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Volume 22 Number 8

Published by Physicians
In Physical Medicine and Rehabilitation

August 5, 2014

PROCESSED RED MEAT AND HEART FAILURE

Previous studies have demonstrated that total red meat consumption is linked to an increased risk of coronary heart disease and stroke, although little data exist comparing processed and unprocessed red meat. This prospective study investigated the associations of both unprocessed and processed red meat with heart failure.

The Cohort of Swedish Men was established in 1997, targeting all men between 45 and 79 years of age. Participants completed questionnaires regarding food intake and other lifestyle factors. Diet was assessed on a 96-food frequency questionnaire, including seven questions concerning unprocessed and processed red meat intake. Other information obtained included education, smoking status, body mass index and physical activity. All subjects were followed for an average of 11.8 years, with the primary outcome measures being heart failure and death due to heart failure.

Positive associations were found between processed red meat but not unprocessed red meat consumption and the risk of heart failure. Comparison of the highest category of processed red meat consumption (over 75 g per day), to the lowest (under 25 g per day) resulted in a HR of 1.28. The risk of heart failure increased by eight percent for each 50 g per day increment in processed red meat consumption. Those in the highest category of processed red meat consumption had a 29% higher risk of heart failure than those in the lowest category. Further, those in the highest category of processed red meat consumption had a 2.43 greater risk of heart failure death as compared to the lowest category ($p < 0.001$).

Conclusion: This prospective study of men found that the consumption of processed red meat,

but not unprocessed red meat, was associated with an increased risk of heart failure.

Kaluza, J., et al. Processed and Unprocessed Red Meat Consumption and Risk of Heart Failure: A Prospective Study of Men. *Circulation Heart Failure*. 2014, July; 7(4):552-557.

BIOMARKERS AND CONCUSSION SEVERITY

Previous studies have demonstrated that elevated levels of cerebral spinal fluid biomarkers of axonal injury can be detected after injuries to the brain, with some demonstrating increased quantities with increasing severity of injury. This study was designed to determine whether sports related concussion is correlated with elevated biomarkers when tested with peripheral blood sampling.

Subjects were 288 players from 12 Swedish hockey teams who underwent clinical examination and concussion screening before season onset. Of these, 47 had biomarkers drawn before the start of the season. During the season, among players who sustained concussion or other head injury, blood samples were drawn at one, 12, 36, 44 and 144 hours post-injury. From these samples, levels of T-tau, S-100B and NSE were determined.

Of the 288 players, 35 sustained a sports related concussion during the study. Of those, 28 agreed to participate. Among these, 15 players had symptoms lasting longer than six days. The T-tau levels were significantly higher in post-concussion samples compared with preseason samples at all times tested ($p = 0.002$).

Levels of both T-tau ($p < 0.001$) and S-100B ($p < 0.001$) were higher immediately after concussion, as compared with pre-season samples. However, the levels of S-100B and

NSE, but not T-tau, increased after a friendly game without concussion compared with baseline. The concentration of T-tau one hour after concussion, was significantly related to the number of days for concussion symptoms to resolve ($p = 0.002$).

Conclusion: This study of professional ice hockey players found that, after concussion, the concentration of the biomarker T-tau is elevated, and may be useful in determining the severity of the concussion.

Shahim, P., et al. Blood Biomarkers for Brain Injury in Concussed Professional Ice Hockey Players. *JAMA Neurol*. 2014, June; 71(6): 684-692.

COMBINED BRAIN AND PERIPHERAL STIMULATION FOR BACK PAIN

The lifetime prevalence of low back pain (LBP) is thought to be as high as 79% in adults and 84% in adolescents. As transcranial direct current stimulation (tDCS) and peripheral electrical stimulation (PES) can each desensitize the nervous system and regulate brain organization, this study investigated the effects of combining tDCS and PES in patients with recurrent episodes of LBP.

Sixteen patients with recurrent, nonspecific LBP were recruited for participation. The participants were randomized to receive anodal tDCS combined with PES (applied to the area of worst pain), anodal tDCS combined with sham PES, sham tDCS combined with PES, or sham tDCS combined with sham PES. The subjects were assessed for pain immediately after intervention, using an 11-point numeric rating scale (NRS), motor cortical organization (measured with transcranial magnetic stimulation), sensitization (using pressure pain thresholds), pain free

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range of motion (measured with the Shober test) and higher sensory functions (measured with two-point discrimination).

