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EARLY REHABILITATION AFTER SEVERE TRAUMATIC BRAIN INJURY

During the past several decades, an increasing number of patients survive a severe traumatic brain injury (TBI). Recently, focus has increased concerning the outcomes of severe TBI cases and the effectiveness of rehabilitation in improving physical, cognitive, psychosocial and functional outcomes. However, only a few studies have investigated the effect of integrating rehabilitation into acute TBI care. This study evaluated the effectiveness of early onset TBI rehabilitation, starting in the acute phase of care.

This prospective cohort study was part of a larger TBI research project that included patients with acute TBI admitted to a level I trauma center. Patients in group A received early comprehensive rehabilitation, beginning in the ICU. When sufficiently stable, they were transferred to a rehabilitation hospital or clinic for further rehabilitation. Those in group B did not receive early comprehensive rehabilitation, but received either inpatient brain injury rehabilitation in sub-acute rehabilitation departments or received no inpatient rehabilitation at all. Outcome measures included the Glasgow Outcome Scale Extended (GOSE) and the Disability Rating Scale (DRS), both administered at 12 months post-injury.

Early rehabilitation in Group A began at a median of 12 days after the injury. In Group B, the waiting time for inpatient brain injury rehabilitation ranged from 6 to 57 days. In Group A, the total length of acute hospitalization was 17 days shorter than that for Group B. At 12 months, 71% of patients in group A, as compared to 37% in group B, showed a favorable outcome on the GOSE ($p=0.007$). In addition, at 12-months follow-up, DRS scores were

better in group A than in group B. At 12 months, 81% of patients in group A were living at home, in contrast to 53% in group B ($p=0.06$). The median DRS in Group A was within the range of partial disability, whereas the median in Group B was within the range of moderate disability ($p=0.03$).

Conclusion: This study supports the hypothesis that better functional outcomes occur in patients who receive early onset and continuous chain rehabilitation.

Nada, A., et al. Does Early-Onset and Continuous Chain of Rehabilitation Improve the Long-Term Functional Outcome of Patients with Severe Traumatic Brain Injury? *J Neurotrauma*. 2012, Jan 1; 29(1): 66-74.

CORTICOSTEROID INJECTIONS AND CHONDROCYTE INJURY

Osteoarthritis (OA) is one of the most common chronic debilitating diseases. Corticosteroid injections are routinely used to provide short-term symptomatic relief, reduce inflammation and increase mobility. Previous studies examining the effect of these corticosteroids on articular cartilage have been inconclusive. This study evaluated the effect of a single injection of the four most commonly used corticosteroids on chondrocytes.

Human chondrocytes were cultured in a bioreactor capable of simulating normal joint fluid metabolism. Dexamethasone sodium phosphate, triamcinolone acetonide, methylprednisolone acetate and betamethasone sodium phosphate/betamethasone acetate were added in amounts equivalent to a 40 mg dose of triamcinolone acetonide. A mixed regression model was used to compare the amount of cell death among the corticosteroids over a 14-day trial.

Compared to the control medium, at 14 days, dexamethasone produced 1.3% more necrosis, methylprednisolone produced 38.2% more necrosis, triamcinolone produced 98.3% more necrosis and betamethasone produced 464% more necrosis ($p=0.002$).

Conclusion: This *in vitro* study of human chondrocytes found that, of the steroid preparations tested, betamethasone may be most damaging to articular cartilage.

Dragoo, J., et al. The Chondrotoxicity of Single Dose Corticosteroids. *J Knee Surg Sports Traumatol Arthrosc*. 2011, Dec 20: (E pub ahead of print)

GINGER AND CARDIOVASCULAR RISK FACTORS

Chronic inflammation is thought to play a major role in the physiological mechanism of cardiovascular disease. Some studies have shown that obesity may be regarded as a state of chronic, low-grade inflammation. Among the herbal medicines used to treat cardiovascular disease, ginger has been speculated to be beneficial due to its anti-inflammatory and anti-lipid activity. This study tested the effects of ginger supplementation and progressive resistance training on indices of cardiovascular risk.

Thirty two men, ranging in age from 18 to 30, were selected for a 10-week trial. Each subject was assigned to one of four groups to receive ginger supplementation, ginger supplementation with resistance training, placebo with no resistance training, or placebo with resistance training. The progressive resistance training program was performed three days per week for 10 weeks. Those receiving ginger received four capsules of ginger powder four times a day, with each

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capsule containing 250 mg of ginger root powder.

