Chronic repetitive unrecognized flexion injury of the cervical spine (high jumper's neck)

Paley D, Gillespie R. Am J Sports Med 1986; 14:92-5

Unrecognized flexion injuries of the cervical spine may lead to late instability and neurologic damage. These hidden flexion injuries may be from acute or chronic traumatic episodes. Cervical spine instability was seen in an amateur high jumper as a result of chronic repetitive flexion loading of her cervical spine due to incorrect landing technique. The instability from these types of flexion injuries is generally unrecognized on a routine lateral radiograph. The presence of slight anterior subluxation, simple compression fractures, or subtle kyphotic angulation at one cervical level should alert the physician to this diagnosis. Flexion extension views are useful to demonstrate this instability. Occupations and sports which involve repetitive flexion stress to the cervical spine are at risk for this type of late instability. Therefore, in high jumping careful attention to safe techniques of landing is of utmost importance.

Congenital absence of lumbar facets as a cause of lower-back pain

Segal D, Franchi AV. Spine 1986; 11:78-80

Unilateral arch hypertrophy secondary to congenital absence of lumbar articular facets is a rare condition of still undetermined etiology.

Most symptomatic cases had a history of mild trauma.

Radiologic criteria using plain films and CAT scan are available to make the diagnosis of unilateral arch hypertrophy and the specific defects that cause this condition.

Awareness of these signs by the orthopedic community may prove helpful in recognizing this anomaly as a cause of lower-back pain in the future. It would seem logical to conclude that the source of pain in patients with this congenital anomalies may be due to microfracture of the hypertrophic side caused by the concentration of stresses.

Treatment of this condition varies, and too few cases are reported to draw any conclusions. A conservative approach of bedrest and immobilization should be attempted first. However, if this regime proves unsuccessful after a long well-documented trial, fusion seems to offer a good prognosis in the cases thus far treated by this method.

Cervical spine biomechanics: a review of the literature

Huelke DF, Nusholtz GS. J Ortho Res 1986; 4:232-245

This article reviews the many clinical and laboratory investigative research reports on the frequency, causes, and biomechanics of human cervical spine impact injuries and tolerances. Neck injury mechanisms have been hypothesized from clinically observed cervical spine injuries without laboratory verification. However, many of the laboratory experiments used static loading techniques of cervical spine segments. Only recently have dynamic impact studies been conducted. Results indicate that crown-of-head impacts can routinely produce compression of the neck with extension or flexion motion. However, the two-dimensional (midsagittal) movement of the head bowing into the chest does not routinely produce flexion/compression type damage to the cervical spine. Flexion/compression damage to the cervical spine can be produced by prepositioning the subject so that upon impact, a three-dimensional motion of the head and neck occurs. Future laboratory research is needed to determine the forces and impact directions required to produce the various known fracture types and dislocations for a clear, accurate description of the cervical spine impact dynamics.

KEY WORDS: Literature review – Biomechanics – Impact tolerances – Future research.

Childhood diskitis: report of 2 cases and review of the literature

Moskal MJ, Villar LA. J Am Osteopathic Assoc 1986; 86:169-174

Diskitis is an inflammatory and destructive process of the invertebral disk that occurs primarily in children and adolescents. The patient may display a wide range of symptoms that can be confused with other disease entities, which often results in a delay in diagnosis. Most authors favor an infectious etiology, while others have proposed that diskitis is secondary to trauma. It is probable that one is not exclusive of the other. *Staphylococcus aureus* and occasionally other organisms have been isolated from cultures of the disk or blood. The diagnosis of diskitis requires a high index of suspicion and the use of appropriate diagnostic procedures. Treatment generally includes bed rest, possibly immobilization, and antibiotics. The prognosis is usually good. With improved physician recognition of this disorder, early diagnosis and treatment will be the rule rather than the exception.

The effect of two sites of high frequency vibration on cutaneous pain threshold

Sherer CL, Clelland JA, O'Sullivan P, et al. Pain 1986; 25:133-8

The purpose of this study was to evaluate the effect of two sites of high frequency vibration on experimentally produced pain thresholds. Subjects were assigned to one of two experimental groups. Vibration was applied proximal to the site of pain threshold measurement in one group and distal to the measurement site in the other group. The cutaneous pain threshold was measured at the ulnar aspect of the wrist in both groups prior to, during, and following 5 min of vibration. Subjects were 30 right-handed, Caucasian males with a negative history of upper extremity dysfunction.