Pain severity was significantly reduced following each of the three active interventions, and maintained at day three. No pain reduction resulted from the sham intervention. The combined intervention resulted in improvement on the sensitization tests, normalized motor cortical organization and improved sensory function.

Conclusion: This study suggests that a combination of tDCS and PES can provide clinical benefits greater than those obtained with each intervention applied alone.

Schabrun, S., et al. Targeting Chronic, Recurrent Low Back Pain from the Top-Down and Bottom-Up: A Combined, Transcranial Direct Current Stimulation and Peripheral Electrical Stimulation Intervention. **Brain Stim.** 2014, May-June; 7(3): 451-459.

KINESIOTAPE FOR ANKLE INSTABILITY

Previous studies have reported that 55-72% of individuals who sustain a lateral ankle sprain have residual symptoms for weeks or years, and/or develop functional ankle instability (FAI). One of the primary factors contributing to FAI is thought to be proprioceptive defects. As the application of tape or braces can improve conscious proprioceptive sense, some have suggested using these techniques as therapeutic interventions. This study assessed the effect of kinesiotape on the proprioceptive capability of patients with ankle sprains.

Fourteen university students were identified with chronic ankle sprains, all of whom felt unstable during sports or recreational activity. A control group comprised 14 subjects with healthy ankles and no history of ankle injury. After baseline ankle assessment, the subjects were randomized to either a group to receive kinesiotape or a control condition without taping. The ankles were then tested once again for strength by maximum voluntary isometric contraction, and for proprioception by force sense testing.

The mean force sense error for the treatment group improved from a

baseline of 2.6 to 1.8 at 72 hours after tape application. Immediately after tape application, the injured group had significantly more errors than the control group. After they had worn the tape for 72 hours, no significant differences were noted between the two groups.

Conclusion: This study of patients with functional ankle instability found that, after wearing tape for 72 hours, proprioceptive deficits are improved, approaching those of subjects without injury.

Simon, J., et al. The Effect of Kinesiotape on Force Sense in People with Functional Ankle Instability. **Clin J Sports Med.** 2014, July; 24(4): 289-294.

BRACING FOR RECURRENT ANKLE SPRAINS

As ankle sprains remain the most common sports and other activity related injury, prevention of recurrence is of significant import. This study was designed to determine the cost-effectiveness of bracing, as compared with neuromuscular training, for the prevention of recurrent ankle sprains.

This prospective, randomized, controlled trial included 340 athletes with recent lateral ankle sprains. The athletes were randomized into three groups. Group 1 underwent a home-based neuromuscular training program, involving three, unsupervised training sessions per week at 30 minutes per session. Those in the bracing group received a semi-rigid ankle brace, to be worn during all sports events for 12 months. Those in the combination group received both training and the brace. For the cost analysis, cost of materials, patient time and health care utilization were recorded at one-year follow-up.

During follow-up, 69 athletes reported a recurrent ankle sprain, including 19% in the combination group, 15% in the brace group and 27% in the neuromuscular training group. By reviewing the total cost of the injuries (including patient time), the incremental cost-effectiveness ratio was determined. Bracing alone resulted in a significant decrease in costs (hazard ratio=0.81), as well as reduced ankle sprain incidence. Neuromuscular training resulted in a lower cost compared to the

combination group but was associated with an increased risk of repeat ankle sprain (hazard ratio=1.52) as compared with the combination group.

Conclusion: This study of athletes with acute ankle sprains found that bracing is the most cost effective intervention for preventing recurrent ankle sprains, as compared with neuromuscular training and combination therapy.

Janssen, K., et al. The Cost Effectiveness of Measures to Prevent Recurrent Ankle Sprains: Results of a Three-Arm, Randomized, Controlled Trial. *Am J Sports Med.* 2014, July; 42(7): 1534-1541.

REHABILITATION AFTER ANKLE RECONSTRUCTION FOR CHRONIC, LATERAL INSTABILITY

Chronic ankle instability occurs in approximately 20% of patients with ankle inversion sprain. In these cases, surgical reconstruction is an option, with post-surgical immobilization and non-weight bearing. This study compared post-reconstructive surgery clinical outcomes between those with a traditional, delayed rehabilitation and patients subjected to early accelerated rehabilitation.

Between January of 2007 and March of 2010, 33 athletes with inversion ankle sprain, followed by chronic ankle instability and pain, underwent reconstruction of the anterior talofibular ligament. Those randomized to receive traditional rehabilitation were immobilized in a short leg cast for four weeks, followed by a soft ankle orthosis for four weeks. Two weeks after surgery, weight bearing was allowed with the cast on, and at four weeks after surgery, full weight bearing was allowed while wearing a soft ankle orthosis.

