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Volume 21 Number 2 Published by Physicians In Physical Medicine and Rehabilitation February 5, 2013

DONOR FECES INFUSION FOR CLOSTRIDIUM DIFFICILE

Studies have demonstrated that antibiotic treatment for an initial *Clostridium difficile* (*C. diff*) infection fails to induce a durable response in 15 to 26% of patients. Infusion of feces from healthy donors has been found to be an effective treatment for recurrent *C. diff*, although experience with this procedure is limited. This study compared the efficacy of this infusion method with conventional vancomycin treatment, with and without bowel lavage.

This study included patients 18 years of age or older who had experienced a relapse of *C. diff* infection after at least one course of antibiotic therapy. The subjects were randomized to receive one of three treatments. In group one, patients received vancomycin, 500 mg orally, four times per day for four or five days, followed by bowel lavage with four liters of macrogol solution (Klean -Prep) on the last day of antibiotic treatment. The participants then received donor feces through a nasoduodenal tube. Those in group two received a standard vancomycin regimen (500 mg orally, four times per day for 14 days). Those in group three received a standard vancomycin regimen, with bowel lavage on day four or five. The primary outcome was cure without relapse within 10 weeks after the initiation of therapy.

During the study, 43 patients were randomly assigned to receive donor feces infusion (n=17), vancomycin only (n=13) or vancomycin and bowel lavage (n=13). Of the 16 patients in the donor infusion group, 81% were cured after the first treatment, compared with 31% of the vancomycin alone group and 23% of the group receiving vancomycin and lavage. The donor feces infusion was superior to both vancomycin regiments after the first infusion ($p<0.01$ for both comparisons), and for overall cure rates ($p<0.001$). Immediately after feces infusion, 94% of the patients had diarrhea, with 31% reporting abdominal cramping. In all patients, the symptoms resolve within three hours.

Conclusion: This study of patients with recurrent *C. diff* infection found that the infusion of donor feces resulted in a significantly better treatment outcome than did treatment with vancomycin.

Van Nood, E., et al. Duodenal Infusion of Donor Feces for Recurrent Clostridium Difficile. **N Eng J Med.** 2013 DOI: 10.1056/NEJMoa1205037

VALIDATION OF S100B FOR MILD HEAD INJURY

In the past 15 years, the protein S100B has received attention as a possible biomarker for neurologic disease. This study examined the clinical impact and diagnostic performance of S100B levels in the management of patients with mild head injury.

This prospective, cohort validation study included patients seen at a regional hospital in Sweden between November of 2007 and May of 2011. As part of the clinical practice of that institution, patients with mild head injury determined to be at intermediate risk for intracranial complications underwent S100B sampling. Study inclusion criteria were acute trauma to the head, Glasgow Coma Scale scores of 14 to 15, loss of consciousness of less than 5 minutes and/or amnesia, with a sampling of S100B taken at three hours post-injury. Charts were reviewed for details concerning how the patients were managed, as well as patient characteristics, injury history, medications and clinical examination results. The main outcome variable was defined as significant intracranial complications.

One hundred thirty-eight patients (27%) had S100B levels of less than 0.10µg/L, while 374 patients (73%) had S100B levels of higher than or equal to 0.10µg/L. No patients with a normal S100B level showed significant intracranial complications, either on CT or upon follow-up. Therefore, S100B had a sensitivity and a negative predictive value of 100% and a specificity of 28% for significant intracranial complications.

Conclusion: This study of patients seen in an emergency room for mild head injury found that no patients with S100B levels within normal range developed significant intracranial complications.

Calcagnile, O., et al. Clinical Validation of S100B Use in Management of Mild Head Injury. **BMC Emerg Med.** 2012; 12: 13.

NUMBER OF JOINTS IN THE FIFTH TOE

The fifth, or little toe is classically described as having three bones, with two interphalangeal joints. Gray's Anatomy suggests that there are, on occasion, only two phalanges. This study was designed to determine the true incidence of the number of bones in the little toe.

Data were obtained from the records of all patients presenting to the Royal Liverpool University Hospitals NHS trust for foot radiographs during a one-month period in 2010. All patients had been referred for foot radiographs of either one or both feet. During that time, 606 patients were assessed.

Of those 606 patients, 362 radiographs (55.3%) revealed three phalanges in the fifth toe, with 291 (44.4%) revealing two phalanges. Of the 103 patients with bilateral radiographs, 43.7% had two phalanges in both feet, 51.5% had three phalanges in both feet and

4.8% had differing numbers of phalanges in each foot.

