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The information provided in 10 per cent of all written medical referrals received by a teaching hospital physiotherapy outpatient department in each of the years 1982 and 1989 was systematically analysed to identify any demonstrable changes in emphasis. Significant between year differences indicated fewer referrals containing a diagnosis in 1989 than in 1982, less emphasis on requests for physiotherapy modalities and a significant increase in more generalised requests and inclusion of aims of treatment. These results suggest that greater clinical autonomy is expected of physiotherapists by medical practitioners in this particular hospital setting. The method used in this study could be applied in future to monitor referral to physiotherapy to examine whether these results represent a real trend.

Keywords: Physical Therapy Department, hospital; Physician's Practice Patterns; Professional Autonomy; Referral and Consultation


Proponents of mandatory continuing professional education (MCPE) contend that continuing professional education is necessary to ensure clinical competence and prevent professional obsolescence. Opponents believe that MCPE is contrary to adult learning principles. Although the research demonstrates positive attitudes towards MCPE in those groups undertaking continuing education programs, there has been insufficient quantitative research which examines whether continuing education results in enhancement of practitioner performance and improvement of patient care. Currently, there are no MCPE requirements in Australia for the general practice of physiotherapy. The recommendation for the physiotherapy profession is to address the immediate need for research into the relationship between continuing education and clinical competence.

Keywords: Education, continuing; Physical Therapy; Professional Competence; Professional Practice


Common clinical beliefs about the relationship between postural characteristics and pain are based on mainly anecdotal evidence. This study examined the reliability of physical characteristics of the head, shoulders and thoracic spine and identified relationships among them. Measurements were made from photographs of subjects in comfortable erect standing. A forward head position was related to the curvature of the upper thoracic spine, and a forward position of the shoulders to the tilt of the head in the sagittal plane and to upper cervical extension. The magnitude of the relationships, however, was of questionable clinical significance. No relationship was found between a forward head position and forward shoulders, nor between a forward head position and upper cervical spine extension.

Keywords: Head; Posture; Shoulder; Thoracic Vertebrae
The precise source and cause of mechanically evoked sensory and motor responses can sometimes be surprisingly difficult to identify. Accurate interpretation of these responses may be confounded by peripheral as well as central nervous system mechanisms. Examples of such peripheral nervous system mechanisms likely to be of relevance to therapists have been selected from basic and clinical research. Symptomatic relief has been inferred to endorse the diagnostic specificity of mechanical stimulation. The extent to which this would be valid for relief acquired by neurological means is discussed in terms of endogenous pain inhibitory systems.

Keywords: Pain; Physical Stimulation; Physical Therapy


Functional instability of the ankle is common following inversion sprain. Factors suggested as causes of this disability include mechanical instability of the talocrural joint, peroneal muscle weakness and motor incoordination due to impaired proprioception. This study documented physical examination characteristics of functionally unstable ankles relevant to these theories. Each ankle of 45 subjects with unilateral functional instability was examined. Mechanical stability was assessed by standard clinical instability tests. Evertor and invertor muscle strength was measured using the Cybex 11 dynamometer. The Uni-axial Balance Evaluator (UBE) was used to assess dynamic control of the ankle and was considered capable of detecting unilaterally impaired proprioception. Mechanical instability was frequently absent in the functionally unstable ankles tested. Evertor muscle strength was similar in the normal and functionally unstable ankles. UBE results were consistent with the theory of impaired proprioception contributing to functional instability, but the need for further research is emphasised.

Keywords: Ankle; Joint Instability; Proprioception


Twenty subjects enrolled to take part in an exercise program (mean age = 62.5 years) and 20 control subjects (mean age = 65.5 years) underwent assessments of strength, reaction time, neuro-muscular control and body sway. The exercisers participated in one hour exercise sessions comprising a cardiorespiratory (walking) component and a gentle exercise component twice weekly for 20 weeks. All subjects were then re-tested for the same measures after the completion of the program. The exercisers showed improved quadriceps strength, reaction time and reduced body sway when compared with the control group; the exercise group showing continued improvement throughout the program in tests of body sway. The findings suggest that exercise can improve physical function in older people.