Anthropometric measurements were taken at baseline and at follow-up. Blood samples were taken for biochemical analyses, including triglycerides, high-density lipoprotein cholesterol and low-density lipoprotein cholesterol. In addition, blood levels were drawn to estimate systemic inflammation and insulin resistance.

Compared with baseline values, mean cholesterol, body fat percent, fat mass, waist circumference and weight to height ratios decreased in both resistance training groups ($p < 0.05$). In addition, a mean increase in fat free mass was seen in the resistance groups ($p < 0.05$). Subjects in both ginger groups and in both resistance training groups showed significant decreases in CRP levels ($p < 0.05$).

Conclusion: This study of obese men found that resistance training, three times per week, as well as ginger supplementation alone or in combination with resistance training, can reduce chronic inflammation.

Atashak, S., et al. Obesity Related Cardiovascular Risk Factors after Long-Term Resistance Training and Ginger Supplementation. **J Sports Sci and Med.** 2011, December 10; 10(4): 685-691.

EPIDURAL STEROID INJECTIONS FOR PATIENTS WITH DIABETES

Epidural steroid injections are among the most common nonoperative interventions for patients with pain related to lumbar spine disorders. In addition, diabetes is one of the leading causes of morbidity and mortality in the United States. This study analyzed the effects of epidural steroid injections on the blood glucose levels of patients with diabetes.

Thirty patients diagnosed with diabetes mellitus and symptomatic, image confirmed, lumbar spine stenosis were offered epidural steroid injections. The participants were asked to keep a journal of blood glucose levels for two weeks prior to the injection and for two weeks after the injection of 40 mg of betamethasone. The injections were delivered to the epidural space. Mean glucose values were derived using a nonlinear mixed effect model.

Blood glucose levels rose for 48 hours after the injection. The mean glucose level before injection was 160.18, while that immediately after injection was 286.13. The estimated half-life of the glucose level increase was 1.06 days. No significant association was seen between observed glucose level change and pre-injection hemoglobin A_{1c} or patient age.

Conclusion: This study of diabetic patients undergoing epidural steroid injections found that significant increases in blood glucose may occur within the first two days after injection.

Even, J., et al. Effects of Epidural Steroid Injections on Blood Glucose Levels in Patients with Diabetes Mellitus. **Spine.** 2012, January; 37(1): E46-E50.

EFFECT OF VITAMIN D ON MUSCLE STRENGTH AND BALANCE

Among older adults, vitamin D deficiency has been associated with important determinants of disability, including poor physical performance, cognitive impairment, falls and fractures. This meta-analysis further explored the data concerning vitamin D and its affect on muscle strength, balance and gait in older adults.

The authors completed a literature search, including articles published between 1980 and 2010. Studies which were selected for inclusion focused on the effect of vitamin D supplementation on muscle strength, gait and balance in older adults. All studies were randomized, controlled trials of supplemental vitamin D, with or without calcium, among subjects 60 years of age or older.

Thirteen articles met the inclusion criteria. In the pooled analysis, vitamin D supplementation with daily doses of 800 to 1,000 IU consistently demonstrated beneficial effects on strength and balance. In addition, postural sway was reduced ($p = 0.04$), as was the time to complete the Timed up and Go Test ($p = 0.03$).

Conclusion: This meta-analysis suggests that vitamin D supplementation with daily doses of 800 to 1,000 IU is beneficial for strength and balance.

Muir, S., et al. Effect of Vitamin D Supplementation on Muscle Strength,

Gait and Balance in Older Adults: A Systematic Review and Meta-Analysis. **J Am Geriatr Soc.** 2011, December; 59(12): 2291-2300.

LEUKOCYTE ESTERASE STRIP TEST TO DIAGNOSE JOINT INFECTION

To date no test is both sufficiently specific and sensitive to rule out or confirm a prosthetic joint infection. Leukocyte esterase is an enzyme secreted by neutrophils that have been recruited to the site of an infection. A colorimetric strip test for this enzyme has been used since the early 1980s to detect urinary tract infections. No study to date has assessed the value of a leukocyte esterase strip test for detecting the presence of infection in synovial fluid aspirated at the site of total knee arthroplasty (TKA).

