identify relevant aspects of functioning and health from the individuals' perspective. This study is a first step towards the development of ICF Core Sets for individuals with SCI to guide clinical practice, research and health policy. The data challenges health professionals' assumptions about how persons with SCI might view functioning and health.

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How does the experience of fatigue in people with Multiple Sclerosis change during an eight week exercise programme?

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This study explored changes in perceived fatigue in people with multiple sclerosis (MS) during an eight week exercise programme. Ten individuals with relapsing/remitting MS participated three

times a week in an eight week duration exercise programme at a physiotherapy-based gymnasium. Participants were interviewed at three sequential points; prior to, at four weeks, and on completion, of the exercise programme. *Interviews were audio-taped, transcribed and analysed using interpretive description, a qualitative methodology.* The data analysis identified five interrelated categories. It appeared that exercise outcomes were related to the participant's level of perceived control over fatigue. Participants with a high level of perceived control used the strategy of "listening to your body" which in turn helped to define "the edge" a point during exercise which determined progression into contrasting "states of tiredness": A "healthy tiredness" led to perceived physical improvements and positive feelings whereas an "unhealthy tiredness" led to perceived physical deterioration and negative feelings. Participants with a low level of perceived control over fatigue appeared unable to utilise the strategy of "listening to your body" and were therefore unable to recognise "the edge". These participants were more likely to experience negative perceived outcomes following exercise. Healthcare professionals, including physiotherapists, need to be cognisant of strategies which promote the benefits of general exercise in order to minimise negative perceived effects of exercise related fatigue in people with MS.

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Neuromuscular control during transition from double- to single-leg stance in athletes with hamstring injuries

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The aim of this research was to investigate whether variations in neuromuscular control, as recorded by surface electromyography (EMG) of thigh and gluteal muscles, differentiated 16 hamstring-injured athletes from 18 uninjured controls during a transition from double- to single-leg stance (contralateral hip flexion). Surface EMG activity was recorded from the gluteus maximus, gluteus medius, biceps femoris (BF), medial hamstring (MH), vastii lateralis (VL) and medialis, and rectus femoris muscles of the weight-bearing limb during this task. Muscle onsets, expressed relative to the start of movement as determined by force platform data and normalised EMG amplitudes during 500 ms of transition were compared between sides and between groups. There were no significant differences between sides for EMG onsets and amplitudes within both groups. The onsets of BF and MH of the hamstring-injured ($P < 0.001$) and uninjured limbs ($P < 0.05$) occurred earlier in comparison to the control group bilateral average. Transition EMG amplitudes of the BF, MH and VL of the hamstring-injured limbs were greater than the bilateral average of the control group ($P < 0.05$). No other significant between-group differences were detected. The earlier onset of the hamstring muscles in preparation for single leg stance of the injured and uninjured limbs, and the higher normalised EMG amplitudes of the hamstrings and the VL of the injured limbs in comparison to the control group bilateral averages suggest alterations in the neuromuscular control of these muscles. This factor may need to be considered when designing strategies for prevention and rehabilitation of hamstring injuries.

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EMG-triggered neuromuscular electrical stimulation enhances corticospinal excitability

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Weakness in the hand and finger extensor muscles is a common residual disability following stroke. Neuromuscular electrical stimulation (NMES) of the extensors is often employed as a treatment intervention and has been demonstrated to enhance muscle activity, force production and motor control. The goal of

the current study was to investigate changes in neural pathway excitability induced by NMES over the extensor carpi radialis muscle. We examined two variations of NMES as well as active muscle contraction. Transcranial magnetic stimulation was used to measure corticospinal excitability in 15 healthy subjects following a 12-minute intervention period. Each subject attended three separate sessions in which one of three interventions was employed: passive NMES, EMG-triggered NMES, or active wrist extension. All of the interventions involved alternating periods of five seconds of stimulation/activation followed by five seconds of rest. Measures of corticospinal excitability were obtained prior to the intervention and at 0, 5, and 10 minutes following the intervention. There was no significant change in motor evoked potential (MEP) amplitude following passive NMES. Immediately following the EMG-triggered intervention and active muscle contraction, the MEP amplitude was significantly larger than baseline values. This returned to baseline at 5 and 10 minutes. These results indicate that, in healthy subjects, corticospinal excitability is enhanced immediately following EMG-triggered NMES and active muscle contraction, but not after passive NMES. EMG-triggered NMES may be a more effective intervention for facilitating muscle activation in people with extensor weakness following stroke compared to passive NMES.