Conclusion: This retrospective study of patients receiving foot radiographs found that only 55% have three phalanges in their fifth toe, with 4.8% having different numbers of phalanges in each foot.

Moulton, L., et al. How Many Joints Does the Fifth Toe Have? A Review of 606 Patients of 655 Radiographs. **Foot Ankle Surg.** 2012, December; 18 (4): 263-265.

OSTEOPOROSIS MEDICATION FOR OSTEOARTHRITIS

Strontium ranelate, indicated for postmenopausal osteoporosis, is thought to act both on cartilage and subchondral bone. Preliminary studies have suggested that this medication may have some effect on spinal osteoarthritis (OA) and back pain. This study evaluated the effect of this medication on patients with knee OA.

This phase three trial included outpatients with knee 0A who were at least 50 years of age and complained of having experienced pain on at least half of the days in the previous month. The patients were randomized to one of three groups, including strontium ranelate, one or two grams per day, or a placebo. Knee radiographs were performed on both knees at baseline and then annually. In addition the patients were assessed with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and for global knee pain using a visual analogue scale, both at baseline and at six-month intervals. The primary endpoint was radiographic change from baseline to final evaluation at three years.

Of the 1,683 patients recruited for this study, 558 received strontium ranelate, one gram per day, 566 received strontium ranelate, two grams per day and 559 received a placebo. Of these, 58% participants completed the study. Those in the treatment group had significantly less joint space narrowing progression as compared with placebo, significant for both the one gram per day and two grams per day treatments ($p<0.001$ and $p=0.018$, respectively). Treatment with strontium ranelate two grams per day was associated with significantly better WOMAC total scores and pain subscores ($p=0.045$ and $p=0.028$, respectively).

Conclusion: This study of patients with osteoarthritis of the knee found a beneficial effect of the osteoporosis medication, strontium ranelate, for improving radiographic progression, pain and function.

Reginster, J., et al. Efficacy and Safety of Strontium Ranelate in the Treatment of Knee Osteoarthritis: Results of a Double-Blind, Randomized, Placebo-Controlled Trial. **Ann Rheum Dis**. 2013, February; 72 (2): 179-186.

EPIDURAL INJECTIONS AND BONE MINERAL DENSITY

For patients with low back pain or neurogenic symptoms of radiculopathy, epidural steroid injections are a frequent treatment option when conservative measures have failed. As glucocorticoids are a common cause of secondary osteoporosis, this study was designed to determine whether epidural steroid injections may affect bone mineral density (BMD) in postmenopausal women.

Twenty-eight postmenopausal women were included in this study. All were over the age of 65 years, with bone mineral density T score of more than -1.5 standard deviations. All were experiencing lumbar radiculopathy and elected to undergo epidural steroid injection treatment. Interventions included a single dose of Kenalog at 80 mg, placed at the L4 –L5 level. BMD of the hip, spine and femoral neck, as well as serum markers of bone turnover, were evaluated at baseline, three months and six months post-injection. These data were compared to those of age matched controls.

BMD of the hip, spine and femoral neck decreased between baseline and six months' follow-up, with only the hip reaching statistical significance ($p=0.002$). Compared to a population control group of age matched postmenopausal women, all without previous epidural steroid injection or oral steroid use, the reductions in BMD were significantly worse for the study group in the hip ($p=0.007$), but not in the femoral neck or the spine. The rise of markers of metabolism from baseline to six months was not significant.

Conclusion: This prospective observational study of postmenopausal women found that a single epidural steroid injection may adversely affect the bone mineral density of the hip.

Al-Shoha, R., et al. Effect of Epidural Steroid Injection on Bone Mineral Density and Markers of Bone Turnover in Postmenopausal Women. **Spine.** 2012, December 1; 37(25): E 1567-E 1571.

FUNGAL INFECTIONS AFTER STEROID INJECTIONS

More than 500,000 epidural glucocorticoid injections are administered in United States each year in the Medicare population alone. Complications reported after these injections are rare. This study reports on the results from Tennessee following a multicenter investigation for fungal infections associated with preservative free methylprednisolone acetate produced by single compounding pharmacy.

Patients were included in the study if they had received an epidural or paraspinal injection after 5/21/12 at one of three clinics in Tennessee that had received methylprednisolone vials from the New England Compounding Center. A total of 1,009 patients had received an epidural or paraspinal injection from one or more of the three recalled lots.

