

Ultrastructural study of the short-term effects of chymopapain on the intervertebral disc

Suguro T, Oegema Jr. TR, Bradford DS. *J Ortho Res* 1986; 4:281-7

The initial effects of chymopapain, a chemonucleolytic agent, on the intervertebral disc of dogs were studied by light and electron microscopic techniques. Fragments of nucleus pulposus and annulus fibrosis were incubated with chymopapain up to 24 h in vitro. Proteoglycans and matrix proteins were rapidly removed, while collagen fibers remained intact up to 24 h. For several hours, most cells remained normal in appearance with only slight swelling and an increased number of vacuoles. After exposure to the protease for 24 h cells in both the annulus and nucleus showed extensive membrane damage and some were necrotic, but many survived relatively intact. These results suggest that, similar to the results of the digestion of cartilage with other proteases, the cells of the disc can survive brief chymopapain exposure during chemonucleolysis procedures and could serve as a source for regenerating tissue. The nature of the regeneration may depend on the extracellular scaffold that remains and the nutrition available to tissue as well as the age and biomechanical state of the disc. As for clinical significance, chemonucleolysis is an important nonsurgical alternative for treating prolapsed disc. The cells of nucleus and annulus can survive short-term exposure to treatment, and thus be responsible for partial regeneration of the tissue. This regeneration may be important in preventing long-term degenerative disease in the facet joints caused by increased pressure due to decreased disc height.

KEY WORDS: Intervertebral disc - Chemonucleolysis - In vitro chymopapain - Morphology.

Use of He-Ne laser for treatment of soft tissue trauma: evaluation by Gallium-67 citrate scanning

Krikorian DJ, Hartshorne MF, Stratton SA, et al. *J Ortho Sports Phys Ther* 1986; 8:93-6

Sequential quantitative Gallium-67 Citrate (Ga-67) scanning was used to evaluate the resolution of inflammation in standardized bruises in rat thighs with and without Helium Neon (He-Ne) laser treatment. The severity of inflammation in the injured tissue was assessed as the ratio of Ga-67 localized in the bruise to the Ga-67 localized in the noninjured area of the same geometry. During the first 12 days after injury, both (He-Ne laser) treated and nontreated rats healed rapidly with no observable differences in Ga-67 localization.

Comparison of four treatment approaches for lateral epicondylitis of the elbow

Halle JS, Franklin RJ, Karalfa BL. *J Ortho Sports Phys Ther* 1986; 8:62-9

The relative effectiveness of four treatment protocols on lateral epicondylitis of the elbow were compared by assessing patient pain responses with a modified McGill Pain Questionnaire. The four protocols examined were ultrasound and a home program, ultrasound

with 10% hydrocortisone and a home program, transcutaneous electrical nerve stimulation and a home program, and subcutaneous injection with a steroid and a home program. A total of 48 subjects were used in the study, with 12 in each treatment category. All protocols descriptively showed a decrease in mean pain intensity after the 5-day treatment time, and all of the pain indexes showed some statistical differences between pre- and post-treatment values, indicating that all the treatments were effective in reducing pain. The analysis also demonstrated, however, that the four treatment protocols did not differ significantly in their effectiveness, so the treatment of choice should be based on clinical considerations.

A case-control study of running injuries: comparison of patterns of runners with and without running injuries

McQuade KJ. *J. Ortho Sports Phys Ther* 1986; 8:81-4

It has been reported that 70% of runners suffer from injuries at some time during their running career, and that the majority of these injuries tend to be recurrent. With over 40 million people in the U.S. currently running, an understanding of epidemiological factors relating to running injuries may prove useful for early recognition and prevention of potential problems. This study surveyed 250 runners to determine the prevalence and patterns of running injuries; 62% of the sample reported having pain of injuries related to running. Runners were divided into two groups based on whether they reported pain or injuries related to running in the last 2 years (cases), or were totally asymptomatic (controls). The two groups were compared for years run, miles run per week, stretching time, involvement in other sports, involvement in strength training, and type of running shoes worn. The cases ran slightly more miles, spent less time doing supplemental strengthening, and were less involved in other sports. The cases spent more time stretching, but had a higher proportion of "nonstretchers." There was also a higher proportion of females among the cases. The main limitation of the study was the sample size.

Comparison of lumbar curves when sitting on the Westnofa Balans multi-chair sitting on a conventional chair and standing

Frey JK, Tecklin JS. *Phys Ther* 1986; 66(9):1365-9

The purpose of this study was to determine whether the Balans® Multi-Chair (BMC) approximates the amount of standing lumbar curve better than a standard conventional chair (SCC) in seated subjects writing at a desk. The length of the curve from L1 to S2 was measured with a flexible ruler in 44 healthy subjects who were standing and sitting on both an SCC and a BMC. A one-way analysis of variance for repeated measures and the Student-Newman-Keuls test were used to examine the differences in the curves created in the three positions. The frequency of subjects sitting in lumbar flexion was compared using a chi-square test with those not in flexion. Lumbar curves measured in the three positions were significantly different ($p < .01$). The BMC approximated the standing lumbar curve in seated subjects writing at a desk to a greater degree than the SCC. In addition, the

BMC produced lumbar flexion less frequently ($\chi^2 = 4.33, p < .05$) than did the SCC. These data suggest that the BMC may be an appropriate adjunct in client care when minimal lumbar flexion or lumbar extension is indicated.