A repeated measures analysis of variance (ANOVA) was used to analyze the data. There was a significant interaction between vibration site and time of pain threshold measurement. Post hoc analysis of that interaction indicated that a significant difference between experimental groups occurred only during vibration: the distal group values were significantly higher than the proximal group values ($P < 0.03$). For the distal group, pain threshold values were significantly higher during vibration than pre vibration and post vibration ($P < 0.05$). In the proximal group, there was no significant difference in pain threshold values across the 3 time periods. The results of this study indicate that vibration applied distal to the site of pain can provide temporary analgesia.

Measurement of axial rotation of vertebrae in scoliosis

Stokes IAF, Llynda C, Bigalow MS, Moreland MS. Spine 1986; 11:213-8

The authors report a radiographic method for measuring the axial rotation of vertebrae in degrees and its use in 99 patients with adolescent idiopathic scoliosis. The offset of the pedicle images from the vertebral body center and a "depth" estimate measured radiographically in a population of patients with scoliosis permitted calculation of axial rotation by means of a simple mathematical formula. It was found that measurements of vertebral rotation can be made clinically from single-plane radiographs with a standard deviation of 3.6° (95% confidence limit ±7.1°) based on a study of known rotations of a radiographic phantom, and with a standard deviation of 2.44° (95% confidence limit ±4.8°) based on comparisons with three-dimensional measurements of the orientation of each vertebra derived from low-dose stereo films of a group of patients. Measurements from clinical films are unlikely to be made more accurately than this, because of inherent geometric constraints.

KEY WORDS: scoliosis, vertebral rotation, radiographic measurement, pedicle offset, vertebral geometry.

Arterial changes in the human vertebral body associated with aging

Ratcliffe JF, ed. Spine 1986; 11:235-40

Microarteriography with barium has shown the topgraphic distribution of intraosseous arteries in the cadaveric human vertebral body. Two types of intraosseous artery are found in the adult vertebral body, peripheral and central, whereas in children only central arteries are found. There is a close correlation ($r = 0.79$) between the ratios of peripheral: central arteries against age. The central arteries develop coils, which increase proportionately in number as age advances. The possible clinical significance of these observations is discussed. The increase in peripheral arteries alters the direction of flow from centrifugal to centripetal in the aged vertebral body; this has implications for the distribution of infected material, causing vertebral osteomyelitis, and for the distribution of electric surface charges, which will alter the mineralization of the vertebral body. The increase in coiling will alter intraosseous haemodynamics, potentially increasing resistance to flow resulting in ischaemia. The coils and their sheaths will modify the height of the pulse wave within the artery, increasing agitation of extracellular fluid, thus assisting the transport of metabolites.

KEY WORDS: vertebral body, blood supply, intraosseous arteries, changes with age.

Headache and its management: a personal review

Lewith GT. Annals Swiss Chiro Assoc 1985; 8:7-16

This article represents a review of the various complementary therapies that can be used to manage the common problem of headache. My intention is to explore the common ground between these various approaches and to suggest that techniques such as acupuncture, spinal manipulation, the diagnosis of food and chemical sensitivity and homoeopathy may be used by individual practitioners in a coherent manner to the ultimate benefit of the patient. The use of these techniques in a cooperative manner appears to promote better therapeutic results than the use of single therapies. The latter part of the review is devoted to the stringent methods of assessment that may be used to evaluate these techniques in a controlled manner.

Age-related differences in the human sacroiliac joint: a histological study; implications for therapy

Walker JM. J Ortho Sports Phys Ther 1986; 7: 325-334

Sacroiliac joint dysfunction often is implicated in the etiology of low back pain. Few data exist on age differences in sacroiliac tissues. The purpose of this study was to identify by light microscopy the differences that exist between age decades. Joints from 36 fetuses and 15 adult cadavers were excised and prepared in the routine manner. In fetal joints, the complete cavitation was not observed before 34 weeks of age; the iliac surface was predominantly fibrous or fibrocartilage. Fibrous bands connected joint surfaces even in term specimens. All adult specimens showed degenerative changes which included incomplete fibrous ($N = 9$) or chondroid ($N = 5$) ankylosis and incompletely healed, presumed fractures of the joint surface ($N = 6$). On the average, sacral cartilage was 1.7 times thicker than the iliac "cartilage." The potential for the older sacroiliac joint to be affected by techniques of manual therapy is questionable given the degenerative features observed.

