This study was undertaken to provide data on the range and quality of movement performances in normal four, five and six year olds, when asked to demonstrate a simple lumbrical pattern of MCP flexion and IP extension in combination with wrist extension. The study also evaluated the ability to isolate individual movements of the thumb, third and fifth digits against the stable background posture. Lumbrical control appears poorly developed at four years, but improves from four to six years of age. The ability to isolate individual finger movements from the basic resting position improved across the three age levels. The results of this study revealed little difference between the performances of boys and girls, or between performances with either hand.
Keywords: child development; hand; motor skills; muscles.

This study evaluated the repeatability of three fine motor tasks in normal children aged nine years. Using set procedures and well defined scoring categories, finger drumming, sequential finger/thumb opposition and finger tapping were shown to be repeatable quantitatively and qualitatively. Children demonstrated a preferred or easy direction of movement for drumming and for opposition, which much be considered when assessing hand function. Drumming and finger tapping (but not opposition) showed differences between hands, and movement in the easy direction was better than that in the difficult direction for drumming and opposition. This study has provided repeatability information for three tests, as well as baseline data against which children with motor impairment can be evaluated.
Keywords: child development; hand; motor skills.

Skier's thumb is defined as an acute injury to the ulnar collateral ligament of the metacarpophalangeal joint of the thumb. This review details the history, aetiology, epidemiology, anatomy, diagnosis, surgical and conservative treatment regimens, rehabilitation and current advances in the prevention of skier's thumb. It emphasises the importance of accurate diagnosis of skier's thumb, and appropriate referral of grade three ruptures for surgery. the need for research by physiotherapists which examines this common soft tissue injury is highlighted throughout the review.
Keywords: ligaments; metacarpophalangeal joint; skiing; thumb.

Twisting injuries to the wrist under load may damage the major retaining ligaments in the ulnar carpal region and result in ulnar carpal instability. This presentation reviews the anatomical structures involved in ulnar carpal instability and outlines its clinical classifications. Severe cases require surgical management but less severe cases may be successfully managed conservatively with a program of splinting and strengthening exercises. The conservative treatment is described and its application is presented in two case reports.
Keywords: exercise; hand; joint instability; splints; wrist; injuries.
Hand grip has usually been assessed in the clinic using dynamometers which record the maximum 
grip strength at the instant it is achieved. Provision is rarely made for assessing other grip 
parameters such as endurance, fatigue, rate of developing maximum grip strength or rate of relaxing 
the grip effort. Any or all of these parameters may be of more relevance to the assessment than 
strength alone, depending on the medical condition of the patient. The importance of deciding 
which parameter is to be tested, the method of assessment, the control of variables for repeatability 
and the necessity for recording the assessment procedure accurately are addressed with respect to 
their use in clinical practice and research.

Ten patients with proximal interphalangeal (PIP) joint flexion contracture were treated with 
dynamic Capener splintage. Analysis of the type of joint stiffness and the result of splintage was 
assessed with a torque range of motion (ROM) technique. the end range feel was classified as 
springy if the initial measurement or measurements at the two week mark had a range of 10 degrees 
or more between the 200g and 1000g readings. Average improvement after 16 weeks of splintage 
was 16 degrees passively and 15 degrees actively. In all cases, if the improvement gained in eight 
weeks was to be maintained, the splintage needed to be continued for a further four to eight weeks. 
there was no difference between the springy and non-springy joints. 
Keywords: contracture; hand; joints; splints.

Physiotherapy 41:55-56.
Ocular and visual signs and symptoms have been reported to have been associated with whiplash, 
but there has been no scientific study which has investigated these anecdotal reports. this study 
investigated several aspects of the ocular function of whiplash victims, non-specific injured neck 
subjects and a control group. Results indicated that visual accommodation (focusing), visual 
convergence and aspects of pupil function were significantly affected in the whiplash subjects only. 
Keywords: neck; vision; vision disorders; whiplash; injuries.

strength in the anterior cruciate reconstructed knee. Australian Journal of Physiotherapy 41: 
83-88.
Truncated range average torque (TRAT), peak torque (PT) and angle of peak torque (APT) in the 
knee extensor musculature of subjects with patellar tendon autograft ACL reconstructions were 
compared with non-operated limbs two to four years following surgery. Twenty subjects were 
assessed using a Kin-Com 500H isokinetic dynamometer at three velocities for both concentric and 
eccentric muscle actions. Results of TRAT for knee extensor showed average concentric and 
eccentric deficits of 8.48 per cent and 6.73 per cent, respectively. Deficits in PT were 8.26 per cent 
concentrically and 7.96 per cent eccentrically. There was no difference in the APT for each action 
or velocity. Despite an accelerated rehabilitation program, significant residual deficits were evident. 
Continued strengthening of the knee extensor muscles is recommended. 
Keywords: Knee; Orthopedics; Rehabilitation; Surgery

Ng GY and Walter KS (1995): Ageing does not affect flexion relaxation of erector spinae. 
Erector spinae (ES) activity during trunk flexion in 22 young (20-25 years) and 16 older (60-92 years) normal females was examined with surface EMG. The trunk movements and simultaneous EMG oscillograph of ES were recorded with two synchronised video cameras. The ES relaxed at the critical position (CP) which was 67 and 82 per cent of full trunk flexion for young and older subjects respectively. The vertebral movements to the CP were not different between groups, but the older subjects demonstrated more hip movement to the CP and less full trunk flexion range. The implications of these age related changes in trunk kinematics are yet to be developed with further clinical studies.