The presence of leukocyte esterase was evaluated in knee aspirates obtained from two cohorts of patients between May of 2007 and April of 2010. The first cohort consisted of patients undergoing revision TKA with synovial fluid aspirated intraoperatively. The second cohort comprised patients who had previously undergone TKA and were undergoing a workup for a possible periprosthetic joint infection. The color change on the strip was read as negative, trace, positive or very positive, corresponding to the level of the enzyme noted after one or two minutes. Patients in the intraoperative cohort were classified as having a periprosthetic knee infection if (1) they presented with a sinus tract or an open wound in communication with the joint, (2) purulence was encountered in the joint intraoperatively, (3) cultures of fluid or tissue obtained from the joint preoperatively or intraoperatively tested positive for the presence of a pathogen or (4) elevated serum marker levels and an elevated white blood-cell count and/or an abnormal differential cell count were observed. These findings were used to determine the sensitivity and specificity of the test strips.

Thirty of the 108 knees undergoing revision arthroplasty were found to be infected and 78 were not infected. When the test strip was very positive, the leukocyte esterase test was 80.6% sensitive and 100% specific. The leukocyte esterase level

correlated strongly with the percentage of polymorphonuclear leukocytes and the total white blood cell count.

Conclusion: This study suggests that the leukocyte esterase strip test may be accurate in identifying the presence of periprosthetic joint infection in patients who have undergone arthroplasty.

Parvizi, J., et al. Diagnosis of Periprosthetic Joint Infection: The Utility of a Simple, Yet Unappreciated, Enzyme. **J Bone Joint Surg (Am).** 2011, December 21; 93(21):2242-2248.

AEROBIC AND RESISTANCE EXERCISE FOR CHILDREN WITH CYSTIC FIBROSIS

Cystic fibrosis (CF) impairs cardiorespiratory fitness and strength. Most studies of exercise interventions for CF have assessed aerobic and weight training programs separately. This study addressed the effect of a hospital-based endurance and resistance training program on the functional capacity of pediatric patients with CF.

Twenty-two patients with a diagnosis of CF were enrolled in the study. A control group received eight weeks of twice daily chest physiotherapy (PT), while an intervention group underwent eight weeks of intrahospital weight and endurance training plus chest PT. Exercise sessions occurred three times per week with the use of weight training machines and cycle ergometers. Those eight weeks were followed by four weeks of daily chest PT only. The primary outcomes measured were cardiorespiratory fitness, measured as peak oxygen uptake, $VO_{2\text{ peak}}$ and muscle strength. Secondary outcome variables included pulmonary function, weight, body composition, functional mobility and quality of life.

At the end of the training period, $VO_{2\text{ peak}}$ had increased by 3.9 mL/kilograms per minute in the intervention group ($p=0.002$), but then decreased during the detraining period. While the control group had a higher baseline $VO_{2\text{ peak}}$, no significant changes were noted during the study period. In addition, significant gains were realized in the intervention group on all strength tests ($p<0.001$), with no significant

regression noted in the detraining period. No significant differences were seen between the two groups in any of the secondary outcome measures.

Conclusion: This study found that a hospital-based training program, combining aerobic and resistance exercise, can improve cardiorespiratory fitness and strength in children with cystic fibrosis.

Sosa, E., et al. Intrahospital Weight and Aerobic Training in Children with Cystic Fibrosis: A Randomized, Controlled Trial. **Med Sci Sports and Exer.** 2012, January; 44(1): 2-11.

LACE UP ANKLE BRACES FOR ANKLE SPRAIN REDUCTION

Lace up ankle braces are commonly used to prevent ankle injuries in adolescent athletes, but their use remains controversial. This study was designed to determine whether lace up ankle braces during play can reduce the incidence and severity of these injuries in high school football players.

This randomized, controlled trial included 2,081 Wisconsin high school freshman football players who were assigned to either a brace or control group. Athletic trainers monitored brace compliance and recorded injury onset and days lost due to injury. Outcome measures included acute ankle, knee or other lower extremity injuries, as well as injury severity. Injury rates were compared between those who did and those who did not use ankle braces.

Two thousand eighty-one football players from 50 high schools were each randomized to two groups, including a lace up brace group ($n=993$) and a control group ($n=1,088$). A total of 95, first event ankle injuries were recorded. Of these, 68 occurred in the control group and 27 in the brace group ($p=0.003$). The reduced rate of ankle injuries was found in players both with and without a history of ankle injury in the previous 12 months. No significant difference was seen in the incidence of acute knee injuries per 1,000 exposures between those in the brace group those in the control group. Further, the results revealed no significant difference between the groups in the severity of the ankle injuries that were sustained.