Pre and post manipulation lateral bending radiographic study and relaxation of muscle function of the low back

Grice AS, Tschumi PC. Annals Swiss Chiro Assoc 1985; 8:149-165

This prospective study of the lumbar spine relates the mechanical and electrical output of muscles with radiographic patterns of lateral flexion. Defines the role of individual muscle during lumbar lateral flexion and discusses the response of abnormal dynamics to manipulative therapy using pre and post treatment radiographs and EMG readings.

Chiropractic care of the aged patient

Sandoz R. Annals Swiss Chiro Assoc 1985; 8:167-191

For sociologic reasons mainly, an ever greater percentage of the clientele of the chiropractor consists of older people suffering from back pain and disablement of the locomotor system linked with age. Experience shows that these ailments can often be considerably relieved, at least temporarily, by appropriate chiropractic measures. The most common gravitational syndrome associated with ageing consists in an increase in the antero-posterior spinal curvatures which favors the development of local degenerative processes like dorsal spondylosis, cervical and lumbar apophyseal arthrosis and surgical subluxations like retro and laterolisthesis. The harmful-psychological effects of

such terms as arthrosis and osteoporosis, when used indiscriminately and without sufficient explanation, is stressed. The general and more specific effects of spinal adjustments are examined in detail, particularly as they relate to the altered physiology of degenerated joints. Means of objectivating the results are presented.

The modification of the physical parameters of adjustments necessary to conform to the requirements of ageing spines is examined. The mechanical and neurologic iatrogenic complications of spinal adjustments in elderly patients are reviewed, as well as the measures of prevention.

Computerized axial tomography of the spine in the differential diagnosis of vertebral subluxations

Koentges A. Annals Swiss Chiro Assoc 1985; 8:25-45

CAT scan is a useful instrument for the enlightment of the proteroetiology of a subluxation.

A subluxation being an intricate entity, its causes and consequences are diverse.

The pictures obtained with the Computer Axial Tomography help in the differential diagnosis of the spinal and neurological pathologies implied in subluxations. Osteosarcomas and hemangiomas, for example, are readily differentiated. Others like osteoarthrosis and herniated intervertebral disks can, with a great amount of certainty, be diagnosed with CAT scan and be of further help for the chiropractor. For example, the diagnosis of a cancerous growth impinging on the transverse foramina makes a referral a must, while the impingment of an IVF by some osteophytes or the bulging of the annulus fibrosus of a disk will only help clarify the diagnosis and give more precision as to the adequate chirotherapy.

Acupuncture in the treatment of migraine

Batra YK. Am J Acupuncture 1986; 14:135-142

Twenty patients subject to frequent attacks of migraine who had not responded to conventional therapy, participated in a study to evaluate the effectiveness of acupuncture. Treatment was administered thrice weekly. Three months after the last sitting, results were excellent in 30% of cases, effective in 35%, slightly effective in 25% of the cases, and ineffective in 10%. These figures suggest that acupuncture be tried in patients suffering from migraine who are resistant to other forms of therapy.

Extraforaminal disk herniation

Kurobane Y, Takahashi T, Jajima T, et al. Spine 1986; 11:260-8

Atypical disc herniation, especially extra foraminal disc herniation (EFDH), is apt to be overlooked, because myelography and peridurography can give false positive and false negative findings. Eleven cases of EFDH were diagnosed since 1975, and all were confirmed by operative treatment. This number is a very small percentage of the total, but if these cases had not been diagnosed correctly, the results of surgery would have been poor. Selective lumbosacral radiculography and nerve root block techniques are very useful in determining the nerve root involved. Discography is an excellent diagnostic technique for finding the relationship between the nerve root and hernia mass. Extra foraminal disc herniation must be kept in mind as a cause of lumbar radiculopathy.

KEY WORDS: atypical disc herniation, radiculography, discography, nerve root block.