In the study group, a soft ankle orthosis was applied immediately after surgery for eight weeks, with weight-bearing allowed without restriction. In both groups, all patients removed the soft ankle orthosis eight weeks after surgery. Endurance training, sports specific drills, and balance training began six to seven weeks after surgery in the traditional group, and at two to three weeks after surgery in the study group. Clinical and radiographic outcomes were

measured before and two years after the surgery. Both groups demonstrated significant improvement in clinical outcome at two years post-surgery. No significant difference was seen between the groups at two years post-surgery. All patients were able to return to their previous athletic activities, with mean times to return of 18.5 weeks in group 1 and 13.4 weeks in group 2 ($p<0.001$).

Conclusion: This study of patients with chronic ankle instability due to inversion injury found that accelerated rehabilitation with early weight-bearing resulted in significantly faster return to sports participation.

Miyamoto, W., et al. Accelerated versus Traditional Rehabilitation after Anterior Talofibular Ligament Reconstruction for Chronic Lateral Instability of the Ankle in Athletes. *Am J Sport Med.* 2014, June; 42(6): 1441-1447.

PHYSIOTHERAPY VERSUS ADVICE FOR CHRONIC WHIPLASH

Whiplash associated disorders (WADs) are associated with substantial social and economic costs. This study investigated the effectiveness of a comprehensive exercise program, compared to advice alone, for patients with chronic WAD.

All subjects had a grade 1 or 2 WAD of three to 12 months' duration. The participants received patient education and were then randomized to receive either advice or a comprehensive exercise program. In the comprehensive exercise group, 21, tailored, supervised exercise sessions occurred over 12 weeks. The program began with four weeks of cervical spine exercises, including flexion and extension training, scapular training, posture reeducation and sensory/motor exercises.

Manual therapy techniques were allowed in the first week only. Between weeks four and six, the focus shifted to whole body exercise. Outcome measures were obtained at baseline, 14 weeks, six months and 12 months after randomization. The primary outcome variable was the average pain intensity during the preceding week, with secondary outcomes including average pain intensity over the prior 24 hours, self-

rated recovery, and disability as measured with the Neck Disability Index and the Whiplash Disability Questionnaire.

The primary analysis revealed that the comprehensive exercise program did not provide benefit over advice alone. In addition, results of most of the secondary analyses were not significant. The exceptions were the results for self-rated recovery at all time points and functional ability at 14 weeks, both statistically significant but not reaching the level of predetermined clinically important gains.

Conclusion: This study of patients with chronic whiplash associated disorder found that simple advice is equal in effectiveness to a more intense comprehensive physical exercise program for symptom treatment.

Michaleff, Z., et al. Comprehensive Physiotherapy Exercise Program or Device for Chronic Whiplash (PROMISE): A Pragmatic, Randomized, Controlled Trial. *Lancet.* 2014, July 12; 384(9938): 133-141.

PHONOPHORESIS FOR CHRONIC NECK PAIN

Approximately 70% of adults experience neck pain during the lifetime. Exercise is often a central component of treatment of chronic pain, with phonophoresis often used as an adjunct therapy. This study compared the effects of phonophoresis with those of exercise therapy for patients with chronic neck pain.

This randomized, single-blind study included 64 female patients with complaints of neck pain of at least three months' duration. The subjects were randomly assigned to one of three groups. Group 1 received phonophoresis with capsaicin and exercise. Group 2 received placebo phonophoresis with capsaicin and exercise. Group 3 received exercise only. All underwent treatment three days a week for six weeks, with the phonophoresis groups receiving 10-minute treatments with capsaicin, while the exercise groups received 60-minute treatments. The participants were assessed before and after treatment using measurements of pain,

disability, sleep quality and depression.

All groups demonstrated significant improvement in pain, disability, sleep quality and depression scores as compared to their initial status. The visual analogue scale scores for rest pain, as well as that for activity pain, were lowest in group 1 and highest in group 3 ($p < 0.001$ for all comparisons). In addition, Neck Pain Disability Scale scores were significantly better in group 1 than in group 2, and significantly better in group 2 than in group 3 ($p < 0.001$ for all comparisons).

Conclusion: This randomized, blinded study of patients with chronic neck pain found that capsaicin, applied via phonophoresis, can improve outcomes of patients, especially when combined with exercise therapy.