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Neuro Skills Online: The development of a multimedia resource to enhance student learning

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The purpose of this presentation is to highlight recent advances in teaching practice at AUT University and to seek feedback from clinicians. Neuro Skills Online is a comprehensive multimedia resource currently being developed at AUT University as part of the undergraduate neurological physiotherapy curriculum. The purpose of this project is to enhance the learning of neurological physiotherapy clinical assessment and reasoning skills, and to reinforce and support the transfer of these skills into clinical practice. These core clinical skills are currently taught in lectures and practical tutorials in the second year of the undergraduate programme. The aim is to provide an adjunct to this teaching which is both flexible and contextually relevant. Neuro Skills Online includes video footage of physiotherapists performing specific aspects of the physiotherapy assessment process with patients who have neurological impairments. The video footage includes written cues, questions and 3-D movement analysis files, along with linked quizzes, research articles and other media resources. This provides a tool for authentic learning in a paper where the students would otherwise only practice techniques on one-another and try and 'mimic' how a patient would respond. Neuro Skills Online is available via AUT University's internet based learning resource, AUTonline, to second, third and fourth year physiotherapy students. In addition, it will be available to physiotherapy clinical educators. This will enable the clinical educators to reinforce and expand student learning, enhancing the continuity between the university setting and clinical practice.

Chronic fatigue syndrome: a possible role of mechanical treatment? A case study

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A patient with a 6 year history of chronic fatigue syndrome was treated by a thoracic rotational movement which effected an instant and major improvement in symptoms. It is argued that dysautonomia, which is defined as a change in the autonomic nervous system function that adversely affects health, was the major factor behind this patient's condition. We propose that dysautonomia is a primary presentation of chronic fatigue syndrome (CFS), fibromyalgia syndrome (FMS) and joint hypermobility syndrome (JHS). Because of their similarities it is suggested that there may be a subgroup of CFS and FMS patients who are also hypermobile. The patient, who met the

criteria for JHS, had been involved in a previous injury involving a rotational force. And so it is believed that due to this previous injury, which was enhanced by joint hypermobility syndrome, the sympathetic nervous system tissues were traumatised and resulted in dysautonomia. By finding a directional preference physiotherapy may be able to influence the autonomic nervous system symptoms associated with these conditions. This would suggest a potential role for physiotherapy in the treatment of these prevalent and intractable conditions, and highlights the importance of further research in this area.

The effect of penetrating trunk trauma on the recovery of adult survivors.

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Penetrating trunk injuries are often seen in South African hospitals. Patients are managed in the intensive care unit (ICU). Mechanical ventilation (MV) and immobilization result in muscle dysfunction. Do survivors of penetrating trunk trauma adequately recover spontaneously following critical illness? A prospective, observational study was conducted. Patients were recruited from four ICUs. Dynamometry, six minute walk distance (6MWD) and oxygen uptake tests were performed over six months after discharge with Group 1 (MV < 5 days; n = 13) and Group 2 (MV ≥ 5 days; n = 29). These results were compared to that of a healthy control group (n = 40). 6MWD was reduced for Group 2 subjects compared to controls [one-month (p = 0.00), three-months (p = 0.00)]. Morbidity correlated with distance walked by Group 2 subjects [three-months (p = 0.03), six-months (p = 0.02)]. No differences were found between groups during the $\dot{V}O_{2peak}$ test. At one-month there was a reduction in strength for subjects in Group 2 compared to Group 1 and controls (p = 0.00 - 0.04). Similar results were detected at three- and six months. ICU and hospital LOS correlated with muscle strength at one and three months for Group 2 subjects. Group 1 subjects had a reduction in strength compared to controls (one-month p = 0.00). No differences in strength were detected between these groups at three or six months. Group 1 subjects recovered adequately spontaneously within three months with regard to muscle strength and exercise capacity. A physiotherapist-led rehabilitation programme may be indicated for Group 2 subjects to address the physical disabilities observed.

Moving ahead with a career in health: navigating the educational 'pipeline' with a culturally responsive health workforce development initiative.