The cohort analysis included 66 patients diagnosed with meningitis, epidural spinal or paraspinal osteomyelitis or abscess at the site of the injection, or posterior circulation stroke. Among these patients, 124 procedures were performed, with 110 lumbar epidural, 12 cervical epidural and one sacroiliac joint injection. The median time from the last injection to symptom onset was 18 days. Of the eight patients who died, seven had a stroke. None of the patients who received antifungal therapy within 48 hours sustained a stroke. All eight deaths in the series occurred in persons who received delayed, minimal or no treatment

Conclusion: This study describes a case cluster of patients who developed fungal infections associated with epidural, paraspinal and peripheral joint glucocorticoid injections associated with contaminated methylprednisolone. The authors note the importance of early detection and initiation of treatment.

Kainer, M., et al. Fungal Infections Associated with Contaminated Methylprednisolone in Tennessee. **N Eng J Med.** 2012, December 6; 367: 2194–2203.

INTRACRANIAL MONITORING FOR TRAUMATIC BRAIN INJURY

For patients with acute traumatic brain injury (TBI), monitoring of intracranial pressure (ICP) is widely recognized as the standard of care for patients with severe injury. However, there remains a lack of well controlled data to evaluate the efficacy of ICP monitoring for these patients. This study was designed to determine whether the information derived from the monitoring of ICP improves patient outcomes.

This multicenter, randomized, controlled trial included 324 patients, all at least 13 years of age, who were diagnosed with severe TBI, and were admitted to a neuro intensive care unit (NICU). The patients were randomized to either an ICP monitoring group (with a goal of ICP of less than 20 mmHg) or an imaging-clinical examination group. The outcome measures included survival time, impaired consciousness, mortality and neuropsychological and functional recovery (using the Galveston Orientation and Amnesia Test, the Extended Glasgow Outcome Scale and the Disability Rating Scale) at six months.

The 14-day mortality rates were 30% in the imaging-clinical examination group and 21% in the pressure monitoring group (p=0.18). Six-month mortality rates were 41% in the imaging–clinical examination group and 39% in the pressure monitoring group (p=0.60). Further, no significant differences were found between the groups the other clinical outcome measures.

Conclusion: This study of patients with severe traumatic brain injury failed to demonstrate the superiority of treatment based upon intracranial pressure monitoring over treatment guided by neurologic testing and serial imaging.

Chestnut, R., et al. A Trial of Intracranial Pressure Monitor in Traumatic Brain Injury. **N Eng J Med.** 2012, December 27; 367(26): 2471–2481.

ACROMIOCLAVICULAR JOINT ARTHROSIS AND SPINAL CORD INJURY

Shoulder pain is a frequent complaint among patients with spinal cord injury (SCI). Pathologies commonly causing this pain include subacromial impingement, tendinopathy and rotator cuff tears. This study investigates the prevalence, severity and risk of acromioclavicular (AC) joint arthrosis in patients with SCI.

This study included patients 18 years of age or older presenting with a complaint of shoulder pain. Patients with SCI whose primary mode of mobility was a wheelchair were compared with patients with no history of SCI. Clinical assessments of the shoulder were included for all patients, including physical examinations of the AC joint and MRIs of the shoulders.

Sixty-eight persons with SCI were compared to 105 able bodied individuals. MRI found an overall prevalence of AC joint arthrosis of 98% in the SCI group, and 92% in the able-bodied group. Using the MRI findings as the gold standard, the sensitivity and specificity of the clinical exam for AC joint arthrosis patients with SCI was 31% and 100%, respectively, and for the able-bodied group was 24% and 71% respectively. The odds of increasingly severe arthrosis was significantly greater among patients with SCI, with an odds ratio 3.82 ($p<0.0001$).

Conclusion: This study of patients presenting with shoulder pain found a higher prevalence of AC joint arthrosis, with more severe and more advanced arthrosis, among patients with spinal cord injury as compared with controls.

Eriks-Hoogland, I., et al. Acromioclavicular Joint Arthrosis in Persons with Spinal Cord Injury and Able-Bodied Persons. **Spinal Cord**. 2013, January; 51(1): 59-63.