Durmus, D., et al. A Randomized, Placebo-Controlled, Clinical Trial of Phonophoresis for the Treatment of Chronic Neck Pain. *Rheum International*. 2014, May; 34(5): 605-611.

EMPLOYMENT PREDICTORS AFTER PEDIATRIC ONSET SPINAL CORD INJURY

Employment rates in the spinal cord injury (SCI) population are significantly lower than those in the general population. This study was designed to better understand the long-term employment outcomes of adults with childhood onset SCI.

Patients who had sustained a SCI before the age of 19 years were invited to participate. A structured questionnaire was administered at each annual interview, addressing demographic data, including education, marital status and employment status. Injury severity was categorized into four American Spinal Injury Association Impairment Scale (AIS) based groups.

A total of 447 adults with pediatric onset SCI participated in the study, with 283 completing three or more consecutive interviews for up to 16 years of follow-up. At the time of the first interview, 56.8% were employed, while 58.1% were employed by the final interview. Compared with the C1-4 ABC group, participants in the T1-S5 ABC group were three times more

likely, and those in the AIS D group 2.4 times more likely, to be employed over time. Life satisfaction scores increased among those who remained employed, with the odds of major depressive disorder increasing 13% among those unemployed. The odds of employment increased over time among women, those who were married and those who had a bachelor's or post-bachelor's degree. Medical conditions associated with a decreased rate of employment included autonomic dysreflexia, spasticity and other chronic medical conditions.

Conclusion: This study of adult patients with pediatric onset spinal cord injury found that more than 50% were employed, with the likelihood of employment greatest among women, those with college degrees, those who were married and those with non-cervical injuries.

Hwang, M., et al. Longitudinal Employment Outcomes in Adults with Pediatric Onset Spinal Cord Injury. *Spinal Cord*. 2014, June; 52(6): 477-482.

MEMANTINE AND RECOVERY FROM STROKE

Stroke is the fourth leading cause of death worldwide. After stroke, despite the loss of neuronal tissue, considerable plasticity is retained. Memantine, when given acutely has been shown to reduce infarction size. This study was designed to assess the effects of memantine when given over two hours after thrombotic stroke.

This animal study included male mice who underwent photothrombosis, or sham treatment. The animals were randomized to receive either memantine or placebo beginning two hours after stroke. The animals were assessed by behavioral testing, cylinder testing and sensory mapping, seven days before and seven, 14, 21 and 28 days after stroke. At the end of the study, the animals underwent histologic evaluation.

No difference was seen between the groups in infarction size, behavior or optic intrinsic maps during the first seven days. Histological analysis did not reveal a difference in neuronal density between the treatment and the control animals. However, those

animals treated with memantine showed significant improvements in motor control as compared to the vehicle treated animals. The optic intrinsic signal imaging data revealed increased activation area in the memantine treated animals at 28 days. In addition decreased astrogliosis and increased vascular density were noted in the memantine group as compared to the sham treated group.

Conclusion: This animal study of mice undergoing ischemic stroke found that memantine may improve functional outcome by reducing reactive astrogliosis, and improving vascularization

Lopez-Valdes, H et al Memantine Enhances Recovery from Stroke. *Stroke* 2014, July;45(7): 2093 – 2100

STATIN USE AND MORTALITY AMONG BLACKS AND WHITES

After decades of clinical trials, statins have emerged as key agents for reducing cardiovascular events and mortality. However, data are limited concerning the use of statins across ethnic groups and gender. This study used data from the Southern Community Cohort Study to examine the association between statin use and mortality, separately between blacks and whites in the southeastern United States.

The Southern Community Cohort Study is an ongoing, prospective, cohort study enrolling subjects between 2002 and 2009. The subjects were 40 to 79 years of age, residing in 12 states in the southern United States. At baseline, all were administered a computer-assisted personal interview to determine demographic, socioeconomic and medical histories. The patients were queried concerning elevated cholesterol levels and the use of lipid lowering drug therapies. Vital status and cause of death were assessed for all participants.

Of the 67,385 subjects, 31% reported a diagnosis of high cholesterol, which was higher among white than black patients (40% percent versus 27%; $p < 0.001$). Among those with high cholesterol, 48% reported being treated with a statin while 47% were untreated. The frequency of statin use was higher among whites than blacks (21% versus 13%). Compared with those

with untreated high cholesterol, statin users experienced significantly lower all-cause mortality and cardiovascular disease (CVD) mortality, with hazard ratios of 0.86 and 0.75, respectively. Decreased all-cause mortality associated with statin use was more pronounced among whites than blacks, as was true for cardiovascular disease mortality. Statin use was more strongly, inversely associated with all-cause and CVD mortality among men. No significant, overall, association was seen between statin use and cancer deaths.