Keywords: Aged; Exercise; Muscles; Posture

The purpose of this study was to identify the relationship between static sitting balance in the acute post stroke patient and gait outcome; and to determine the relationship between initial and six-week post stroke mobility. Fifty-two patients with cerebral infarcts had sitting balance and gait assessed on hospital admission. Gait was reassessed six weeks later using the Functional Independence Measure Locomotion (FIM Locomotion) score. Sitting balance was positively correlated with gait outcome. In particular, lack of static sitting balance initially is correlated with dependent gait at six weeks post stroke. Consideration of infarct location and side of hemiplegia may further enhance the strength of the correlation. The FIM Locomotion was a useful assessment tool with strong correlation between initial and final FIM Locomotion scores.

Keywords: Cerebrovascular Disorders; Gait; Outcome and Process Assessment (health care)


This study investigated whether the reported straight leg raise (SLR) test-retest reliability is an artefact of motor memory. Six SLR measurements were performed by one therapist on 16 subjects with asymptomatic SLR. Distance cues available to the subjects were manipulated by systematic variation of the starting position for each test. Angles at P1 (the angle at which pain was provoked) were measured with a gravitational goniometer. No significant effect on P1 was observed due to either variation in starting position or repeated testing. The SLR procedure was found to be highly reliable with an intraclass correlation coefficient (ICC) of 0.95. These results indicate that SLR reliability is not an artefact of memory for the movement involved in the test.

Keywords: Backache; Pain Measurement; Sciatica


Back exercises addressing deep muscles with a prime stabilising role such as multifidus are important in the rehabilitation of patients with low back pain. Electromyography of erector spinae and multifidus of 18 healthy subjects was investigated during prone arch and two isometric back extension exercises; trunk holding and leg holding. When compared with prone arch, both erector spinae and multifidus were recruited at a high level during trunk holding (76-79 per cent) and leg holding (66-68 per cent). Relative activity of erector spinae and multifidus was similar in different loading conditions and this implied they were working together as a single functional unit. Further studies are needed to investigate the possibility of selective recruitment of individual lumbar muscles in back exercises.

Keywords: Back; Electromyography; Exercise; Muscle Contraction


Evidence suggests that manual examination is reliable in the detection of dysfunctioned spinal segments. Clinical decisions are considered to relate to the presence of abnormal motion and tissue stiffness along with provocation of pain but there have been suggestions that pain is the major diagnostic cue. Pain provocation is important but reliance on pain could cause false positive joint dysfunction diagnoses.
A single blind study was undertaken to test a manipulative physiotherapist’s ability to differentiate painful and non-painful cervical segments without the subjects’ verbal pain cues. Results indicated good agreement between the examiner and subjects for their independent nomination of most painful and painless segments, suggesting pain is not the only cue.

**Keywords:** Manipulation, orthopedic; Physical Examination; Spine


Isometric strength and endurance of the upper cervical flexor muscles were assessed in 54 moderately active asymptomatic females, with specific reference to any age related differences. Subjects, chosen from a sample of convenience, were categorised into three age groups, 20-25, 40-45 and 60-65 years. Strength (kiloponds [kp]) and endurance were measured by subjects flexing their chin against a metal bar to which strain gauges were attached. Endurance (seconds) was measured and defined as the time that subjects could hold at least 50 per cent of an initial maximal voluntary contraction (MVC). Normal values were established for the sample population. Mean strength values for the three age groups, 20-25, 40-45 and 60-65 years were 3.4, 3.5 and 3.4kp and endurance values were 65, 59 and 41 seconds respectively. There was no significant relationship between strength and age or endurance and age.

**Keywords:** Cervical Vertebrae; Neck Muscles; Posture


Fatiguing isokinetic quadriceps exercises and the effect on the ability of 12 human subjects to reproduce knee angles was examined. The experimental and control procedures consisted of two separate test sessions conducted in sitting. Positioning was measured with a potentiometer. Accuracy was estimated by calculating the mean absolute error (AE) between five criterion and reproduction angles and the average directional or constant error (CE). Results showed a significant increase in target overshooting between the initial and final CE measurements on Day Two (experimental session) and Day One (control session). In contrast, the control group showed no alteration in intrasession CE test performance. It is concluded that exercise induced contractile fatigue can introduce bias into the encoding of positional information in a healthy knee.

