

REHAB IN REVIEW

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Volume 17 Number 1

Published by Physicians
In Physical Medicine and Rehabilitation

January 5, 2009

GHRELIN AND BODY COMPOSITION/CLINICAL STATUS

As humans age, growth hormone secretion decreases and muscle mass declines. The resultant sarcopenia may produce frailty, disability, and loss of independence. MK-677 is the first orally active Ghrelin mimetic, a growth hormone secretagogue and growth hormone secretagogue receptor agonist. This study investigated effect of MK-677 on body composition and clinical status in healthy, older adults.

This two-year, randomized, double-blind, placebo-controlled trial involved healthy males and females, 60 to 81 years of age. The participants were randomized to receive either MK-677 or a placebo once daily. The primary outcome measures at one year were growth hormone, insulin like growth factor I levels, fat-free mass, and abdominal visceral fat. Additional factors, measured every six months for two years, were weight, fat mass, insulin sensitivity, lipid and cortisol levels, bone mineral density, limb lean and fat mass, isokinetic strength, function, and quality of life.

Sixty-five subjects were randomized to receive either 25 mg per day of MK-677 or a placebo. At one year of treatment, 24-hour mean growth hormone levels and serum insulin like growth factors increased significantly ($p < 0.001$). Although fat-free mass decreased in the placebo group and increased in the treatment group ($p < 0.001$), no significant differences occurred between the two groups in abdominal visceral fat, function, or quality of life. The most frequent side effects were increased appetite, transient, mild lower extremity edema, and muscle pain.

Conclusion: This twelve-month study demonstrated that an oral Ghrelin mimetic, MK-677 can increase growth hormone levels, serum insulin like growth factor levels, and fat-free mass.

Nass, R., et al. Effects of an Oral Ghrelin Mimetic on Body Composition and Clinical Outcomes in Healthy Older Adults. *Ann Int Med.* 2008, November; 149: 601-611.

SURAMIN AND MUSCLE HEALING

Although muscle contusion is a common sports injury, optimal treatment strategies have not yet been clearly defined. The formation of scar tissue appears to be the end product of the muscle repair process and hinders further muscle regeneration. Suramin is an inhibitor of TGF-Beta I activity, and can, thus, theoretically inhibit scar tissue formation. This study sought to determine whether Suramin could improve muscle healing after muscle contusion.

Myoblasts and muscle derived stem cells were cultured with Suramin. In addition, muscle derived stem cells were co-cultured with Suramin and Myostatin. Different concentrations of Suramin were injected into the muscles of mice two weeks after muscle contusion injury. Muscle regeneration and scar tissue formation were evaluated by histologic analysis, with functional recovery measured by physiologic testing.

Suramin stimulated the differentiation of myoblasts and muscle derived stem cells in a dose dependent manner. In addition, Suramin neutralized the inhibitory effect of myostatin. In the tibialis anterior muscles, Suramin was found to promote muscle regeneration, decrease fibrosis formation, and reduce myostatin expression. Physiologic testing revealed no significant difference in strength between uninjured muscle and injured muscle treated with Suramin.

Conclusion: This study demonstrates that intramuscular injection of Suramin after a contusion injury can improve muscle healing

and performance.

Nozaki, M., et al. Improved Muscle Healing after Contusion Injury by the Inhibitory Effect of Suramin on Myostatin, a Negative Regulatory of Muscle Growth. *Am J Sp Med.* 2008, December ;36(12): 2354-2353.

RADIOFREQUENCY MICROTENOTOMY FOR LATERAL EPICONDYLITIS

Lateral epicondylitis is a degenerative condition involving angiofibroblastic hyperplasia and hypovascularity in the extensor carpi radialis brevis and/or the extensor digitorum communis. Surgical procedures are reported to have good to excellent success rates of up to ninety percent. Treatments that stimulate neovascularization have shown promise in recalcitrant cases. This study compared the outcomes of radiofrequency microtenotomy with those of extensor tendon release and repair.

Twenty-four patients were randomly assigned to either a surgery group or a radiofrequency microtenotomy group. Eligible subjects complained of pain in the lateral epicondyle, exacerbated by resistance. All had completed at least twelve months of conservative therapy and three months of physical therapy, had not improved after three corticosteroid injections, and were considered appropriate candidates for surgical intervention. The surgeries were all performed by one physician using standard techniques. Outcome measures included pain evaluation, using a visual analogue scale (VAS), grip strength, as assessed with a dynamometer, and functional outcome, evaluated using the Mayo Elbow Performance Scale (MEPS).