Conclusion: This study of patients with elevated cholesterol found that, regardless of race or gender, self-reported statin use was associated with reduced all-cause and cardiovascular disease related mortality.

Lipworth, L., et al. A Prospective Study of Statin Use and Mortality among 67,385 Blacks and Whites in the Southeastern United States. *Clin Epidem.* 2014; 6: 15-25.

DEEP BRAIN STIMULATION FOR BRAIN INJURY RELATED TREMOR

Tremor can develop following acquired brain injury (ABI). While deep brain stimulation (DBS) has been found beneficial for tremor resulting from Parkinson's disease or multiple sclerosis, little is known of the efficacy of this intervention for post-traumatic tremor. This patient series reviewed the effect of thalamic DBS following ABI.

A consecutive series of eight patients with post-ABI tremor underwent DBS surgery. All had evidence of neuronal damage at the midbrain or cerebellar pathways, thalamus and peri-Rolandic fissure. The participants were assessed before and after surgery for tremor severity, as measured with Bain's Standardized Clinical Rating Scale for Tremors.

All subjects were videoed with videos assessed for tremors, comparing times with the stimulation ON to those before surgery as well as the stimulation OFF condition. Of the six patients, during the ON stimulation condition, all demonstrated reductions in tremor severity across the five components of the Bain scale ($p=0.046-0.003$). All patients experience some degree of functional benefit, with three of the

subjects regaining the ability to write legibly, and three more regaining the ability to hold a cup of fluid.

Conclusion: This study of patients with post-brain injury tremor found that deep brain stimulation can significantly reduce tremor symptoms and improve activities of daily living.

Sitsapesan, H., et al. Deep Brain Stimulation for Tremor Resulting from Acquired Brain Injury. *J Neurology Neurosurg Psychiatry.* 2014, July; 85(7): 811-815.

EPIDURAL STEROID INJECTIONS FOR SPINAL STENOSIS

An estimated 25% of epidural glucocorticoid injections administered in the Medicare population are provided for spinal stenosis. This study compared the effectiveness of epidural injections of glucocorticoids plus anesthetic with injections of anesthetic alone for patients with lumbar spinal stenosis.

The subjects were 50 years of age or older, all with radiographic evidence of central lumbar spinal stenosis. The patients were randomized to receive either a glucocorticoid injection plus 0.25% to 1% lidocaine, or an equivalent volume of 0.25% to 1% of lidocaine alone. The primary outcome measures were the Rolland-Morris Disability Questionnaire (RMDQ) score and the patient's rating of buttock, hip or leg pain, measured at six weeks. Secondary outcomes included the proportion of participants with at least minimally clinically meaningful (>30%) or substantially clinically meaningful (>50%) improvement.

A total of 200 patients were allocated to each group. At three weeks, significant between group differences were seen in RMDQ scores ($p<0.001$) and intensity of leg pain ($p=0.02$). However, at six weeks, both groups had improved in the RMDQ scores and leg pain, as compared with baseline, with no significant difference between the groups ($p<0.07$, and $p=0.48$, respectively). Among those who received interlaminar injections, those in the combination group reported better physical function on the RMDQ ($p<0.001$) and greater improvement in left leg pain ($p=0.005$) at three weeks. No significant difference was found between the groups at six

weeks. No significant difference occurred between groups in clinically meaningful improvement.

Conclusion: This study of patients with spinal stenosis found no significant difference in outcomes at six weeks between those treated with epidural injections of lidocaine alone and those injected with lidocaine plus glucocorticoid.

Friedly, J., A Randomized Trial of Epidural Glucocorticoid Injections for Spinal Stenosis. *N Eng J Med.* 2014, July 3; 371(1): 11-21.

SMOKING AND MORTALITY IN STROKE SURVIVORS

Current tobacco abuse is a known risk factor for stroke, with evidence of a strong dose response relationship. Despite clinical recommendations for cessation, 18-35% of stroke survivors continue smoking. However, some data suggest that smoking does not increase mortality among stroke survivors. This study investigated whether current smoking is an independent risk factor for all-cause, cerebrovascular disease and cancer mortality among stroke survivors.