COGNITIVE IMPROVEMENT AFTER CRANIOPLASTY

Patients with brain injury are often discharged from neurosurgical units

after a decompressive craniotomy. A cranioplasty is performed at a later time, often for cosmetic and/or safety concerns. For decades it has been known that skull defects can cause neurologic symptoms. This small case series reviewed patients whose cognition changed soon after cranioplasty.

This study included four patients who were retrospectively selected from a cohort of 60 patients with brain injury and subsequent decompressive craniectomy. The subjects were chosen as representative of those with a biphasic pattern of cognition and motor performance, consisting of initial improvement, followed by a progressive worsening of neurologic signs and symptoms, until cranioplasty was performed. All were assessed with the Rancho Los Amigos Scale, the Glasgow Outcomes Scale, the Disability Rating Scale, the Motricity Index and the Functional Independence Measure.

All four subjects suffered from traumatic brain injury, were male and underwent cranioplasty at an average of six months after brain injury. In all four cases, motor and neuropsychological performances had deteriorated prior to the cranioplasty. In three of the cases, motor impairment markedly improved after cranioplasty. Additionally, all patients demonstrated improvement in neuropsychologic testing immediately after the cranioplasty.

Conclusion: This case series suggests that, for a subset of patients, persistence of a skull breach may inhibit progress, and in these cases, a cranioplasty may result in physical and cognitive improvement.

Di Stefano, C., et al. Unexpected Neuropsychological Improvement after Cranioplasty: A Case Series. **Br J Neurosurg**. 2012, Dec; 26(6): 827-831.

PREVALENCE OF POST- STROKE COGNITIVE IMPAIRMENT

A number of studies have documented the short-term prevalence of post-stroke dementia. However, long-term follow-up studies are sparse. This study evaluated the temporal changes and trends in the prevalence of cognitive impairment for up to 15 years after stroke.

Data were obtained from the South London stroke registry, a prospective population-based study recording all first-ever strokes in patients of all ages within South London. The patients were assessed at stroke onset, at three months and annually after stroke. Cognitive state was assessed using the Mini Mental Status Exam or other abbreviated mental tests. The prevalence of cognitive impairments was stratified by sociodemographic factors, past medical history and stroke subtypes. Trends in prevalence rates of cognitive impairments were analyzed.

Data were available for 1,618 patients who had survived beyond three months. The cognitive impairment rate of survivors was associated with age at all time points, progressively increasing after five years of stroke for patients ages 65 to 85 years. Among stroke survivors, the age standardized prevalence of cognitive impairment ranged from 24% at three months to 22% at five years and 21% at 14 years post-stroke. Patients cognitively impaired at three months had the worst survival with 53%, 37% and 34% surviving at 5, 10 and 15 years respectively after stroke.

Conclusion: This long-term follow-up study of patients with first-ever stroke found that the prevalence of cognitive impairment remains significantly elevated over time.

Douiri, A., et al. Prevalence of Post Stroke Cognitive Impairment. South London Stroke Register 1995 – 2010. **Stroke.** 2013, January; 44: 138-145.

CHRONIC FATIGUE AFTER TRAUMATIC BRAIN INJURY

Several studies have suggested that certain posttraumatic brain injury (TBI) symptoms may be related to pituitary hormone deficiencies resulting from trauma related compromise. This study evaluated the impact of various potential hormonal and nonhormonal causes of post TBI chronic fatigue (pTBI-CF).

Patients were identified with a documented history of TBI, all 18-65 years of age and participating in a TBI rehabilitation program. All subjects received a questionnaire to assess the presence and severity of fatigue. Those with fatigue were compared to those without. From each of these groups, 50 were randomly selected to complete the study. Those subjects underwent endocrine testing and evaluation of sleep, attention, coping style, daily activity, dependency, physical performance, emotional well-being and quality of life. In addition, the participants were assessed for physical activity and fitness, and by hormonal analysis.

The fatigue group had a slightly longer coma duration then did the non-fatigue group ($p=0.08$). The fatigue patients scored more poorly on measures of quality of sleep and daytime sleepiness ($p<0.001$). They also experienced anxiety and depression more often ($p<0.001$) and reported a lower quality of life ($p<0.001$) than did the non-fatigue group. Vitamin D deficiency occurred in 81% of the fatigue group and in 45% of the non-fatigue group ($p<0.001$). A multivariate analysis found that the three factors independently related with fatigue were poor sleep, vitamin D deficiency and anxiety, together explaining 59% of the variability in fatigue scores.