No significant differences in VAS scores were noted between the two groups at three, six, or twelve weeks, or at ten to eighteen months.

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In addition, no significant differences were found in grip strength or on the MEPS at twelve weeks.

Conclusion: This randomized, controlled trial involving patients with recalcitrant lateral epicondylitis found similar outcomes between those treated with radiofrequency microtenotomy and extensor tendon release and repair.

Meknas, K., et al. Radiofrequency Microtenotomy: A Promising Method for Treatment of Recalcitrant Lateral Epicondylitis. *Am J Sp Med.* 2008, November; 36(10): 1960 - 1965.

SHOCKWAVE TREATMENT FOR PLANTAR FASCIITIS

Plantar fasciitis is the most common cause of heel pain, with an estimated ten percent of such cases resistant to conservative treatment. This randomized, controlled trial evaluated the efficacy of radial extracorporeal shockwave therapy in the treatment of chronic plantar fasciitis.

A total of 254 patients with chronic plantar fasciitis were selected, with 125 randomized to a treatment group and 118 to a placebo group. The treatment group received 2,000 impulses of radial shock at eight impulses per second, with energy influx density of 0.16 mJ/mm². The subjects received three interventions, two weeks apart. The primary outcome measure was overall heel pain reduction, as measured by the percentage change in the visual analogue scale (VAS) composite score at twelve weeks after treatment completion.

At the end of twelve weeks the composite VAS scores for heel pain had decreased by 72.1% in the active group and 44.7% in the placebo group (p=0.0220). After twelve months, the composite VAS scores for heel pain were reduced by 84.8% in the treatment group and by 43.2% in the placebo group (p<0.25).

Conclusion: This study found that extracorporeal shockwave treatment may be effective in improving pain, function, and quality of life among patients with chronic plantar fasciitis.

Gerdesmayer, L., et al. Radial Extracorporeal Shockwave Therapy Is Safe and Effective in the Treatment of Chronic Recalcitrant Plantar

Fasciitis. *Am J Sp Med.* 2008, November; 36(11): 2100-2109.

MEDIAL PLANTAR NERVE TESTING FOR POLYNEUROPATHY

Sural nerve (SU) action potential abnormalities are commonly used as an electrophysiological marker for distal symmetric polyneuropathy. However, given the high false negative rate, the superficial peroneal or medial plantar nerves have been suggested as alternatives. This study compared the sensitivity of the SU, superficial peroneal (SP), and medial plantar (MP) nerve tests for the diagnosis of distal symmetrical polyneuropathy (DSP).

Subjects were recruited from among patients referred for electrophysiological testing. Those participants were divided into two groups, including those referred for neck or back pain and those with a clinical history of DSP. All patients underwent MP, SU, and SP nerve testing. The results were compared between those with and those without DSP.

Among subjects without DSP, MP nerve action potentials were obtained for 99% of the subjects, with SU and SP nerve action potentials obtained for all subjects. Among subjects with DSP, MP action potentials were absent in 63%, SU action potentials absent in 1%, and SP action potentials absent in 19%. The accuracies of the MP, SP, and SU tests were 91%, 55.2% and 55.1%, respectively.

Conclusion: This study found that medial plantar nerve action potentials are easily obtained in normal subjects and have much higher sensitivity for identifying abnormal nerve action potentials in patients with distal sensory polyneuropathy than do sural or superficial peroneal nerves.

Sylantiev, C., et al. Medial Plantar Nerve Testing Facilitates Identification of Polyneuropathy. *Musc Nerve.* 2008, December; 38: 5095-1598.

LEXAPRO FOR POST-STROKE DEPRESSION

Over half of those patients who have sustained a stroke experience depression. This disorder has been

found to lead at times to impaired recovery of activities of daily living and increased mortality. Several investigators have attempted to prevent the development of post-stroke depression, without success. This study compared the efficacy of escitalopram and that of problem-solving therapy for preventing post-stroke depression.

One hundred seventy-six, previously non-depressed patients were involved in this multi-site, randomized, controlled trial. All subjects were within three months of an acute stroke. The study was conducted over a twelve-month period and included three, randomized groups, receiving escitalopram, placebo, or non-blinded problem-solving therapy. The main outcome measure was the development of a major depressive-like episode or minor depression, as determined by *DSM-IV* criteria.

At follow-up, depression was more likely among those receiving placebo (22%) than among those receiving escitalopram (8.5%) or problem solving therapy (11.9%). Escitalopram was superior to placebo ($p=0.007$), while problem-solving therapy was not ($p=0.51$). No significant difference was found among the three groups in adverse events.