Data were obtained from the National Health Interview Survey (NHIS) from 1997 to 2004. From these data, stroke survivors age 45 years or older were identified. Data were obtained concerning cigarette smoking, with responses categorized as never smoked, currently smoking or smoked in the past. The primary outcome measure was all-cause mortality, with secondary outcome measures including cardiovascular disease related death and cancer related death.

During the study period, 5,797 stroke survivors were identified. A total of 1,988 deaths were documented in this cohort over a mean follow-up time of 4.5 years. Comparing current smokers to never smokers, the hazard ratio for all cause death was 1.36. Former smokers had a greater risk of all-cause mortality than never smokers, with a hazard ratio 1.15. Current and former smokers had a higher risk of cancer mortality than did never smokers after controlling for demographic socioeconomic and clinical factors, with hazard ratios of 3.83 and 2.35, respectively. Current smokers, but not former smokers, had a greater risk of cardiovascular

disease mortality than never smokers.

Conclusion: This study of stroke survivors found that current smoking increases the adjusted risk of all-cause mortality by more than 35%, with this increase largely driven by cancer mortality.

Levine, D., et al. Smoking and Mortality in Stroke Survivors: Can We Eliminate the Paradox? *J Stroke Cerebrovasc Dis.* 2014, July; 23(6): 1282-1290.

VARENICLINE PLUS NICOTINE REPLACEMENT THERAPY FOR SMOKING CESSATION

Tobacco is the foremost preventable cause of morbidity and mortality due to respiratory and cardiovascular diseases. Previous studies have evaluated the combination of varenicline and nicotine replacement therapy (NRT) as a means for increasing abstinence rates. This study compared varenicline plus NRT with NRT alone as a means to increase abstinence rates.

This randomized, double-blind trial included 446 healthy smokers, randomly assigned to receive either a nicotine 15 mg patch or a placebo patch plus varenicline, titrated to 1 mg twice daily through week 12. The primary endpoint was the four-week continuous abstinence rate, at weeks nine through 12. Secondary endpoints included the point prevalence abstinence at six months, the continuous abstinence rate from weeks nine to 24 and the incidence of adverse events.

Of the patients included, 222 were randomized to receive the combination therapy and 224 to receive varenicline alone. The intention to treat analysis indicated that continuous abstinence at 12 weeks occurred in 44.6% of the combination group and 31.3% of the varenicline group ($p=0.004$). Continuous abstinence at 12 weeks was realized by 55.4% of the combination group and 40.9% of the varenicline group. The mean weight gains after six months were 3 kg in the combination group and 2.2 kg in the varenicline group.

Conclusion: This study of patients with tobacco abuse found that combining varenicline with nicotine replacement therapy is more effective than varenicline alone in

achieving tobacco abstinence at 12 weeks and six months.

Koegelenberg, C., et al. Efficacy of Varenicline Combined with Nicotine Replacement Therapy versus Varenicline Alone for Smoking Cessation: A Randomized Clinical Trial. *JAMA.* 2014, July 9; 312(2): 155-161.

RISK-PRONE PITCHING IN YOUTH BASEBALL

Despite improvements in the incidence of serious arm injuries in young baseball pitchers, roughly half of pitchers nine to 14 years of age report either shoulder or elbow pain while pitching. This study was designed to understand the consequences of certain pitching behaviors and the odds of pitching related injuries resulting from these behaviors.

Subjects included children, ages nine to 18, all of whom pitched in at least one organized baseball game during the 12 months of the study. Parents who agreed to their child's participation were given a survey for the child to complete, with the assistance of the parent. The questionnaire included 55 items regarding pitching activities, as well as preventive/protective activities, pitching related shoulder and elbow problems and treatments received. Injuries were identified as pitching related trauma which caused the athlete to forgo at least one practice or game. Pitching related arm tiredness and arm pain were measured by two separate questions.

Subjects were 754, young, male pitchers with an average age of 14.1 years. Of those, 31.3% reported having sustained a pitching related elbow or shoulder injury in the 12 months prior to the survey. Despite the recommendations of the American Sports Medicine Institute, 13.2% reported having pitched more than eight months during the prior 12 months, with 52.7% having pitched year-around. In addition, 45% pitched in a league without pitch counts or limits, and 43.5% pitched at least once on consecutive days, with 19% pitching more than one game on the same day. Those who engaged in these activities were more likely to experience pitching related shoulder and/or elbow injuries.

Conclusion: This study of youth baseball pitchers found that those who violate recommendations of the

American Sports Medicine Institute are at increased risk for pitching related injuries to the shoulder or elbow.