Conclusion: This study of high school football players found that wearing lace up ankle braces can reduce the incidence but not the severity of acute ankle injuries.

Mcguine, T., et al. The Effect of Lace up Ankle Braces on Injury Rates in High School Football Players. **Am J Sport Med.** 2012, January ; 40(1): 49-57.

NEUROPROTECTIVE EFFECT OF ETHANOL

Despite a focus on the pathological effect of alcohol abuse, numerous studies have demonstrated the beneficial effects of light to moderate consumption of alcoholic beverages. This animal study was designed to assess the effect of alcohol immediately after a stroke, both alone and when combined with hypothermia.

The subjects were Sprague Dawley rats, randomly assigned to a sham or one of four surgically induced stroke groups. In addition, within each of these five groups, a normothermia group and a hypothermia group (32°C to 33°C of body core temperature) were created. The stroke groups included one non-treatment and three treatment groups receiving ethanol at 0.5, 1.0 or 1.5 g per kilogram. Follow-up infarction volumes were compared between groups.

After MCA occlusion for two hours and reperfusion for 48 hours, a dose-dependent relationship was found between ethanol dose (0.5, 1.0 or 1.5 g/kg) and infarct volume ($p < 0.001$). Treatment with 1.5 g per kilogram of ethanol was most effective in reducing total infarction volume by 47% compared with the control group. Significantly greater improvement in motor behavior was seen at two to 28 days after stroke among those rats treated with ethanol as compared to the control group. Adding hypothermia to the ethanol treatment did not produce a further reduction in infarction volume.

Conclusion: This animal study demonstrates a neuroprotective effect of 1.5 g per kilogram of ethanol when administered within four hours after a middle cerebral artery stroke.

Wang, F., et al. Neuroprotective Effect of Acute Ethanol Administration on a Rat with Transient Cerebral

Ischemia. **Stroke.** 2012, January; 43: 205-210.

NEUROPATHY IN PARKINSON DISEASE

Neuropathy has been described in significantly higher proportions of patients with Parkinson disease (PD) than among controls. Some have suggested that this greater incidence is related to levodopa therapy and consequent vitamin B₁₂ deficiency. This study further assessed the prevalence and determinants of neuropathy among patients with PD.

This study included consecutive patients with idiopathic PD attending a specialty clinic. All participants underwent peripheral nerve function assessment using the Utah Early Neuropathy Scale (UENS). In addition, serum vitamin B₁₂ levels, duration of PD, cumulative levodopa exposure, body mass index and alcohol consumption were determined. The primary outcome measure was the prevalence of neuropathy. A total of 37 patients with PD were included in the study. The mean age was 67.9 years and the mean disease duration 5.95 years. These patients were compared with 37 age- and gender-matched control subjects. The most common diagnoses in the control subjects were migraine headache and myasthenia gravis.

Fourteen of the 37 patients with PD and three of the 37 control subjects demonstrated neuropathy ($p = 0.005$). Eight of the 14 patients with PD (57.1%) with neuropathy had vitamin B₁₂ levels < 300 ng/L, compatible with deficiency. Vitamin B₁₂ levels were significantly lower in patients with PD with neuropathy than in control subjects ($p = 0.002$). In considering all patients with PD, cumulative levodopa exposure was significantly related to PD duration ($p < 0.001$).

Conclusion: This study found a significantly greater prevalence of neuropathy in patients with PD than among control subjects. Vitamin B₁₂ deficiency was likely a significant cause of the neuropathy among the patients with PD. The authors suggest that levodopa therapy may be related.

Rajabally, V., et al. Neuropathy in Parkinson's Disease: Prevalence and

Determinants. **Neurol.** 2011, November; 77(22): 1947-1950.

ANTIMUSCARINIC THERAPY FOR OVERACTIVE BLADDER IN MEN

Overactive bladder is a common syndrome in men, manifesting in symptoms of urgency, frequency and nocturia. This study compared the effectiveness of behavioral treatment to that of antimuscarinic therapy in men who continued to experience symptoms despite alpha blocker therapy.

This randomized, controlled trial included 143 men with clinical symptoms and urodynamic evidence of overactive bladder without obstruction. These patients were given alpha blockers for four weeks and were then randomized to groups receiving behavior therapy or antimuscarinic therapy. Subjects in the behavioral therapy group underwent a comprehensive program, including pelvic floor muscle training, delayed voiding, monitoring with bladder diaries and urge suppression techniques to inhibit or suppress detrusor contractions and reduce urgency, frequency and incontinence. Individuals in the antimuscarinic group received oxybutynin titrated to between five and 30 mg per day. The primary outcome measure was the post-treatment, 24-hour voiding frequency.