Conclusion: This study of previously non-depressed patients with recent stroke found that escitalopram may reduce the incidence of post-stroke depression.

Robinson, R., et al. Escitalopram and Problem-Solving Therapy for Prevention of Post-Stroke Depression: A Randomized, Controlled Trial. *JAMA*. 2008, May; 299(20): 2391-2400.

PHRENIC NERVE CONDUCTION STUDIES FOR THE EVALUATION OF DIAPHRAGM PACING FOR QUADRIPLÉGIA

Mechanical ventilation via tracheostomy is standard therapy for patients with quadriplegia after a complete cervical spinal cord injury (SCI). Diaphragm pacing systems have been proposed as an alternative to mechanical ventilation for selected patients with high level SCIs. This study assessed the utility of phrenic nerve conduction studies for the pre-operative evaluation of patients

scheduled for the insertion of a diaphragm pacing system.

Phrenic nerve conduction studies were performed with simultaneous fluoroscopic observation of diaphragm excursion in 36 quadriplegic patients scheduled for the insertion of a pacing system. Stimulation was performed percutaneously in the supraclavicular fossa, with compound muscle action potentials recorded over the sternum. Subjects with good diaphragmatic movements underwent pacer implantation. The primary outcome measure following pacing was hours per day of tolerance of pacing off the ventilator.

Twenty-six subjects met the study's inclusion criteria. All patients with recordable compound muscle action potentials had diaphragmatic movement. After placement, all could be paced, with 56% achieving full-time pacing with no need for ventilator use. Twenty-four percent achieved part-time pacing. The pre-implantation electrodiagnostic studies did not correlate with the time needed to reach the endpoint.

Conclusion: This study demonstrates that a measurable diaphragm compound muscle action potential is associated with diaphragm movement in patients with high-level cervical myelopathy. The results did not indicate that compound muscle action potential amplitudes can be used to predict who might best benefit from diaphragmatic pacing.

Alshekhlee, A., et al. Phrenic Nerve Conduction Studies in Spinal Cord Injury: Applications for Diaphragmatic Pacing. *Musc Nerve*. 2008, December; 38: 1546-1552.

SAFETY AND EFFICACY OF REMINYL FOR ALZHEIMER'S DISEASE

Alzheimer's disease (AD) is an age-related, neurodegenerative disorder that is increasing in prevalence as the population ages. Reminyl (galantamine) is a reversible inhibitor of cholinesterase and an allosteric-potentiating ligand of the nicotinic acetylcholine receptors. The benefits of galantamine on targeted function, activities of daily living, and behavior in patients with mild to moderate AD have been previously demonstrated. This study assessed

the efficacy of galantamine for patients with severe AD.

Patients ranging in age from 40 to 95 years, all diagnosed with severe AD, and all with a history of cognitive decline of at least six months' duration, were included in this trial. The subjects were randomized to receive either galantamine, 24 mg/day, or a placebo. The participants were evaluated at baseline and at weeks eight, twelve, and twenty-six for changes in cognition, activities of daily living (ADLs), and cognitive function domains as measured by the Severe Impairment Battery (SIB).

The mean SIB scores improved in the treatment group and worsened in the placebo group ($p=0.006$). Significant differences in the SIB domains of memory, praxis, and visuospatial ability were found in favor of the treatment group ($p=0.06$, $p=0.01$, and $p=0.002$, respectively). However, no significant difference was found in the change in activities of daily living.

Conclusion: This study of patients with severe Alzheimer's disease suggests that galantamine can improve cognitive function. However, this treatment did not result in significant improvement in the performance of activities of daily living.

Burns, A., et al. Safety and Efficacy of Galantamine (Reminyl) in Severe Alzheimer's Disease (the SERAD study): A Randomized, Placebo Controlled, Double-Blind Trial. *Lancet Neur*. 2009, January; 8(1): 39-47.

THE MEDITERRANEAN DIET, SUPPLEMENTED WITH NUTS, FOR THE METABOLIC SYNDROME

While unhealthy diets promote the metabolic syndrome, the Mediterranean diet is thought to reduce cardiovascular risks. This study compared the one-year effects on the metabolic syndrome of two high-fat Mediterranean diets, one supplemented with virgin olive oil and the other supplemented with mixed nuts.