KEY WORDS: Back, Lumbosacral region, Posture.

The intravertebral vacuum phenomenon

Kumpan W, Salomonowitz E, Seidl G, et al. *Skeletal Radiol* 1986; 15:444-447

An intravertebral vacuum phenomenon was observed within 19 vertebrae of 17 patients. It represents a non-healing vertebral fracture. Three possible pathologic mechanisms are discussed: ischemic bone necrosis, trauma with ensuing ischemic necrosis, and intraosseous disc prolapse. The intravertebral vacuum phenomenon was found in two patients with multiple myeloma and thus does not exclude the presence of malignancy in the affected bone. Radiographs obtained during traction or extension may be of diagnostic value.

KEY WORDS: Vacuum phenomenon - Spine, fracture - Pseudarthrosis - Osteonecrosis, ischemic.

Percutaneous nerve block of the cervical facets - a relatively new method in the treatment of chronic headache and neck pain

Hilderbrandt J, Argyrakis A. *Man Med* 1986; 2:48-52

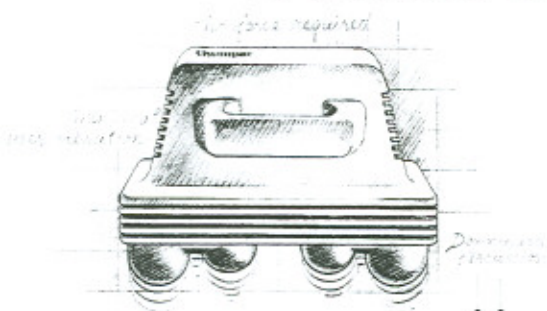
Apophyseal joints (facet joints) of the cervical spine, ligaments and neck muscles play an important role in the development of headache and neck pain. These structures are innervated by the dorsal rami of the spinal nerves. Their exact course, especially in relation to the bony structures, is described in this paper. The treatment of this type of pain is generally conservative. If conservative treatment is rendered unsuccessful and the main problem is not a psychosomatic one, radio-frequency denervation of the facet joints is recommended. A partial percutaneous nerve block of the cervical facets (mostly C2-C3 and C3-C4) was performed in 35 patients suffering from chronic headache and neck pain. As the procedure has a low risk to the patient, it can be used on a larger scale, even if the pain is not always totally eliminated.

KEY WORDS: Cervical syndrome - Headache and neck pain - Facet-denervation - Radio-frequency electrocoagulation - Upper cervical syndrome.

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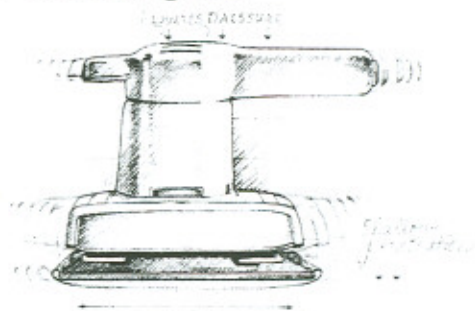


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Measurement of axial rotation of vertebrae in scoliosis

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 $\pm 7.1^\circ$) based on a study of known rotations of a radiographic phantom, and with a standard deviation of 2.44° (95% confidence limit $\pm 4.8^\circ$) 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.

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.

Prevention of running injuries

Jackson DW, Matz SO. *J Musculoskel Med* 1986; 3(4):10-19

Though runners often ask medical advice of other runners, ultimately most of them seek out a physician whom they regard as knowledgeable in the prevention, diagnosis, and treatment of running-related injuries. The majority of running injuries are the result of training errors, overuse, improper footwear, or inadequate stretching. We think that if physicians adhere to certain basic principles of injury prevention and encourage runner-patients to use common sense, injury levels can be reduced.

Extraforaminal disc 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.

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 $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$ 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.

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.

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.

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

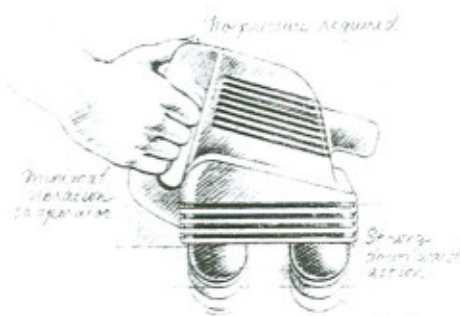
Burdett RG, Brown KE, Fall MP. Phys Ther 1986; 66:677-684.

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 (inter-class correlation coefficient).

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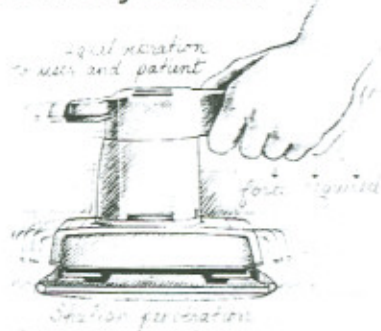
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