Attempts to reduce body weight through auricular acupuncture

Dung HC. Am J Acupuncture 1986; 14:177-122

This report contains data of individuals who, over a period of four years, came to an acupuncture clinic seeking reduction in body weight. Auricular acupuncture, or placing two press needles in each ear, was used to assist subjects in reducing weight. Results of such an attempt were not very promising. Reasons for the difficulty in reducing weight through auriculopuncture are discussed.

The development of a functional rating scale to measure the treatment outcome of chronic spinal patients

Evans JH, Kagen A. Spine 1986; 11:277-281

A Functional Rating Scale (FRS) was developed to quantify behavioral changes in chronic pain patients relative to six subcategories. The aim was to demonstrate its validity, test the instrument's reliability, and determine its value in measuring treatment outcome. Five sample populations were examined: a test group of 58 pain clinic patients; a medical control group comprising 29 outpatients with arthritis; and a three-part, healthy control group of 98 subjects. The validation and reliability of the scale were affirmed by clearly differentiating healthy from infirm subjects and through a test-retest check of the four control groups. The difference between means of the test group, before and after treatment, was of high statistical significance, which indicates the practical value of the FRS in measuring relative changes.

KEY WORDS: chronic back pain, functional rating scale, validity, reliability, treatment outcome.

Reliability and validity of four instruments for measuring lumbar spine and pelvic positions

Burdett RG, Brown KE, Fall MP. Phys Ther 1986; 66:677-684

We studied the between-therapist reliability and the validity of four instruments in measuring lumbar spine curvature and pelvic tilt. The four instruments and their measurements were 1) a tape measure to measure the change in lumbar curvature during trunk flexion; 2) a gravity goniometer to measure pelvic angle and lumbar curvature during stance, trunk flexion, and trunk extension; 3) a parallelogram goniometer to measure lumbar curvature during stance, trunk flexion, and trunk extension; and 4) a standard goniometer to measure the angle between wooden pointers mounted perpendicularly to the spine to obtain pelvic angle and lumbar curvature during stance, trunk flexion, and trunk extension. We found no single instrument to be the most reliable or valid. Between-therapist reliability ranged from .64 to .93 (Pearson product-moment correlation) and from .60 to .92

(interclass correlation coefficient). The validities of the instruments compared with measurements from roentgenograms generally were low, ranging from −.13 to .76 (Pearson product-moment correlation) and −.73 to −.05 (interclass correlation coefficient).

Flexibility and velocity of the normal and impaired lumbar spine

Marras WS, Wongsam PE. Arch Phys Med Rehabil 1986; 67:213-7

Trunk mobility, as defined by trunk angle, has long been considered an acceptable means to evaluate the degree of impairment in patients with low back pain (LBP). However, biomechanically, there is reason to believe that patients with LBP may exhibit significant sensitivity to trunk velocity of motion as well as angular mobility factors. An experiment was performed to study the trunk action of patients with LBP and of a normal control group. A lumbar monitor was used to monitor both trunk angle range and trunk velocity. The results indicate significant differences between the two groups for both angle and velocity measures. However, the velocity measure revealed more dramatic difference between groups and was the only parameter that was capable of distinguishing between the particular experimental tasks for both LBP and normal groups. Thus, it is suggested that trunk velocity be used as a quantitative measure of low back disorder and that it be used as a means to monitor the rehabilitative progress of patients with LBP.

Herniated nucleus pulposus: Nonoperative approach stressing proper body positioning

Hart JL. J Am Osteopathic Assoc 1986; 86:293-7

Patients with acute radicular symptoms from a herniated nucleus pulposus are commonly offered one of three treatment modes: conservative care, surgery, or chemonucleolysis. This article proposes a hypothetical model for inflammation and nerve root pressure that results in pain. With this method, proper body positioning allows the normal healing process to occur. Nineteen patients underwent a standardized course of nonoperative management stressing this correct positioning. Of these patients, 90 percent experienced a complete resolution of their symptoms and were able to return to their prior occupations. The average treatment period was 9 weeks.

A review study of the differing opinions expressed in the literature about anatomy of the sacroiliac joint

Otter R. European J Chiro 1985; 33:221-242

This is a review study of the literature pertaining to the sacroiliac joint. Included is a summary of its anatomy, with particular regard to the anterior surfaces of the sacrum and innominate bones. Their shape, surface contour, and the modelling affects upon them by age and posture, are considered.