Keywords: Aging; Electromyography; Muscle Contraction; Spine


The effect of Screen Based Keyboard (SBK) operation on extensibility of the neural system was investigated using the radial nerve upper limb tension test (Butler 1991). Twenty-five female subjects (aged 17-55 years) including 15 SBK operators and 10 non-SBK operators who acted as a control were examined. Mean glenohumeral abduction in the upper limb tension test in the control group was 40 degrees. In the SBK operators, it was 27 degrees (right side) and 30 degrees (left side). Statistical analysis showed a significant difference between the groups. Results indicate that the normal mechanics of the neural system may be affected by SBK operation and that neural tension warrants consideration in the prevention and management of work related neck and upper limb disorders.

Keywords: Nervous System; Radial Nerve; Repetitive Strain Injury


Children with Minimal Cerebral Dysfunction (MCD) are a large client group for many paediatric physiotherapists. The increasing number of research papers published in the area of MCD are often complex and difficult to interpret because the children to whom they refer do not form an easily definable, homogeneous group and their prognosis is unclear. This review presents a summary of current findings about MCD and poses a number of questions about physiotherapy intervention. The need for physiotherapists to validate their role in the management of children with MCD is emphasised.

Keywords: Brain; Child Behaviour Disorders; Child Development Disorders; Pediatrics


Burnout has been shown to be present in experienced physiotherapists and other health professionals, but the prevalence in recently graduated physiotherapists has not been established. This study used the Maslach Burnout Inventory to determine the prevalence of burnout in physiotherapists working in South Australia who had been qualified for less than five years. Sixty per cent of subjects were found to have moderate to high levels of emotional exhaustion, the key characteristic of burnout. High or moderate depersonalisations were recorded by 44 per cent of subjects. These levels were higher than those found in experienced physiotherapists (Solowij 1992). Burnout is related to attrition from the profession, absenteeism and reduced quality of care for patients, as well as physical and psychological symptoms.

Keywords: Burnout, Professional; Emotions; Physical Therapy
An audit of 81 patients referred to hydrotherapy for low back pain was carried out over 12 months. The audit recorded response to hydrotherapy in terms of area of pain; intensity of pain; range of motion and ability to perform activities of daily living; treatment frequency and duration; and hydrotherapy program content. Results showed a highly significant beneficial response (t(67) = 9.2, p < 0.001). Changes to the hydrotherapy service resulting from the study include improved documentation; standardised assessment; re-worked hydrotherapy program; and regular assessment of patients within planned time-frames.
Keywords: Backache; Hydrotherapy; Lumbosacral Region; Quality Assurance, Health Care

One possible explanation for the poor reliability of clinical judgments of spinal stiffness is that humans do not possess a good ability to discriminate stiffness stimuli. This study sought to investigate this hypothesis by conducting stiffness discrimination tests on 72 subjects, using a mechanical device to provide the stiffness stimuli. The relative increment in stiffness needed so that two stimuli could be differentiated 75 per cent of the time was found to be 11 per cent when the pisiform grip was used to assess stiffness of stimuli in the range from 6 to 11 N/mm. Thus, by inference, other factors are more likely to be the cause of the poor reliability of clinical judgments of spinal stiffness.
Keywords: Differential Threshold; Palpation; Perception; Psychophysics

Real-time ultrasound imaging is currently used extensively in medicine. It provides a safe, cost-effective and readily accessible method of examination of various organs and tissues. Furthermore, real-time ultrasound imaging has the potential to be of considerable benefit in rehabilitation. Possible applications in physiotherapy practice and research relate to measurement of muscle size and observation and monitoring of muscle contraction while it actually occurs. This may be useful for muscle rehabilitation and reeducation, especially in the case of deep muscles, which are often difficult to assess.
Keywords: Muscles; Rehabilitation; Ultrasonography