A total of 1,224 participants were recruited. All subjects were between the ages of 55 and eighty years. Eligible candidates underwent interviews, including the administration of a 26-item

questionnaire, and were then randomized to one of three groups. Interventions included quarterly education about the Mediterranean diet plus provision of 1 L per week of virgin olive oil (med diet plus VOO), 30 g per day of mixed nuts (med diet plus nuts), or advice for following a low-fat diet (control). The participants were assessed at baseline and again at one-year follow-up.

At baseline, 61.4% of the subjects met the criteria for the metabolic syndrome. The one-year prevalence was reduced by 6.7% in the med diet plus VOO group, by 13.7 percent in the med diet plus nuts group, and by 2% in the control group ($p=0.01$). After adjusting for compounding factors, the odds ratios for a reversion of the metabolic syndrome were 1.3 for the med diet plus VOO and 1.7 for the med diet plus nuts group, as compared with the control diet.

Conclusion: This prospective study of patients with the metabolic syndrome demonstrates that the positive effects of the Mediterranean diet can be enhanced with 30 g per day of nuts.

Salas-Salvado J, et al. Effect of a Mediterranean Diet Supplemented with Nuts on Metabolic Syndrome Status. *Arch Int Med.* 2008, December; 168(22): 2449-2458.

POST-STROKE HYPERTENSION

Elevated blood pressure is common after an acute stroke, with more than half of patients admitted to the hospital with a systolic blood pressure (SBP) above 160 mm Hg. Results of the International Stroke Trial indicated that the risk of early death increases by 3.8% for every 10 mm Hg rise in SBP above 150 mm Hg. However, a SBP of below 140 mm Hg is also associated with a poor prognosis. This study assessed the efficacy and safety of early blood pressure reduction within 36 hours of stroke onset.

One hundred seventy-nine patients were studied, all diagnosed with cerebral infarction or cerebral hemorrhage. All were evaluated within 36 hours of symptom onset, and all had an admission SBP of over 160 mm Hg. The subjects were randomly assigned to receive active or a placebo treatment. The treatment group was initiated on 50 mg of labetalol and 5 mg of lisinopril, with

further doses to titrate SBP to 145-155 mm Hg, or to a reduction of 15 mm Hg. The outcome measures were death or dependency, adverse effects, safety, and three-month mortality. The hypotensive arm of the study was abandoned due to recruitment problems.

Death or dependency at two weeks occurred in 61% of the combined, active treatment group and in 59% of the placebo group ($p=0.82$). However, three-month mortality was reduced in the active treatment group as compared to the placebo group ($p<0.05$). No significant difference in the occurrence of adverse events was found between the active treatment and placebo groups.

Conclusion: This study of patients with stroke and with hypertension at admission found reduced, three-month mortality among those with systolic blood pressure lowered to 145-155 mm Hg. However, due to the small sample size studied, the authors cautioned against over-interpretation of these results.

Potter, J., et al. Controlling Hypotension and Hypertension Immediately Post-Stroke (CHHIPS): A Randomized, Placebo Controlled Trial. *Lancet Neur.* 2009, January: 48-56.

CERVICAL PLEXUS BLOCK FOR CERVICOGENIC HEADACHE

Headache pain arising from disorders of the neck was first described in 1860. Cervicogenic headache is a syndrome with multiple causes, often presenting somewhere in the C2-C3 distribution. Several anesthetic techniques have been used to treat this pain, including greater and lesser occipital nerve blocks, cervical epidurals, and transforaminal injections. This study sought to determine the efficacy of a modified, deep cervical block for the treatment of these headaches.

All subjects had been referred for treatment of atypical headaches. All had completed diagnostic testing and had failed conservative treatment, including physical therapy, medications, and previous nerve blocks. The subjects received fluoroscopically guided unilateral blocks at the C2-3 interface, using a combination of bupivacaine and methylprednisolone. The injections

were repeated one week later in the contralateral side (for bilateral headaches) or in the ipsilateral side (for unilateral headaches). The participants were followed for six months, using a ten-point pain visual analogue scale and a pain diary. Pain levels were assessed before and after injections and again at three and six months.

A total of 39 patients participated in this study. The mean values for pre- and post-injection pain scores were 9.54 and 6.75 ($p<0.001$). One third of the patients reported a score of less than four after the last treatment. At three months, the pain scores were significantly lower than at baseline ($p<0.032$). However, at six months, those scores were no longer better than at baseline ($p=0.48$).

Conclusion: This study of patients with chronic, cervicogenic headaches found that deep cervical plexus injections, using a combination of bupivacaine and methylprednisolone, can produce significant immediate and three-month pain relief.