Yang, J., et al. Risk Prone Pitching Activities and Injuries in Youth Baseball. *Am J Sports Med.* 2014, June; 42(6): 1456-1463.

HIGH-DOSE SIMVASTATIN AND BRAIN ATROPHY IN MULTIPLE SCLEROSIS

Despite advances in the treatment of multiple sclerosis (MS), many patients experience a significant accumulation of neurologic deficits and brain atrophy, thought to be driven by neuroaxonal loss. As statins are known to have immune modulating characteristics, this study was designed to determine whether high-dose simvastatin is effective in treating secondary, progressive MS.

Subjects were 18 to 65 years of age, all with a diagnosis of secondary, progressive MS. The patients were randomized to receive either simvastatin 80 mg or a matching placebo for 24 months. All participants underwent volumetric MRI scans at baseline, 12 months and 25 months. The primary endpoint was the rate of whole brain atrophy per year.

Of the 140 participants, 70 received simvastatin and 70 received placebo. A pre-specified intention to treat analysis revealed that the mean atrophy rate was lower in the treatment group (0.288% per year) than in the placebo group (0.584% per year). This finding represented a 43% reduction in the annualized rate of atrophy ($p=0.003$). A similar reduction in atrophy rate occurred between baseline and 25 months. At 24 months, significant differences in favor of the simvastatin group were found on the Expanded Disability Severity Scale ($p<0.01$) and on the Multiple Sclerosis Impact Scale ($p<0.05$). No significant difference was seen between the groups in the proportion who experienced serious side effects.

Conclusion: This study of patients with secondary, progressive multiple sclerosis found that oral simvastatin at 80 mg per day can significantly reduce brain atrophy and functional decline.

Chataway, J., et al. Effect of High-Dose Simvastatin on Brain Atrophy and Disability in Secondary

Progressive Multiple Sclerosis (MS-STAT): A Randomized, Placebo-Controlled, Phase 2 Trial. **Lancet**. 2014, June 28-July 4; 383(9936): 2213-2221.

RADIOFREQUENCY ABLATION FOR TRIGEMINAL NEURALGIA

Previous studies have demonstrated that CT guided percutaneous radiofrequency thermocoagulation (PRT) can decrease pain caused by trigeminal neuralgia. This study evaluated the long-term outcomes of patients receiving repeated PRT for recurrent trigeminal neuralgia.

From January 2002 to December 2012, 996 patients underwent initial PRT procedures for trigeminal neuralgia. After the initial PRT, recurrent pain occurred in 146 patients. Of these patients 33 underwent a combined 43 repeated PRT procedures over the course of 10 years. The patients' pain was measured using a Barrow Neurological Institute rating scale prior to procedure, immediately after procedure and at two years and five years. The primary outcome measures were pain and need for further intervention.

The data revealed that 91% of the patients had immediate relief following repeat PRT, with 75% of them remaining in excellent or good pain control at one year. In addition 60% had excellent or good pain control at two years and 68% at five years. Of those who again had recurrent pain, 10 patients underwent a third PRT treatment with only three achieving good results or better.

Conclusion: This study of patients with recurrent trigeminal neuralgia found that repeated PRT may provide long-term pain relief.

Tang, Y et al. Repeated CT Guided Percutaneous Radiofrequency Thermocoagulation For Recurrent Trigeminal Neuralgia. **European Neurology**. 2014, July; 72:54 – 59

ATRIAL FIBRILLATION AND CRYPTOGENIC STROKE

While atrial fibrillation (a-fib) is a known risk factor for ischemic stroke, this rhythm is often intermittent and asymptomatic. Strategies to improve the detection and treatment of a-fib are, therefore, important to the health of these patients. This study

compared the efficacy of conventional electrocardiography (ECG) monitoring with that of 30-day monitoring for the detection of a-fib.

The subjects were patients 55 years of age or older with ischemic stroke or transient ischemic attack (TIA) of undetermined origin. All had undergone a workup for stroke, including a 24-hour Holter monitor, as well as brain and neurovascular imaging and ECG. Patients were excluded if a likely etiologic diagnosis had been determined. The participants were randomized to undergo ambulatory ECG monitoring with a 30-day, event triggered loop recorder (intervention group), or traditional 24-hour Holter monitoring (control group). The primary outcome measure was the detection of one or more episodes of a-fib or flutter lasting 30 seconds or longer within 90 days after randomization.