The utility of functional electrical stimulation regimens depend on an understanding of movement strategies and muscle activation patterns. The purpose of this study was to describe the electromyographic (EMG) profiles of the lateral transfer in individuals with spinal cord injury. Two movement strategy groups were examined: translatory (n = 9) and rotatory (n = 4). Transfer event markers were identified from force platform data. EMG signal profiles (100ms Root Mean Square envelopes) of triceps and latissimus dorsi bilaterally were generated for each group. Rotatory movement strategy demonstrates greater muscle synchronisation than do individuals who translate. The results provide evidence of different phasic characteristics of muscle activity during the lateral transfer using two possible movement strategies. The implications for intervention regimens are discussed.
Keywords: Electric Stimulation; Electromyography; Movement; Spinal Cord Injuries
This study investigated parent satisfaction with the Minimal Motor Dysfunction Unit (MMDU), a service for clumsy children based in Adelaide. A questionnaire was developed and mailed to 102 parents whose children had attended the MMDU between 1991 and 1993. The response rate was 76 per cent.
The level of parent satisfaction with the overall MMDU service was 86 per cent. Parents rated the processes of service delivery and the resulting outcomes as more important to them than structural aspects of the service. Based on parent comments, recommendations were made to assist in further improving the quality of the MMDU service. Parent satisfaction should be investigated as an outcome measure for other paediatric physiotherapy services.
Keywords: Outcome Assessment (Health Care); Parents; Quality Assurance, Health Care

The effect of clinical experience on the accurate and reliable interpretation of auscultated lung sounds was examined by comparing 16 new graduates (Group A) with 16 experienced cardiopulmonary physiotherapists (Group B). Subjects listened to a tape comprising six different lung sounds, with each sound repeated three times in random order. Group B tended to be more accurate than Group A for five of the six sounds but the difference was significant only for the normal breath sound (c? = 6.72, p = 0.01). Intrarater reliability was poor; for any individual sound, a maximum of nine subjects recorded the same response on all three occasions. There were no significant intergroup differences in reliability. In conclusion, clinical experience had no significant effect on accuracy and reliability.
Keywords: Auscultation; Physical Therapy; Respiratory Sounds

Flexion relaxation of erector spinae (ES) has mainly been studied during slow trunk movements. Due to the viscoelastic properties of spinal ligaments, the ES activity may change at different movement speeds. Twentyone normal females (2025 years) were examined during slow, intermediate and natural speeds of trunk flexion. The movements and simultaneous ES surface EMG recordings were recorded by two synchronised video cameras. The ES relaxed at approximately 80 per cent of vertebral flexion at each speed, and no difference was found among the three speeds. This implies that either ES activity is independent of speed in the slow to natural functional speed range, or the flexion relaxation phenomenon is not related to changes in spinal ligamentous tension.
Keywords: Electromyography; Movement; Muscle Contraction; Spine

This article reports an investigation into the influences of gender, speed of motion and chronological age on the active movements of the lumbar spine. Data were collected from 100 ablebodied volunteers using an automated motion analysis system. Subjects performed movements at two selfselected speeds. Consistent patterns of motion coupling during the actions were detected
and no significant genderspecific difference were observed. With advancing age, significant reductions in the ranges of forward and side flexion, but not axial rotation, were found. Agerelated differences in the patterns of coupling between movements were also determined. The results of this study will provide therapists with data upon which to base judgements regarding movement restriction, particularly in older clients.

Keywords: Age Factors; Biomechanics; Lumbosacral Region; Movement


This study was designed to evaluate an established group exercise program at a large public hospital for subjects with osteoarthritis of the knee(s). Although quantitative gait analysis shows a clear difference between subjects with osteoarthritis of the knee(s) and asymptomatic controls, a significant effect of the group exercise program undertaken was not demonstrated, on either objectively measured gait parameters or subjectively reported pain and function. Possible reasons for this, together with an outline for a revised program and assessment procedure, are discussed.

Keywords: Exercise; Gait; Osteoarthritis; Outcome Assessment (Health Care)


The primary aim of this retrospective audit was to determine whether sitting balance ability at initial physiotherapy assessment post stroke could predict ambulation ability at discharge. Also considered were the side affected by the stroke, sensory loss, dysphasia, whether they affected outcome and whether ambulation ability determined social destination at discharge. Forty stroke patients were treated during the 12month study period. All patients received early physiotherapy treatment in the acute then rehabilitation wards. The average length of hospital stay was 47.7 SD ± 28.2 [SD] days. All patients achieved independent sitting balance at discharge, with a significant improvement (p < 0.001) from initial assessment. Twentyseven achieved independent ambulation by discharge. This was shown to have a significant (p < 0.001) relationship to early independent sitting balance but was not significantly related to side of stroke or sensory loss.

Keywords: Cerebrovascular Disorders; Gait; Outcome and Process Assessment (Health Care); Stroke


Excretion from both the bladder and the rectum depends upon the interaction of smooth and striated muscle. Pelvic floor muscle action differs in micturition and defaecation. Defaecation requires rectal support, anal outlet release and an effective expulsive effort. A physiotherapy treatment method has been developed to teach sufferers of obstructed defaecation how to evacuate without straining. This paper outlines the rationale and method of this physiotherapy treatment.

Keywords: Anus; Defecation; Fecal Incontinence; Rectum