Goldberg, M., et al. Deep Cervical Plexus Block for the Treatment of Cervicogenic Headache. *Pain Phys.* 2008, November/December; 11: 849-854.

COMPREHENSIVE PAIN REHABILITATION

An estimated one in five American adults experiences chronic, non-cancer pain. The American Pain Society Task Force recently reported that comprehensive pain rehabilitation programs (CPRPs) which focus on functional restoration are associated with substantial, long-term improvements in a variety of chronic pain conditions. As opioid withdrawal is often the goal of pain programs, this study examined whether patients with chronic pain and opioid dependency benefit from CPRP which also involves opioid withdrawal.

Eligible subjects included 416 patients with chronic, non-cancer pain, admitted consecutively to the Mayo Clinic's comprehensive pain rehabilitation program over a period of a year. The subjects were divided into two groups based upon their opioid status at the time of admission. Those who were taking opioids upon

admission were compared to those who were not. The majority of the patients completed the intensive, three-week, outpatient, interdisciplinary program. Seventy percent of those who completed the program returned questionnaires assessing medication use, physical function, and emotional well-being six months after discharge.

At admission, significant differences were noted between the two groups, with the opioid use group having greater pain and depression ($p < 0.001$). For those completing the treatment program, no significant main effects were found for opioid status on any treatment outcome variable. Significant improvement was found on all outcome variables following treatment ($p < 0.001$) and at six months post-treatment ($p < 0.001$), regardless of opioid status at admission.

Conclusion: This study demonstrates that patients with chronic pain who arrive for treatment on chronic opioid therapy can experience significant improvement in pain severity and function, even with opioid withdrawal.

Townsend, C., et al. A Longitudinal Study of the Efficacy of a Comprehensive Pain Rehabilitation Program with Opioid Withdrawal: Comparison of Treatment Outcomes Based on Opioid Use Status at Admission. *Pain*. 2008, November; 140: 177-189.

EXERCISE AND BONE MINERAL DENSITY IN CHILDREN

Skeletal health and body composition are important in childhood, and can be modified favorably by physical activity. This study compared the effect of a structured, vigorous, high-impact exercise program with a non-sedentary lifestyle intervention on bone mineral content (BMC) and bone and mineral density (BMD) in ten- to eleven-year-old children.

Three primary schools were selected to participate, each assigned to one of three intervention groups. Sixty-one children who were free of chronic disease, metabolic disease, and prescription medications were included. A structured exercise intervention group performed high-impact, vigorous activity for sixty minutes twice per week for nine

weeks. A lifestyle intervention group received weekly mail to their homes, with the mission being to participate in physical activity. A control group received no intervention.

At follow-up, the structured exercise group increased BMC by 63.3g ($p = 0.019$) and BMD by 0.011 g cm^{-2} ($p = 0.018$). The mean increases did not differ between the control and lifestyle intervention groups. A reduction of 1.1% body fat was found in the exercise intervention group, with increased body fat noted in the control and lifestyle intervention groups ($p < 0.05$).

Conclusion: This study of ten- and eleven-year-old children found that structured exercise sessions, focusing on high impact activity, can significantly improve whole body bone mineral accrual, accompanied by encouraging changes in body composition, as compared with lifestyle intervention or no treatment.

McWhannell, N., et al. The Effect of a Nine-Week Physical Activity Program on Bone and Body Composition of Children Aged Ten to Eleven Years: An Exploratory Trial. *Int J Sp Med*. 2008, December; 29: 941-947.

PERCUTANEOUS CERVICAL NUCLEOPLASTY

Percutaneous cervical nucleoplasty (PCN) is a new, minimally invasive disc decompression technique that uses radiofrequency energy to ablate a portion of the intervertebral disc nucleus pulposus. This study sought to evaluate the effectiveness of PCN for the treatment of cervical disc herniation.

This prospective, non-randomized non-controlled trial included 126 consecutive patients diagnosed with contained cervical disc herniation. All subjects had failed conservative treatment and were scheduled for PCN. Outcome measures included pain reduction, using a visual analogue pain scale score, and McNab standard results descriptors.

Pain relief was significantly improved at week two and at months one, three, six, and twelve ($p < 0.001$). Average preoperative visual analogue scale scores for the five follow-up intervals were 7.25, as compared with average post-operative scores of 2.4. McNab standard results were excellent for 62 subjects, good for 41

subjects, and fair for 23 subjects.

Conclusion: This prospective, non-randomized, non-controlled study of patients with contained cervical discs found good to excellent outcomes in 84% of consecutive patients treated with percutaneous cervical nucleoplasty.