**Keywords:** Exercise; Fatigue; Knee; Proprioception


The relationship between clinical measures of balance and function in elderly persons was the focus of this investigation. Sixty subjects were assessed on three clinical balance measures, the Balance Scale, the Self Paced Walk Test and the Falls Efficacy Scale and a measure of general function, the Functional Assessment Inventory. Results demonstrated significant relationships between all measures. The Balance Scale results were highly predictive of function and were predicted by scores on the Falls Efficacy Scale and the
Self Paced Walk Test. Only the Self Paced Walk Test was able to discriminate between subjects on the basis of previously reported falls. On the basis of data from this sample of elderly people, it was concluded that the Balance Scale was the most appropriate clinical balance measure for use with older individuals.

Keywords: Accidental Falls; Aged; Equilibrium; Self Concept


This study quantified differences in the gait parameters of velocity and stride length at three different self selected speeds between 113 subjects with rheumatoid arthritis and 104 normal controls stratified for age and gender. Significant differences were found between the well-matched groups of females 50-64 and over 65 years of age at all three speeds for both gait parameters. Females younger than 50 years of age, however, differed from their controls only at normal and fast velocities. The gait of males appeared to be less affected by the disease as only males over 65 years of age differed significantly from their controls and then only at the fast self selected speed. These data provide a base from which to judge the efficacy of therapeutic intervention in the arthritic population.

Keywords: Arthritis; Gait; Outcome Assessment (health care); Walking


The reproducibility of cervical and cervicothoracic curvature in an unconstrained standing position was examined in 17 volunteers. Parameters investigated included three angles of cervical inclination (the angle between the horizontal and a line drawn between C2 and C7, C2 and T1, and C2 and T2 respectively), cervical lordosis, and cervicothoracic kyphosis. Reliability of these parameters for within-trial, between-trial (intraday), and between-day (one week apart) measures was calculated from lateral photographs using intraclass correlation coefficients ICC (2,1). All measures of cervical inclination were highly reproducible as was cervicothoracic kyphosis, but cervical lordosis had more variable reproducibility. These findings suggest that cervicothoracic kyphosis and cervical inclination are appropriate to use for determining the effects of intervention in either clinical practice or research.

Keywords: Cervical Vertebrae; Kyphosis; Posture; Reproducibility of Results


The manoeuvres of the upper limb tension test (ULTT) were described by Elvey (1983 and 1985) to identify the presence of a brachial plexus component in upper arm pain. A pilot study was undertaken to examine strain at the subclavian artery during the ULLT in two embalmed cadavers. Photographs of the artery segments were obtained at each step of the test and from these, strain scores were calculated. Results show that limb manoeuvres conducted with cervical contralateral lateral flexion produced more strain than with ipsilateral lateral flexion. Since cervical contralateral lateral flexion appears capable of increasing strain at the subclavian artery, further studies
comparing strain at the artery with strain at cervical nerves are indicated.

Keywords: Brachial Plexus; Chemoreceptors; Mechanoreceptors; Subclavian Artery


The role of the cervical short flexor muscles in maintaining head posture has been recognised recently. While a computerised device is available for measuring isometric performance of this muscle group, no clinical method is available. This paper reports on an inexpensive and time-efficient method of measuring the endurance capacity of the cervical short flexor muscle group in a clinical setting. The measurement is adapted from an exercise described and illustrated by Trott (1988). The measurements of cervical short flexor endurance were reproducible over a one month interval. There was a systematic improvement in mean endurance capacity for both women and men and the possible causes of this are discussed.

Keywords: Neck Muscles; Posture; Reproducibility of Results


Advances in neurophysiological research over the past 20 years have led to dramatic changes in the understanding of the neural control of movement. These newer concepts have directed attention towards possibilities for motor recovery previously discounted. They also imply that changes in health care delivery may be necessary in order to take advantage of the recovery process and achieve maximum potential. If the neurologically disabled are to benefit from the advances of science, and if physical therapy practitioners are to reach and maintain scientific credibility, some fundamental changes in clinical thinking and practice seem indicated. This article discusses some implications for the practice of physiotherapy in neurology.

Keywords: Muscle Tonus; Neurology; Neurophysiology; Rehabilitation