Conclusion: This study of patients with traumatic brain injury found that poor sleep, vitamin D deficiency and anxiety are the most important factors associated with chronic fatigue in this group.

Schneiders, J., et al. Factors Contributing to Chronic Fatigue after Traumatic Brain Injury. **J Head Trauma Rehabil.** 2012, Nov/Dec; 27 (6): 404-412.

KNEE ARTHROPLASTY AND ALCOHOL USE

While previous studies have suggested that chronic alcohol use may affect cell mediated immune responses, the effect of moderate alcohol consumption on surgical outcomes is not completely clear. This study was designed to determine the effects of alcohol consumption on the outcomes of patients undergoing elective total knee arthroplasty (TKA).

This study included 430 patients undergoing TKA between 2005 and 2008. All subjects were given a preoperative, self-administered questionnaire concerning the consumption of alcohol. Based upon these responses, the subjects were categorized as nondrinkers, occasional drinkers or moderate drinkers. No patient reported heavy consumption. Before and after surgery, patients were assessed with

the Quality of Well-Being index (QWB), the SF–36 , WOMAC, the Hospital for Special Surgery (HSS) and the Knee Society (KS) scores.

Preoperatively, as compared with nondrinkers, moderate drinkers had better QWB scores, SF–36 general health and bodily pain scores and WOMAC physical function, stiffness and total scores. At follow-up, as compared to nondrinkers, those who reported being occasional or moderate drinkers obtained better KS function scores and better HSS knee scores did nondrinkers but had less improvement in the SF–36 general health scores than did moderate drinkers. Moderate drinkers had a hospital length of stay over one day less than nondrinkers.

Conclusion: This study of patients undergoing elective total knee arthroplasty found that moderate drinkers had a shorter hospital length of stay, better patient knee scores but worse general health scores at long-term follow-up.

Lavernia, C., et al. Arthroplasty Knee Surgery and Alcohol Use. Risk or Benefit? **Clin Ortho Rel Res.** 2013, January; 471: 189-194.

RETURN TO SPORTS IN NONOPERATIVELY AND OPERATIVELY TREATED ANTERIOR CRUCIATE LIGAMENT INJURIES

Anterior cruciate ligament (ACL) injuries are common in sports requiring pivoting. Treatment choices include both surgical and nonsurgical options. This study compared the one year return sport rate following surgical versus nonsurgical intervention.

This study included patients with a unilateral ACL rupture within the prior six months who were between 13 and 60 years of age and were participants in pivoting sports. All subjects underwent a rehabilitation program of heavy resistance strength training, neuromuscular training and plyometric exercises before the decision to proceed with surgery was made, based on predetermined functional testing.

Surgically treated patients were allowed to return to level II sports no earlier than six months post-operatively and to level I sports no earlier than nine months postoperatively. It was recommended that those treated nonoperatively not return to level I sports. Patient reported outcome measures were used for baseline and follow-up testing.

At one year, no significant difference was seen between the nonoperative and the operative groups in overall return to sports (68.1% versus 68.1%) or in return to level I sports (54.8% versus 61.9%, respectively; p=0.66.) Among those treated nonoperatively, patients who participated in level I sports had a significantly lower rate of return (54.8%) than did patients who participated in level II sports (88.9 %, p=0.003).

Conclusion: This nonrandomized study of patients with anterior cruciate ligament tears found no difference at one year between those treated operatively and those treated conservatively in patients' returning to pivotal sports. Interestingly, despite a recommendation to not return to level I sports, 55% of the nonoperative group did so.

Grindem, H., et al. A Paired–Matched Comparison of Return to Pivoting Sports at One Year in Anterior Cruciate Ligament Injured Patients after a Nonoperative versus an Operative Treatment Course. **Am J Sports Med.** 2012, Nov; 40(11): 2509 -2516.

SECONDARY PATHOLOGY AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

The timing of the reconstruction of the anterior cruciate ligament (ACL) remains controversial, in particular regarding the length of time one can safely wait while avoiding further damage. This study was designed to determine the incidence of secondary pathology in ACL deficient knees with respect to the time between injury and reconstruction.

This study included 5,086, consecutive patients who underwent primary ACL reconstruction at one sports medicine practice between 2000 and 2010. The mean time to surgery after injury was 17 months. All data were collected in a prospective manner and entered into a longitudinal database. Meniscal tears were recorded by type and location. Only those requiring meniscectomy or repair were considered to display significant secondary pathology. Articular cartilage abnormalities were graded.