Li, J, et al. Percutaneous Cervical Nucleoplasty in the Treatment of Cervical Disc Herniation. *Eur Sp J*. 2008, December; 17: 1664-1669.

OBESITY AND OA

Obesity is considered to be an important risk factor for osteoarthritis (OA). However, the relationship between obesity and OA of the hands and hips remains controversial. This study investigated the long-term impact of obesity on OA of the hips, the knees, and the hands.

In 1995, all inhabitants born from 1918 to 1920, 1928 to 1930, 1938 to 1940, 1948 to 1950, 1958 to 1960, and 1968 to 1970 were sent questionnaires concerning musculoskeletal pain. The questionnaires specifically asked about diagnoses of OA of the hip, knee, or hand. The main outcome measure was OA diagnosis, based upon self-report. Obesity was defined as a body mass index (BMI) of thirty or above.

At ten-year follow-up, the incidences of OA were 5.8% for the hip, 7.3% for the knee, and 5.6% for the hand. Obesity was significantly associated with OA of the hand and knee, but not the hip. No significant interactions occurred among BMI, gender, age, or any other variables.

Conclusion: This study suggests that a high body mass index is associated with knee and hand osteoarthritis.

Grotle, M., et al. Obesity and Osteoarthritis in Knee, Hip and/or Hand: An Epidemiological Study in the General Population with Ten Years' Follow-Up. *BMC Musculoskel Dis*. 2008, 9: 132.

FUNCTION AFTER AC INJURY

Acromioclavicular (AC) joint separations are very common in contact sports. It is common practice to manage type I and type II AC injuries conservatively. This article

focused on the non-operative approach and its effects on long-term function.

This case series evaluated the treatment and long-term shoulder function of 23 patients with type I or type II AC separations. Included were four females and nineteen males, with an average age of 38 years. Bilateral shoulder function was evaluated using Constant scores, University of California-Los Angeles Shoulder Scale (UCLA) scores, and Simple Shoulder Test (SST) scores. Ultrasound was used to measure the amount of joint space separation and to exclude patients with rotator cuff disorders.

The average follow-up time was 10.2 years. Of the 23 patients, twelve reported occasional pain that interfered with their daily activities. All measures of shoulder function were worse in the injured than in the uninjured shoulders. Average Constant scores were 86.8 in the unaffected shoulder and 70.5 in the affected shoulder ($p < 0.001$). The average UCLA score in the uninjured shoulder was 29.2, and that in the injured shoulder 24.1 ($p < 0.001$). The average SST in the uninjured shoulder was 10.9, and that in the injured shoulder 9.7 ($p < 0.002$).

Conclusion: This long-term follow-up of patients with type I or type II acromioclavicular joint disruption found that half of the subjects had impaired function at ten-year follow-up.

Mikek, M., et al. Long-Term Shoulder Function after Type I and II Acromioclavicular Joint Disruption. *Am J Sp Med.* 2008, November; 36(11): 2147-2150.

ANKLE TAPING AND PERFORMANCE

Ankle sprains account for up to fifty percent of all sports injuries. Functional taping and ankle bracing are passive preventive measures, with few studies demonstrating their effect on athletic performance. This study evaluated the effect of prophylactic ankle taping on balance and jump performance.

Fifteen, physically active, recreational athletes were studied. All underwent a baseline medical history taking and physical examination, including ligamentous and range of motion tests. Each

participant performed three tests in two different situations, with and without taping. The taping technique was the Gibney closed basket weave. The tests included a counter movement jump, static balance, and a dynamic posturography test. The path of the center of pressure was measured on the balance tests, and the vertical ground reaction forces during push off and landing were measured in the counter movement jump tests.

No significant differences in performance were noted between the conditions in balance performance or in the push off phase of the jump. However, the second peak vertical force value during the landing phase of the jump was twelve percent greater in the ankle taping condition.

Conclusion: This study found that prophylactic ankle taping had no significant influence on the balance or jump performances of healthy, young subjects.

Abian-Vicen, J., et al. Ankle Taping Does Not Impair Performance in Jump or Balance Tests. *J Sp Sci Med.* 2008, September; 7: 350-356.

COLD WHIRLPOOL AND PERFORMANCE

Cryotherapy is a widely accepted therapeutic modality in sports medicine. This study measured the immediate and lasting effects of cold whirlpool treatment on various measures of functional performance.