A total of 572 patients underwent randomization, with 90-day follow-up completed for 97.7% of the patients. A-fib was detected in 45 of 280 (16.1%) patients in the intervention group and nine of 277 (3.2%) in the control group ($p < 0.001$). A-fib lasting at least 2.5 minutes was found in 9.9% of the intervention group and 2.5% of the control group ($p < 0.001$).

Conclusion: This study found that ambulatory electrocardiography for 30 days is superior to short-term monitoring for the detection of atrial fibrillation in patients with cryptogenic stroke or transient ischemic attack.

Gladstone, D., et al. Atrial Fibrillation Patients with Cryptogenic Stroke. **N Eng J Med**. 2014, June 26; 370(36): 2467-2477.

LIGHT INTENSITY PHYSICAL ACTIVITY AND CANCER SURVIVORS

Compared with individuals without cancer, cancer survivors have a twofold increase risk of having one or more functional limitation. This study was designed to evaluate the effects for cancer survivors of low – light physical activity, high – light physical activity and moderate – vigorous physical activity.

This randomized controlled trial was designed to evaluate whether a year-long diet and exercise intervention would improve physical function in older long-term cancer survivors. Subjects were at least 65 years of age, were at least five years from diagnosis of breast, prostate or

colorectal cancer, were overweight or obese and engaged in less than 150 minutes per week of moderate intensity strength or endurance exercise. Physical activity during intervention was quantified using METs with low-light level physical activity defined as 1.5 to 2 METs, high –light physical activity as 2.1 to 2.9 METs and moderate to vigorous physical activity as greater than 3 METs. The primary outcome was measures of physical function, as assessed at baseline and at one, and two year follow-up.

At follow up increasing tertiles of low physical activity were associated with higher scores on all measures of physical activity ($p < 0.005$), with associations stronger for those with increasing high-low than those with low-low physical activity.

Conclusion: This prospective study found that among chronic cancer survivors, increasing light physical activity by 2.1 minutes or greater per day can result in significant health benefits.

Blair, C et al. Light Intensity Activity Attenuates Functional Decline In Older Cancer Survivors. **Med Science Sports and Exercise**. 2014, July; 46(7): 1375 – 1383

EXERCISE AND SEVERE OSTEOARTHRITIS

Previous studies have demonstrated that exercise can improve function and relieve pain for patients with mild to moderate osteoarthritis (OA). This randomized, controlled, single-blind trial evaluated the efficacy of an exercise program for patients with severe knee or hip OA.

Subjects were 165 patients scheduled for primary knee or hip replacement. Those patients were randomized into one of two groups. A control group received an education package only. An intervention group received the same education package, and also participated in an individualized, eight-week, neuromuscular exercise intervention (12 sessions), addressing functional instability and impaired muscle function. The primary outcome measures were Activities of Daily Living (ADL), subscores of the Hip Disability and Osteoarthritis Outcome Score (HOOS), and the Knee Injury and Osteoarthritis Outcome Score (KOOS). The other HOOS/KOOS subscales served as secondary

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*Regional Managing Editors have attested that they have no financial conflict of interest when choosing articles that appear in Rehab in Review.

subscales served as secondary outcome variables.

The 165 subjects were an average of 67 years of age. For the primary outcome, the difference in mean change between groups was 7.2 points in favor of the intervention group ($p=0.0002$). For the secondary outcomes of pain, symptoms, sport and recreation function and joint related quality-of-life all were significantly better in the treatment group than in the control group ($p=0.0012$, $p=0.0358$, $p=0.0329$ and $p=0.0034$, respectively). Those with hip OA reported greater improvement in pain and physical function than those with knee OA.

Conclusion: This study of patients scheduled for knee or hip surgery due to osteoarthritis found that a neuromuscular exercise intervention before surgery could produce significant improvements in self-reported physical function and functional outcomes.

Villadsen, A., et al. Immediate Efficacy of Neuromuscular Exercise in Patients with Severe Osteoarthritis of The Hip or Knee: A Secondary Analysis from a Randomized, Controlled Trial. *J Rheum.* 2014, July; 41(7): 1385-1394.

Rehab in Review (RIR) is produced monthly by physicians in the field of Physical Medicine and Rehabilitation (PM&R), with the cooperation and assistance of Emory University School of Medicine, Department of Rehabilitation Medicine. 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.

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ISSN # 1081-1303
www.rehabinreview.com



REHAB IN REVIEW

Produced by the Department of
Rehabilitation Medicine, Emory
University School of Medicine



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