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Increasing an appropriately qualified physiotherapy workforce that is ethnically diverse will rely upon promoting physiotherapy careers to secondary school students, increasing the pool of rangatahi eligible to enter physiotherapy programmes, supporting them through to completion, and successful transition into the physiotherapy workforce. A Maori health workforce development initiative has been developed and piloted in the Auckland region. The Rangatahi Programme, based on a health workforce best practice model, aims to increase the pool of rangatahi Maori suitably qualified and interested in being a health professional, mentor and support them from secondary school, through tertiary education, and into employment. It is a community-driven mentoring and transitional programme that has been developed in partnership with Auckland DHB. The Programme provides interventions at critical points at which rangatahi fail to progress along the educational 'pipeline'. The nine month pilot programme has already had notable success with 14 rangatahi pursuing health-related opportunities, and seven students enrolled in tertiary health programmes, and more enrolling in 2009. Successful health workforce development programmes are known to require a coordinated, intersectoral approach. There is

an opportunity for the physiotherapy profession to link in with this workforce development initiative to promote physiotherapy careers. This presentation explores the development of the Rangatahi Programme and the concept of culture in relation to facilitating teaching and learning theory, and its integration in career decision-making.

POSTER PRESENTATIONS

The physical attributes of elite female rowers and rowing tasks.

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In rowers, the high incidence of rib-stress fractures have been attributed to the highly repetitive movement patterns involving the thorax. However the possible influence of the different rowing styles on thoracic function has not been fully explored. The aim of this study was to examine the physical attributes of thoracic function in female rowers grouped according to their predominant rowing task. The study comprised elite female rowers (n=28), mean age 18.89(±1.31) years. Measurements of flexibility (cm), thoracic cage mobility (cm), respiratory function (peak expiratory flow rate, forced vital capacity, and forced expiratory volume in the first second of expiration) and spinal frontal plane mobility (cm) were gathered from each participant prior to the commencement of a training session on the water. Data were then grouped according to the participants' respective rowing styles: bilateral sculling, left or right sweep rowing. Descriptive statistics, student t-tests and Pearson's correlation tests were used to examine the data between and within these three groups. Mean thoracic cage mobility in the bilateral sculling group was significantly greater than that of the right sweep rowing group (p<0.05). No significant differences or correlations were found between the three groups in terms of anthropometric measures, spinal frontal plane mobility, flexibility or respiratory function. Although there was no reported incidence of rib fractures within this study cohort the observation that there were differences in the thoracic cage mobility of participants grouped according to rowing style may be relevant when considering the predisposing factors of rib-stress fractures in these athletes.

Clinical reliability and utility of an RT3 activity monitor in the measurement of free living physical activity

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Activity monitoring is being increasingly utilised as a measure of health outcome. We investigated the reliability and utility of the RT3 accelerometer as a measure of free living activity within a healthy population. Twenty one adults wore the RT3 activity monitor for 7 days, on three separate occasions over eight weeks. An activity diary and seven day recall questionnaire were also used to monitor free living activity levels. A utility questionnaire documented participant's perception of the RT3 monitor. Twenty one days of data were analysed to determine mean daily and weekly RT3 activity counts. High daily (ICC = 0.83) and moderate weekly correlations (ICC = 0.74) were demonstrated over the three recorded weeks. Within subject variance accounted for 50% of the weekly and 80% of daily activity variance: the RT3 monitor accounted for 4% of the daily and 15% of the weekly variance. The amount of time the monitor was not worn increased from 41 hours in the first week to 135 hours in the third week of monitoring. The most common reasons cited for not wearing the monitor were forgetting to wear it and discomfort: data was also lost due to technical failure of the monitor. The majority of participants reported that it was relatively easy to remember to wear the RT3 and did not interfere with their daily activities. The RT3 monitor showed good repeat reliability and acceptable

utility in this population. It is important to recognise the contributing factors to reliability of activity measurement in specific populations.

The influence of chair backrest inclination and lumbar support on resting head and neck posture in sitting.

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Forward head posture has been identified as a risk factor for neck pain with some evidence to show that attention to postural correction may reduce its incidence. The purpose of this study was to investigate the possible influence of positional adjustments to the standard office chair and use of lumbar support on the resting head and neck posture in the sagittal plane, as defined by the craniovertebral (CV) angle. Thirty healthy male participants aged between 18-30 years were photographed whilst registered in the natural head resting position in four different sitting positions, with and without a McKenzie lumbar roll. The CV angles were measured using software taken from digitized photographs of the eight postural registrations for each participant. Comparisons between all positions were analyzed using a linear mixed model and adjusted for multiple comparisons, with a significance level of $p < 0.05$. It was found that the most significant effect on the head and neck position with the lumbar roll *in situ* was in the backrest 110° position (2.32°, 95% confidence interval 1.31, 3.33; $p < 0.001$). Despite the clinical impression that use of a lumbar roll in sitting promotes a more retracted head position, this may not necessarily be the case, at least in young healthy males. Rather, the backrest position of the chair may be the more important factor influencing sagittal alignment of head and neck posture. These results highlight to the physiotherapist the need for consideration of the inherent chair adjustments before utilizing ancillary lumbar support when providing postural advice.