Two hundred three men entered the alpha blocker portion of the study. One hundred forty-three continued to experience symptoms, and were randomized to receive behavioral treatment or drug treatment. The mean voids per day decreased from 11.3 to 9.1 with behavioral treatment ($p < 0.001$), and from 11.5 to 9.5 with drug therapy ($p < 0.001$). After treatment, the behavioral therapy group demonstrated greater reductions in episodes of nocturia than did those in drug treatment group ($p = 0.05$). However, the drug therapy group demonstrated a greater reduction in maximum urgency scores than did the behavior group ($p = 0.05$).

Conclusion: This study of men with overactive bladders found that behavioral and antimuscarinic therapies are equally effective treatments when added to alpha blockers.

Burgio, K., et al. Behavioral versus Drug Treatment for Overactive Bladder in Men: The Male Overactive Bladder Treatment in Veterans (MOTIVE) Trial. *J Am Geriatr Soc.* 2011, December; 59: 2209-2216.

INCIDENCE AND RISK FACTORS FOR FALLS FOLLOWING TOTAL KNEE ARTHROPLASTY

Among the intrinsic risk factors for falls among the elderly are deformed or painful joints. As the standard approach for the treatment of deformity and pain in the knee joint is total knee arthroplasty (TKA), this study investigated the incidence of falls among elderly patients following TKA.

This prospective, observational study included 70 patients, all at least 60 years of age, who underwent standard TKA within six to 11 months of enrollment. Preoperative and postoperative assessments included a physical examination, physical performance tests and questionnaires. Follow-up assessments at six months after baseline included a fall incidence questionnaire.

At six months, 32.9% of the subjects reported that they had fallen. Postoperative knee flexion and ankle plantar flexion range of motion were significantly lower among those who fell than among those who did not ($p=0.037$ and $p=0.014$, respectively). Multivariate analysis revealed that a 10° increase in knee flexion after surgery reduced the odds of falling by 72.3%, while a 5° increase in plantar flexion of the ankle reduced the odds of falling by 40.6%.

Conclusion: This study found that reduced postoperative knee flexion and ankle plantar flexion are risk factors for falls among the elderly who undergo total knee arthroplasty.

Matsumoto, H., et al. Fall Incidence and Risk Factors in Patients after Total Knee Arthroplasty. *Arch Ortho Trauma Surg.* 2011, DOI 10.1007/800402011-1418-y.

RISK OF HEMATOMA WITH ELECTROMYOGRAPHY

There are no absolute contraindications to performing a selective electromyographic examination (EMG). However, either

acquired or medically induced coagulopathy has historically been considered a relative contraindication to EMG. This study was designed to determine whether there is an increased risk for hematoma in patients who are taking antiplatelet or Coumadin therapy when undergoing EMG.

This prospective, case-control study investigated adult subjects referred for EMG. Subjects were included if EMG was performed on any or all of seven predetermined muscles. A total of 205 subjects were divided into three groups, warfarin (58 patients), aspirin and/or clopidogrel (78 patients) and a control group (70 patients). All participants underwent ultrasound after needle EMG to evaluate for hematoma formation.

No significant difference in the risk of hematoma formation was seen between the groups ($p=0.43$). Only two hematomas were found. None of the control patients demonstrated a hematoma, while one subject in the aspirin/clopidogrel group had a subclinical hematoma measuring 8.8×1.2 mm. The other subclinical hematoma occurred in a patient in the warfarin group, measuring $16 \text{ mm} \times 3 \text{ mm}$. This patient had an international normalized ratio of 2.3. Both subjects were asymptomatic at 24 hours after EMG.

Conclusion: This prospective study of patients undergoing EMG suggests that the risk of hematoma formation in patients undergoing antiplatelet or anticoagulant therapy is low.

Boon, A., et al. Hematoma Risk after Needle Electromyography. *Musc Nerve.* 2012, January; 45(1): 9-12.

INFLUENCE OF STATINS ON POST-STROKE MORTALITY

Statins have been shown to reduce the risk of first-time and recurrent ischemic stroke. However, controversy persists regarding the effects of statins on mortality following stroke. This study investigated the use of statins on survival of patients with first-time ischemic stroke.