The overall incidence of meniscal tears requiring treatment was 48%. The overall incidence of articular cartilage damage was 35.7%, with grades I and II seen in 32.6% and grades III and IV in 3.1%. An increased incidence of medial meniscal injury and chondral damage was noted as the duration from injury increased. Compared with patients under age 17, the odds of secondary pathology increased in the 17 to 30 group (OR=1.4), the 31 to 50 group (OR=3.6) group and the greater than 50 group (OR=11.1).

Conclusion: This study of patients with anterior cruciate ligament injuries requiring surgery found that a delay in surgery may lead to further damage.

Sri-Ram, K., et al. The Incidence of Secondary Pathology after Anterior Cruciate Ligament Rupture in 5,086 Patients Requiring Ligament Reconstruction. **Bone Joint J**. 2013, January; 95–B(1): 59–64

OBESITY'S EFFECT ON THE TREATMENT OF LUMBAR DISC HERNIATION

Obesity affects one third of the adult United States population and is associated with numerous clinical sequelae. The impact of obesity on musculoskeletal and spinal disease is well documented. This study was designed to determine whether obesity affects outcomes of patients treated for lumbar disc disease.

The Spine Patient Outcomes Research Trial (SPORT) included patients with disc herniation, all over 18 years of age with radicular pain lasting at least six weeks. Patients were offered participation in either a randomized cohort or a concurrent observational cohort. Those in the operative treatment group were designated to undergo lumbar discectomy, while those in the non-operative group were managed conservatively. The subjects were assessed at baseline and for up to four years after enrollment. Primary outcome measures included the Physical Function and Bodily Pain Domains of the Short Form – 36 (SF-36) and the Oswestry Disability Index (ODI). Secondary outcomes included patient self-reported improvement, work status and satisfaction.

Outcomes were compared between those with a body mass index of less than 30 kg/m² and those with greater weights.

Included in the analysis were 354 patients in the nonobese group and 336 patients in the obese group. Patients in the obese group had poorer improvement over baseline scores on all three primary outcome measures including the ODI, the SF-36 Bodily Pain Domain and the SF-36 Physical Function Domain ($p<0.001$, $p=0.005$ and $p<0.001$, respectively). In the nonrandomized arm of the study, obese patients were more likely to undergo surgical intervention than were nonobese patients. In addition, among those treated surgically, the obese group had significantly less improvement on the Sciatica Bothersomeness Index and the Low Back Pain Bothersomeness Index.

Conclusion: This study of patients with lumbar disc herniation demonstrates that obese patients are more likely to undergo surgical intervention and less likely to benefit from either surgical or nonsurgical intervention than are nonobese patients.

Rihn, J., et al. Influence of Obesity on the Outcome of Treatment of Lumbar Disc Herniation. **J Bone Joint Surg (Am).** 2013, January 2; 95 (1): 1-8.

RESISTANCE TRAINING AFTER CORONARY ARTERY BYPASS GRAFTING

With the general population aging, the number of cardiac surgical interventions in the elderly and very old adults has increased. As little is known about very old adults attending cardiac rehabilitation after surgical intervention, this study was designed to assess the efficacy of resistance training, added to a conventional cardiac rehabilitation program.

This prospective, randomized, controlled trial included 173 patients 75 years of age and older with a recent coronary artery bypass surgery. The participants were randomly assigned to either inpatient cardiac rehab intervention with (an intervention group) or without (a control group) resistance training. The three-week rehabilitation exercise program included a 30-minute walk, three times per week, calisthenics for 30 minutes two times per week and cycle ergometry for 30 minutes three times per week. In addition, the intervention group participated in daily resistance weight training (with repetitions at 60% of their one rep max) and balance training. Participants were tested using a six-minute walk test, cardiopulmonary exercise test (CPET), the Timed Up and Go Test (TUG) and a maximum isometric strength test. The MacNew questionnaire was used to evaluate health-related quality of life.

Significant improvements were noted for all subjects on all measured variables over the duration of the study ($p<0.001$). Improvement in walking distance was significantly greater in the resistance than in the control group ($p=0.003$). Improvements were also greater in the resistance training group on the TUG ($p=0.008$), and the maximal relative workload ($p=0.03$).

Conclusion: This study of patients 75 years of age and older, undergoing coronary artery bypass grafting, found that the addition of daily resistance and balance training to a traditional cardiac rehabilitation program resulted in enhanced functional capacity.