Effects of manual physical therapy and exercise in hallux valgus: a single subject design

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Hallux valgus (HV) is a common foot problem linked to functional deficits in the elderly. This study will assess the outcome of manual physical therapy (MPT) and exercise therapy for the treatment of HV. A single subject meeting the diagnostic criteria for HV. This was a single subject (A-B-A) design, assessed over an eight week period. Baseline data (A) were compared to the six week intervention phase (B) and final data (A). Outcome measures included the Numeric Pain Rating Scale, Patient Specific Functional Scale (PSFS) and the Foot and Ankle Ability Measure (FAAM). Changes between sessions were measured with the Global Rating of Change and clinical measures. Treatment was at the therapist's discretion and included MPT and exercise to the joints of the hallux, foot, and ankle. The patient experienced a statistically and clinically significant improvement in FAAM activities of daily living (ADL) subscale. The PSFS scores met the minimum clinically important difference (MCID) yet did not demonstrate a trend throughout treatment. Other assessment variables, but not all, showed non-significant trends of improvement, including: navicular drop height, 1st metatarsal phalangeal extension, and functional squat. The improvements observed are most likely attributable to the treatment effect for the involved lower extremity, however controlled trials are needed. Despite finding no statistically significant difference in the PSFS score, the subject achieved a MCID in the average score of the PSFS. In conclusion MPT and exercise may be effective for the treatment of HV.

The effect of arm load on global and segmental angles of the thoracic spine measured in different postures

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The thoracic spine curvature has a natural tendency to adopt a kyphotic curvature due to the anterior location of the line of gravity and there have been few investigations into the effect of load on thoracic spinal curvature in different postures. Thus the purpose of the study was to investigate the effect of load on global and segmental angles of the thoracic spine in different postures using the SpinalMouse®, a hand-held electronic non-invasive measuring instrument that provides reliable data for global and segmental ranges of movement in the spine. Ten male and 17 female volunteers without spinal pathology (mean age 23.39 ± 2.87y) took part in the study. Range of motion of thoracic spine without arm load was recorded using the SpinalMouse® device placed on the skin surface of the spine, and repeated with arm loads of 0.8kg (empty box) and 5.0kg (full box) in upright, flexion and extension postures. Measurements were repeated in random order with knees bent. Results showed there were no significant differences in global or segmental thoracic angles in standing, flexion or extension postures with or without arm loads for males. For females, the thoracic global angle in full flexion with knees bent and 5kg load was significantly greater ($p < 0.001$) than the angle without load and with knees bent. We conclude that the significant difference found in the flexion position for females carrying a 5kg arm load suggests that this is an important factor to be considered in an education session involving lifting activities.

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Fear factor: respiratory physiotherapy in neonates: Have we thrown out the baby with the bath water?

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The evidence for respiratory physiotherapy in adults has been well documented in patients with both acute and chronic conditions. Within paediatrics, and specifically neonates, the practice of respiratory physiotherapy has been more challenging. Over the last two decades, there has been much controversy over the effects and 'side-effects' of respiratory physiotherapy in the neonates. Since then, respiratory physiotherapy has been feared and mostly avoided in neonatal units. But, have we thrown out the baby with the bath water? This poster reflects the oral presentation given at the National Neonatal Conference in Auckland in September 2007. It shows an overview of the history of respiratory physiotherapy in neonates, highlights what we have learned from the past and presents current evidence for respiratory physiotherapy and adjuncts to physiotherapy in neonates. To conclude, recommendations to implement international standards of best practice as a multidisciplinary neonatal team are given with the aim to optimise outcomes and development of the (premature) baby. These include the deletion of routine "prophylactic" post-extubation chest physiotherapy (CPT), the requirement of individual thorough assessments, essential accurate documentation, the need to support baby's head during CPT and continuous monitoring during CPT.