This retrospective chart review included 12,689 patients with first-ever ischemic stroke. The subjects were divided into groups based upon statin use. These groups included those who did not use statins before

or after the stroke, those who used statins before the stroke but did not continue after hospitalization, those who did not previously use statins, but began at hospitalization, and those who were statin users before the stroke and continued during and after hospitalization. The groups were compared for outcomes after ischemic stroke.

The use of statins before and during stroke hospitalization was associated with improved survival over the year after stroke ($p<0.001$). Similar results were obtained using lovastatin and simvastatin. The cumulative, one-year risk of death among patients with statin initiation in the hospital was similar to that seen for patients taking a statin before and during hospitalization. The risk of death among patients who underwent statin withdrawal was significantly higher than among those who did not receive statins before or during hospitalization ($p<0.001$). Patients who used a dose of at least 60 mg per day had improved survival as compared with those using less than 60 mg per day ($p<0.001$).

Conclusion: This study of patients with first-time ischemic stroke found that statin use during acute hospitalization is associated with improved survival, and that withdrawal of statins during hospitalization worsens the chance of survival.

Flint, A., et al. Statin Use during Ischemic Stroke Hospitalization is Strongly Associated with Improved Post-Stroke Survival. *Stroke.* 2012, January; 43: 147-154.

NON-ALCOHOLIC BEER AND RESPIRATORY TRACT ILLNESS IN RUNNERS

Prolonged, rigorous exercise has been linked to an increased incidence of respiratory tract infections. This phenomenon is thought to be the result of transient inflammation and immune system dysfunction. Alcoholic beverages contain polyphenols, which are non-alcoholic compounds known to have anti-pathologic, antioxidant and anti-inflammatory properties. This study examined the effects of non-alcoholic beer polyphenols on the incidence of upper respiratory tract infections in healthy male athletes training for a marathon

A total of 277 participants, ages 20 to 60 years and without significant medical disease, were randomly assigned to receive nonalcoholic beer containing polyphenols or a control beverage of the same composition without polyphenols. All subjects received their beverages, consuming one to 1.5 liters per day, three weeks before and two weeks after a marathon. Athletes who took nonsteroidal anti-inflammatory drugs, did not complete the race or discontinued their assigned intervention were excluded. The primary outcome measure was plasma interleukin-6 level, with secondary measures including plasma leukocyte count and the incidence of upper respiratory tract infections.

Immediately after the marathon, plasma interleukin-6 levels were significantly reduced in the intervention group as compared to the control group ($p=0.03$). The control group had a significantly higher incidence of upper respiratory tract infections in the two weeks following the race ($p=0.007$), as well as a higher plasma leukocyte count when measured 24 hours after the race ($p=0.02$).

Conclusion: This study demonstrates that the consumption of polyphenols found in non-alcoholic beer can reduce plasma interleukin-6 level, leukocyte count and the incidence of upper respiratory tract infections in endurance training athletes.

Scherr, J., et al. Non-Alcoholic Beer Reduces Inflammation and Incidence of Respiratory Tract Illness. *Med Sci Sports Med.* 2012; 44(1): 18-26.

YOGA AND STRETCHING FOR LOW BACK PAIN

Numerous treatments have been trialed for chronic low back pain (LBP), although none have proven significantly effective. One form of exercise with at least fair evidence for effectiveness for LBP is yoga. This study compared the effectiveness of yoga classes with that of stretching classes for the treatment of chronic LBP.

Subjects were patients with chronic, nonspecific LBP who were recruited from an integrated health care organization. From these 280 individuals were identified who were

randomized to one of three treatment arms, including 12 weekly yoga classes, 12 weekly stretching exercise classes, or use of a self-care book (*The Back Pain Helpbook*). Assessments were made at baseline, six, 12 and 26 weeks after randomization. The primary outcome measures were the Roland Morris Disability Questionnaire and self-rated symptom bothersomeness. Secondary outcomes included activity restriction, patient global ratings of improvement, and patient satisfaction.

Compared with self-care, the yoga group reported superior function at 12 and 26 weeks, with the stretching group reporting superior function at six, 12 and 26 weeks. No significant differences were seen between the yoga and stretching groups.

Conclusion: This study of patients with chronic low back pain found no difference in outcome between those treated with yoga and those treated with stretching exercises.

Sherman, K., et al. A Randomized Trial Comparing Yoga, Stretching, and a Self-Care Book for Chronic Low Back Pain. *Arch Inter Med.* 2011, Dec 12; 171(22): 2019-2026.