Busch, J., et al. Resistance and Balance Training Improves Functional Capacity in Very Old Participants Attending Cardiac Rehabilitation after Coronary Bypass Surgery. **J Am Geriat Soc**. 2012. December; 60(12): 2270-2276.

COFFEE CONSUMPTION AND PREVALENCE OF METABOLIC SYNDROME

The metabolic syndrome is characterized by the clustering of abdominal obesity, impaired glucose tolerance, elevated triglyceride levels, reduced high density lipoprotein cholesterol levels and hypertension. While habitual coffee consumption has been found be a protective factor against the development of type II diabetes, the association between this drink and the metabolic syndrome is unclear. This study was designed to evaluate the correlation between the consumption of coffee and green tea and the prevalence of the metabolic syndrome.

Patients were selected from among individuals attending a health center in Japan, each of whom had participated in the baseline survey of the Japan Multi-Institutional Collaborative Cohort (J-MICC) study. From this cohort, 577 agreed to participate in this study. Each participant was asked to answer a self-administered questionnaire, including medical history, physical activity and dietary habits. The questionnaire included two items concerning coffee consumption and one item concerning Japanese green tea consumption. The data were used to determine the association between coffee, green tea and the prevalence of the metabolic syndrome,

The overall prevalence of metabolic syndrome was 20.6%. After adjusting for age and gender, those who drank more coffee (at least 1.5 cups per day) were found to have significantly lower odds ratios for the metabolic syndrome than those who drank less ($p=0.03$). Coffee consumption of at least three cups per day was associated with a lower prevalence of high serum triglycerides, as well as lower blood pressure. Conversely, green tea was not associated with the prevalence of the metabolic syndrome or any of its components.

Conclusion: This Japanese study found that coffee consumption was inversely associated with the metabolic syndrome, with no such finding concerning the consumption of green tea.

Takimi, H., et al. Inverse Correlation between Coffee Consumption and Prevalence of Metabolic Syndrome: Baseline Survey of the Japan Multi-Institutional Collaborative Cohort (J-MICC) Study in Tokushima Japan. **J Epidemiol.** 2013, January; 23(1): 12–20.

TIMING OF PHYSICAL THERAPY REFERRALS FOR LOW BACK PAIN

Low back pain (LBP) accounts for 2.5% to 3% of all physician visits in the United States. Despite increasing expenditures, the prevalence of chronic, disabling LBP is increasing. This study examined the impact of timing and content of physical therapy referrals on the utilization costs of healthcare.

This retrospective study used the Mercer HealthOnline database for patients ages 18 to 60 years with a primary diagnosis of LBP. Of these

patients, seven percent received physical therapy. The timing of the start of therapy after the initial diagnosis was noted, with subjects divided into those with early referrals (within 14 days) and late referrals (15 to 90 days). The treatment during the physical therapy visit was categorized as active, if more than 75% sessions were active (therapeutic exercise, self -training management), or passive, if fewer than 75% of the sessions were active. The participants were followed for 18 months, with healthcare utilization costs calculated.

A total of 76,967 eligible patients with a primary care visit for LBP within the study period were identified, of whom 32,070 (41.7%) were included in the study. The subjects receiving early physical therapy were less likely to undergo advanced imaging, additional physician visits, major surgery or lumbar spine injections, or to be treated with opiates, as compared to those whose therapy referrals were delayed. Total medical costs for LBP management in patients receiving early PT were $2,736.23 less than that for those receiving late referrals. Patients receiving active physical therapy were less likely to receive surgery or lumbar spine injections with medical expenses found to be $1,374 less when compared to the passive group.

Conclusion: This retrospective study of patients with low back pain found that referral to physical therapy within two weeks of physician consultation is associated with a reduced risk of subsequent healthcare utilization and lower, overall health care costs.

Fritz, J, et al. Primary Care Referral of Patients with Low Back Pain to Physical Therapy: Impact on Future Health Care Utilization and Costs. **Spine**. 2012, December; 37: 2114-2121.

DEPRESSION AND MIGRAINES

Migraine can be subtyped based upon attack frequency into episodic migraine (EM) or chronic migraine (CM). The progression to CM from EM occurs in approximately two percent of patients with EM annually. Previous studies have demonstrated that migraine and depression are highly comorbid and share a bidirectional relationship. This study was designed to better understand the role that depression plays in the progression from EM to CM.