The study used a repeated measures, pretest - post-test design, involving 21, healthy participants. The subjects underwent twenty minutes of bilateral immersion of the lower extremities in a whirlpool cooled to 10°C. All then underwent measures of anaerobic power, speed, agility, and active range of motion. Tests included a mean vertical jump, a forty yard dash, the T-test of agility, and assessment of active range of motion of the ankle.

Mean vertical jump scores were lower than at the pre-test at all immediate post-tests following immersion. Mean times for the forty yard dash significantly increased at two, seven, twelve, and twenty-two minutes. Mean agility scores were significantly increased for up to seven minutes following immersion. Dorsiflexion was significantly lower at seven and at twelve minutes, with no

deterioration noted in plantar flexion or inversion/eversion. Jumping performance was diminished for up to 32 minutes after immersion.

Conclusion: This study suggests that functional performance is adversely affected for up to 32 minutes after cold whirlpool treatment.

Patterson, S., et al. Effects of Cold Whirlpool on Power, Speed, Agility, and Range of Motion. *J Sp Sci Med.* 2008, September; 7: 387-394.

DEGENERATIVE LUMBAR SPONDYLOSIS IN THE ELDERLY

Low back pain (LBP) is a common complaint in the elderly, often caused by degenerative disc disease. Due to the higher morbidity and mortality of surgeries in the elderly, most initially seek alternative treatment options. This study compared conservative and surgical management for patients with degenerative lumbar scoliosis.

Fifty-five patients with degenerative lumbar scoliosis were divided into two groups, those who chose surgery ($n=26$), which consisted of decompression and spondylodesis, and those who chose conservative management, including pain medications and physical therapy. The participants were followed for a minimum of two years. The first part of this study involved retrospective analysis of medical records and radiographic studies. The second portion was a prospective survey measuring quality of life using the Oswestry Disability Score and a visual analogue scale.

At follow-up, significantly fewer patients in the surgery group complained of a restriction in walking distance as compared with baseline (36% versus 92%), with no such change found in the non-operative group. The proportion noting neurologic difficulties improved in both groups ($p < 0.01$). The proportion reporting daily use of analgesics was less for the surgery group ($p < 0.02$), with no significant change seen in the conservative treatment group ($p = 0.47$). Mean pain scores did not differ significantly between the groups at follow-up.

Conclusion: This uncontrolled study of patients with degenerative lumbar scoliosis found that those treated surgically had greater walking distances and less opioid use than

did those treated conservatively.

Kluba, T., et al. Comparison of Surgical and Conservative Treatment for Degenerative Lumbar Scoliosis. **Arch Orth Traum Surg.** 2009, January; 129: 1-5.

LUMBAR DISC HERNIATION: SURGERY?

Lumbar disc surgery remains one of the most commonly performed surgeries. This study sought to further clarify the long-term outcomes of operative versus nonoperative treatment of lumbar radiculopathy due to disc herniation.

The Spine Patient Outcomes Research Trial (SPORT) included 1,244 patients from thirteen medical centers. All subjects were eligible for open discectomy. The participants were randomized to receive either surgery or nonoperative care. The nonoperative protocol was usual care, which included physical therapy, education, home exercise instructions, and nonsteroidal anti-inflammatory drugs, if tolerated. The primary outcome measures included the SF-36 Bodily Pain and Physical Function Scales, with secondary outcome measures including self-reported improvement, work status, satisfaction with current symptoms and care, and sciatica severity.

Of those randomized to undergo surgery, 57% had surgery by one year and 59% by four years. In the nonoperative group, 41% of the subjects underwent surgery by one year and 45% by four years. Based upon an intention to treat analysis for over four years, all measures favored surgery, although no significant treatment effects occurred on any of the primary outcome measures. The secondary outcome measures significantly favored the surgery group at one year, with that significance maintained at four years only for the Sciatica Bothersomeness Index.

Conclusion: This study found that, at four-year follow-up, patients with lumbar disc herniation who had undergone surgery had maintained greater improvement on all primary outcome measures than had those treated conservatively. In addition, all secondary measures significantly favored the surgery group at four years.

Weinstein, J., et al. Surgical versus Non-Operative Treatment for Lumbar Disc Herniation: Four-Year Results for the Spine Patient Outcomes Research Trial (SPORT). **Spine.** 2008, December 1; 33(25): 2789-2800.

CALCIUM FOR MEN

Calcium supplementation is widely regarded as important for the prevention and treatment of postmenopausal osteoporosis. However, the evidence is less consistent concerning the effects for men. Therefore, this study sought to determine the effect of calcium supplementation on bone mineral density (BMD) in men.