TAI CHI AND CARDIAC FUNCTION

Tai chi has been practiced in numerous Asian countries for hundreds of years. This martial art emphasizes the balance of the body and the mind, and is rated as a moderately intense form of aerobic exercise. This study evaluated the effect of tai chi on cardiac function in a healthy sample.

Eighty-three healthy subjects, all at least 50 years of age, were recruited from a tai chi club at Taipei Hospital. All were community dwellers engaged in regular exercise at least three times per week. The subjects were asked to practice tai chi three times a week for one hour sessions over a five-month period. The tai chi program consisted of 24 movements from the Yang styles. Laboratory data, including fasting glucose and lipid profiles, were collected before and after the five-month study. Hemodynamic data were also obtained, including vascular compliance and resistance, cardiac output, stroke volume and left ventricular ejection fraction, all

measured at baseline and at the end of the study. The subjects were divided into two groups, adherents (who attended 80% of the sessions) and non-adherents (who attended <80% of the sessions), in order to compare the effects of adherence to the tai chi regimen.

After five months, blood glucose and serum triglyceride levels were significantly lower in those who attended at least 80% of the sessions than among those who attended less. No significant difference was seen in the other biomarkers. The adherent group demonstrated improved left ventricular contractility, cardiac output, cardiac index, stroke volume and systemic vascular resistance as compared to the non-adherent group ($p<0.01$ for all comparisons).

Conclusion: This prospective study of healthy individuals over the age of 50 years found that a five-month tai chi program improved blood sugar control and enhanced cardiac performance parameters.

Huang, Y., et al. Adhering to Tai Chi Chuan Exercise Program Improves Vascular Resistance and Cardiac Function. *Int J Gerontol.* 2011, September; 5(3): 150-154.

SMOKING AND EARLY RHEUMATOID ARTHRITIS

Smoking is an accepted risk factor for rheumatoid arthritis (RA), increasing the risk of seropositive RA. Data have also demonstrated that smoking is associated with a poor response to anti-rheumatic drugs. This study further explored the effects of smoking on disease activity, therapeutic response and radiographic progression in patients with early RA.

Subjects were 156 patients from two clinics, all diagnosed with RA within two years of enrollment. At inclusion, the participants were classified as ever-smokers, past smokers (smoking cessation \geq one year before disease onset), current smokers or nonsmokers. At study entry, variables recorded included demographic characteristics, disease duration, serum RF, ACPA-2, anticyclic citrullinated fibrin-filaggrin autoantibodies, and HLA-DRB*1 genotype. Disease activity was assessed at baseline and every three months. Demographics, as well as hand and foot radiographs, were

obtained at baseline and at 12 and 24 months. All radiographs were scored for radiographic damage.

Clinical disease activity, rates of European League Against Rheumatism (EULAR) clinical response at 12 and 24 months and therapy received, including biologicals, were similar in current smokers and nonsmokers. A multivariate analysis showed that current smoking was independently associated with radiographic damage after 24 months. However, the symptoms of RA did not differ between the two groups.

Conclusion: This study of patients recently diagnosed with rheumatoid arthritis found that smoking may be an independent risk factor for radiographic progression of the disease.

Ruiz-Esquide, V., et al. Effects of Smoking on Disease Activity and Radiographic Progression in Early Rheumatoid Arthritis. *J Rheumatol.* 2011, December; 38(12): 2536-2539.

EFFECT OF DIETARY PROTEIN CONTENT ON WEIGHT GAIN DURING OVEREATING

In previous reviews of macro nutrient composition in response to overeating, data have suggested that, when people over eat a diet that contains either high or low protein, they are less metabolically efficient. This study further explored whether dietary protein levels differentially affect body composition, body weight gain and/or energy expenditure.

Twenty-five, weight stable adults were recruited. The sample included 16 males and nine females with body mass indices ranging from 19 to 30. Each participant was initially placed on a weight stabilization diet. That diet was followed by 10 to 12 weeks of one of three randomly selected diets. These included low protein (five percent of energy through protein), normal protein (15% of energy through protein), and high protein (25% of energy through protein). Each diet was 40% above weight maintenance energy requirements. All subjects underwent measurements of resting energy expenditure, total daily energy expenditure and body composition.

Overeating produced less weight gain in the low protein diet than in the normal or high protein diet. Lean

body mass increases were greater in the normal and high protein groups, while fat gain was similar across all three groups. The normal and high protein groups had increased resting energy expenditure as compared to the low protein group.