The American Migraine Prevalence and Prevention (AMPP) study is a two-phase, longitudinal population survey of headache epidemiology. In the year 2004, a random sample of 24,000 adults was selected from respondents reporting at least one severe headache in the prior year. From these data, respondents who met the criteria for EM were identified. As subjects were followed annually through 2007, those who transformed from EM to CM were identified. Depression was also measured, with results from these measures compared to the data concerning migraine.

Subjects included 6,657 participants with EM in 2005. Of those, 160 developed CM in 2006. Also studied were 6,852 patients with EM in 2006, with 144 developing CM in 2007. After adjusting for multiple covariates, depression was found to be a significant factor in CM transformation, with a depression dose effect. The odds ratios for transformation relative to those with no depression or mild depression were 1.77 for moderate depression, 2.35 for moderately severe depression and 2.53 for severe depression.

Conclusion: This study of patients with episodic migraine found that depression is a risk factor for progression to chronic migraine.

Ashinaa, S., et al. Depression and Risk of Transformation of Episodic to Chronic Migraine. **J Headache Pain**. 2012, November; 13(8): 615-624.

SMOKING CESSATION AND SPINAL PAIN

Previous research has demonstrated a link between tobacco abuse and an increased risk for chronic pain. In addition, among patients with chronic pain disorders, studies have suggested an increased magnitude of pain among smokers as compared with nonsmokers. This study examined the relationships among patient smoking status, smoking cessation and patient self-assessment of pain and disability associated with spinal disorders.

This prospective study included 5,333 patients undergoing spinal care at two academic centers. The subjects were categorized into one of four groups, based upon their tobacco habits, (1) those who had never smoked, (2) smokers who had quit prior to study entry, (3) current active smokers and (4) those who had quit smoking during the course of care. The primary outcome measure was pain as assessed by a Visual Analogue Scale. Additional data gathered included age, gender, body mass index, the Oswestry Disability Index (ODI) and secondary gain factors.

Those who had never smoked or had quit before the study had lower baseline pain scores ($p<0.001$) than did smokers. At the end of the study, those who were current smokers had the highest mean pain scores ($p<0.001$). Those who had quit smoking reported significantly greater improvement in VAS pain ratings for worst pain ($p = 0.013$), current pain ($p < 0.05$) and average weekly pain ($p = 0.024$).Greater improvement on the ODI was found among those who had never smoked than among current smokers.

Conclusion: This study of patients undergoing spinal care found that smoking is associated with increased pain and that smoking cessation is related to improvement in pain.

Behrend, C., et al. Smoking Cessation Related to Improved Patient Reported Pain Scores following Spinal Care. **J Bone Joint Surg (Am)**. 2012, Dec 5; 94(23): 2161-2166.

LIFE SATISFACTION WITH LATE EFFECTS OF POLIO

Several decades after an acute paralytic poliomyelitis infection, up to 80% of individuals experienced new symptoms or impairments, commonly referred to as the post-polio syndrome. These impairments can lead to activity limitations, which can, in turn, impact life satisfaction. This study investigated the association between life satisfaction and self-report impairments in patients with late effects of polio.

One hundred sixty-nine patients with a confirmed history of acute poliomyelitis, all with at least 20 years of functional stability, and new symptoms representative of the late effects of polio, were studied. The patients were assessed with an 11-

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item life satisfaction questionnaire and a 13-item questionnaire regarding self-reported impairments.

Of the participants, 55% were satisfied with life as a whole, 33% were rather satisfied, and 12% were dissatisfied to some degree. The impairments rated as most bothersome were general fatigue in 60%, muscle fatigue in 58%, muscle and or joint pain during physical activity in 57% and muscle weakness in 54%. Those who were not satisfied reported significantly higher degrees of impairment than did those who rated themselves as satisfied.

Conclusion: This study of patients with post-polio syndrome found that 55% were either very satisfied or satisfied with life as a whole, with only 12% being dissatisfied. Satisfaction with life had a low to moderate association with self-reported impairments.

Lexell, J., et al. Life Satisfaction and Self-Reported Impairments in Persons with Late Effects of Polio. **Ann Phys Med Rehab.** 2012, December; 55: 577–589.

***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

EMORY UNIVERSITY SCHOOL OF MEDICINE | Department of Rehabilitation Medicine

Expanding the frontier of rehabilitation sciences in research, teaching, and patient care