The ligaments are described, including the possibility of an extra intra-articular ligament, 'Illi's ligament'. Their function and the possible effects of hormones upon them are discussed.

The muscles surrounding the joints are briefly mentioned with regard to their contribution towards joint dysfunction.

The various views regarding the classification of the sacroiliac joint, whether amphiarthrodial or diarthrodial, are discussed. The innervation of the joint is described along with the pain patterns which might be associated with joint dysfunction. The difficulties of defining joint dysfunction are briefly discussed.

This study aims to summarize the large body of literature on the sacroiliac joint which is often both confusing and contradictory.

The tennis stroke: an EMG analysis of selected muscles with rackets of increasing grip size

Adelsberg S. Am J Sports Med 1986; 14:139-142

The purpose of this study was to analyze the effect of different racket grip sizes on the muscle activity of the forearm and shoulder. Telemetry EMG was used to assess the muscle activity of the anterior deltoid and the forearm extensor muscles during the forehand and backhand strokes of tennis in a selected group of test subjects. The EMG activity of the subjects' anterior deltoid muscle and the forearm extensor muscle group was recorded with the subjects using racket grip sizes of $4^1/_4$, $4^1/_2$, $4^3/_4$ inches. A specific pattern of sequence phasing was seen in all subjects, and amplitude ratio between the muscles was constant. Changes in grip size demonstrated a change in amplitude of both the anterior deltoid and the forearm extensor muscle group.

An algorithm for the management of scoliosis

Nykoliation JW, Cassidy JD, Arthur BE, Wedge JH. J Manipul Physiol Therap 1986; 9:1-14

Scoliosis is a lateral and rotary deformity of the spine that is often found in children. Treatment of this deformity is based on the principle of early recognition and prevention, although surgical correction may be warranted in the case of progressive curves. There is no scientific evidence that spinal manipulative therapy (SMT) has any effect on curve progression in patients with idiopathic scoliosis; however, there is clinical evidence that SMT is a useful treatment for those patients who have an associated mechanical backache.

This paper reviews the classification, natural history, pathogenesis, and clinical and radiological assessment of scoliosis. An algorithm for the management of scoliosis by chiropractors is presented, and illustrative cases from a scoliosis clinic in a university hospital are used to reinforce important clinical principles.

Accuracy of piezoelectric accelerometers measuring displacement of a spinal adjusting instrument

Fuhr AW, Smith DB. J Manipul Physiol Therap 1986; 9:15-21

The accuracy and reproducibility of an electronic system to measure the displacement of a spring-loaded chiropractic adjusting instrument was examined. The electronic system included a piezoelectric force transducer, piezoelectric accelerometer transducers and a digital oscilloscope. Accuracy was studied by comparing electronic measurements with the expansion allowed by the mechanically limiting expansion-control knob of the instrument. The results suggested im-

provements for future accuracy verification checks and detected accuracy within about 10% of the expansion of the commonly used expansion-control-knob revolutions. Preliminary experiments are presented to show application of the system to studies on thrusts into the spine. The impedance-head-equipped spring-loaded Activator chiropractic adjusting instrument had a low velocity when used on the patient and appeared to cause bone movement and a measurable EMG response.

The management of hypertensive disease: a review of spinal manipulation and the efficacy of conservative therapeusis

Crawford JP, Hickson GS, Wiles MR. J Manipul Physiol Therap 1986; 27:32

When considering the ailments that plague mankind, certainly one of the enigmatic conditions is hypertensive disease. This perplexing disorder is recognized insidiously in the clinical setting. It is believed to occur because of the complex interactions of a variety of factors which act on the components of the blood vasculature. Although afflicted individuals may appear relatively asymptomatic, the additive influences of such factors eventually culminate in deleterious sequelae. Overall, hypertension appears to be related to stress, diet and lifestyle. The autonomic nervous system, particularly its sympathetic component, appears to mediate such accumulated factors, affecting the overall clinical scenario of hypertension. Although generally aligned with the aging process, this condition also may affect younger individuals. Hypertension, therefore, may be regarded as a prime condition warranting specialized care that includes proper education during the formative years, modification of dietary habits in conjunction with daily exercise regimens, and regular spinal maintenance, all of which are covered by modern chiropractic clinical practice.