Conclusion: This study found that overeating a diet with low protein results in less weight gain than consuming normal or high protein.

Bray, G., et al. Active Dietary Protein Content on Weight Gain, Energy Expenditure and Body Composition during Overeating. *JAMA.* 2012, January 4; 307(1): 47-55.

AUTOLOGOUS CHONDROCYTE IMPLANTATION FOR ARTICULAR CARTILAGE DEFECTS OF THE KNEE

Articular cartilage lesions of the knee are known for their limited potential to heal spontaneously. Interventions intended to reestablish the cartilage surface by tissue repair include marrow stimulation techniques such as microfracture (MF) and regenerative approaches such as autologous chondrocyte implantation (ACI). ChondroCelect is an ATMP (Advanced Therapy Medicinal Product) recently approved as the first cell-based therapy by the European Medicines Agency for the treatment of symptomatic, isolated, full-thickness cartilage defects of the femoral condyle. This study assessed the efficacy of this new system.

Between 2003 and 2008, 116 patients with symptomatic isolated grade II or grade III cartilage lesions were recruited. All subjects underwent initial arthroscopic procedures, with a cartilage biopsy taken at that time. In addition, 120 mL of whole blood was taken from the patient for the cultivation of the implant. From these materials, an implant was fabricated, with a diameter of 34 mm and a height of 6 to 8 mm. These implants were cultured in autologous serum for 10 to 13 days, and then surgically implanted.

For isolated femoral and tibial defects, the knee joint was immobilized 48 hours, with flexion limited to 30° during the first three weeks and 60° during the next three weeks, with partial weight bearing for 12 weeks. When a reconstruction of the subchondral bone was performed,

non-weight-bearing was encouraged for at least six weeks. Physical activity was allowed after six months with competitive loads such as soccer or track and field athletics allowed after 12 months. International Knee Documentation Committee (IKDC) scores were obtained before and after treatment. Patients were followed for a mean of 30.2 months.

IKDC scores improved from 42.4 before surgery to 70.5 at long-term follow-up. Further, ten point visual analogue pain scores decreased from 6.7 before surgery to 3.2 at long-term follow-up. Overall treatment satisfaction was judged as very good or good by 80% of the patients. The IKDC functional and the status was grade I in 23%, grade II in 56.3% grade III in 17.2% and grade IV in 3.1% of the patients.

Conclusion: This study of patients with articular cartilage defects of the knee found that a matrix associated autologous chondrocyte implantation technique may yield satisfying long-term results.

Schneider, U., et al. A Prospective, Multicenter Study on the Outcome of Type I Collagen Hydrogel -- Based Autologous Chondrocyte Implantation (CaReS) for the Repair of Articular Cartilage Defects in the Knee. *Am J Sports Med.* 2011, December; 39 (12): 2558-2565.

CONTINUOUS VERSUS INTERMITTENT TREATMENT WITH COX 2 INHIBITORS

Concerns regarding the treatment side effects of non-steroidal anti-inflammatory drugs and Cox-2 inhibitors have led to a perception that intermittent dosing may be a safer treatment option. This study further assessed the effects of continuous versus intermittent use of celecoxib for the treatment of osteoarthritis (OA).

Subjects were patients 18 to 80 years of age with symptomatic OA of the knee or hip requiring the use of NSAIDs. Initially, the participants underwent a washout period, during which discontinuation of NSAID treatment resulted in a documented OA flare. After the washout period, if the subjects demonstrated resolution of symptoms, they were eligible for further study. Those eligible patients were then randomized to either group A, to receive daily celecoxib with

(Continued from page 2)

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placebo for flares, or group B, to receive daily placebo with celecoxib for flares. The primary outcome measure was the number of OA flares during a 22-week period, with secondary measures including time until first flare.

A total of 875 subjects entered the study, with 858 receiving treatment and 675 completing the study. The subjects in group A reported 42% fewer OA flares per month than did those in group B. The subjects in group A also reported improvements in pain, with improved global arthritis scores at all time points. The median time to occurrence of a flare was longer in group A, with 22.9% reporting that they were flare free during the study, as compared with 10.6% in group B.

Conclusion: This study of patients with osteoarthritis found that continuous treatment with a Cox-2 inhibitor is more effective than intermittent use for preventing flares of symptoms.

Strand, V., et al. Treatment of Osteoarthritis with Continuous versus Intermittent Celecoxib. *J Rheum*, December. 2011; 38(12): 2625-2634.

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