This two year, randomized trial included 323 healthy men, all of whom were at least forty years of age. The subjects were randomized to receive calcium supplementation of 600 mg mg/day, of 1,200 mg/day, or a placebo. BMD was assessed at baseline and then at six-month intervals for the lumbar spine, the proximal femur, and the total body. The lumbar spine BMD was the primary endpoint, while changes in hip and total body BMD served as secondary outcome variables.

BMD increased at all sites by 1% to 1.5% more for the participants receiving calcium supplementation than for those receiving the placebo. Those receiving 600 mg/day of calcium did not significantly differ in BMD from the placebo group. Interestingly, the rate of falls for the 1,200 mg/day group was significantly less than that for the 600 mg/day group ($p < 0.005$) or for the placebo group ($p < 0.005$).

Conclusion: This study found that calcium, supplemented at 1,200 mg/day, affects bone mineral density positively in men. This study found no significant benefit of a dose of 600 mg/day of calcium.

Reid, I., et al. Randomized, Controlled Trial of Calcium Supplementation in Healthy, Non-Osteoporotic, Older Men. **Arch Int Med.** 2008, November 10; 168(20): 2276-2282.

NATURAL HISTORY OF DEGENERATIVE DISC DISEASE

The intervertebral disc is a

complex assembly which contains a relatively sparse population of cells responsible for the maintenance of disc hydration. This study examined to the density of cells at the L4-5 discs and in discs containing major pathology.

The nucleus zone and the eighteen annulus zones were demarcated for sagittal sections of the L4-5 discs. In each of the nineteen zones, the healthy disc cells were enumerated in ten, randomly selected, microscopic fields. Various measures of the disc were recorded, including disc dimensions, height ratio, and convexity, for correlation with cell density data.

The average density of the posterior annulus was significantly greater than that of the anterior annulus. The average density in the right half of the disc, including the nucleus, was significantly higher than that of the left. The density was lowest in the left anterior quadrant. Studies of the mid- to sagittal sections from the spines of ten men and ten women, ranging in age from thirteen to seventy years, demonstrated that nuclear cellular decline occurred progressively throughout life, whereas the decline at the annulus ceased after age fifty. Some tears were associated with low cellularity close to the tear, but not elsewhere.

Conclusion: This study demonstrates that disc cellularity declines as age advances. Cellularity is also reduced in the vicinity of major tears.

Barrie, V., et al. The Natural History of Age-Related Disc Degeneration: The Influence of Age and Pathology on Cell Populations in the L4-5 Disc. **Spine.** 2008, December 1; 33(25): 2767-2773.

NEEDLE STICK INJURIES IN EMG

Until now, electromyography (EMG) has not been cited as a significant cause of needle stick injuries among healthcare workers. This study sought to identify the prevalence of needle stick injuries among those who practice EMG.

An anonymous electronic survey was sent to all 3,802 members of the American Association for Neuromuscular and Electrodiagnostic Medicine who had available e-mail addresses. The survey instrument

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highlighted demographics, education, number of years in practice, and the actual experience of needle stick injury during EMG.

Eight hundred eight physicians responded. Those participants averaged sixteen years of having practiced at least one day per week. Two thirds of electromyographers reported at least one needle stick injury related to EMG. Only 44% reported having had a specific EMG safety component to their training, although this finding was higher in academic settings.

Three fourths of the physicians reported always wearing gloves while performing EMGs. Nearly half of all needle stick injuries occurred during a routine procedure, which occurred as the patient moved. Of the 412 electromyographers reporting a specific cause of the most recent injury, 37% specified a perceived lack of time, followed by equipment related factors.

Conclusion: This study suggests that EMG is an under-recognized cause of needle stick injury.

Mateen, F., et al. Needle Stick Injuries Among Electromyographers. *Musc Nerve*. 2008, December; 38: 1541-1545.

Rehab in Review is a monthly publication produced by physicians in the field of Physical Medicine and Rehabilitation (PM&R). The summaries appearing in this publication are intended as an aid in reviewing the broad base of literature relevant to this field. These summaries are not intended for use as the sole basis for clinical treatment, or as a substitute for the reading of the original research.

Rehab in Review is produced with the cooperation and assistance of Emory University School of Medicine, Department of Rehabilitation Medicine. *Rehab in Review* is affiliated with the Association of Academic Physiatrists and the Chinese Society of PM&R. Funding for academic training subscriptions is provided by corporate sponsorship.

Private subscriptions are available by mail at P.O. Box 183, Lampe, MO 65681, or by fax or phone at (800) 850-REU (7388).

ISSN # 1081-1303

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