MUSCULOSKELETAL

IN REVIEW

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Volume 2, Number 6 | Published by Physicians Specializing In Musculoskeletal Medicine | November 5, 2015

BRAIN MODULATION FOR CHRONIC TEMPOROMANDIBULAR DISORDERS

Temporomandibular disorders (TMD) often result in pain and masticatory dysfunction, despite a range of treatments. As several studies have shown that stimulation of the primary motor cortex can provide analgesia in patients with refractory central pain, this study assessed the effect of high definition transcranial direct current stimulation (tDCS) in patients with pain-related TMD.

Subjects were 24 female adults with chronic myofascial TMD pain, all with daily, chronic pain and dysfunction for at least one year. Pain was measured with a Visual Analogue Scale (VAS), the Short Form of the McGill Pain Questionnaire and Pain Trek, as well as pain-free mouth opening. All subjects underwent 20-minute sessions of active or sham 2 mA HD-tDCS at the M1 stimulation area, five times per day. The primary outcome measure was a pain VAS decrease of 50% or greater from week one to week six.

At week six, nine of 13 in the active group and three of 11 in the sham group achieved a greater than 50% decrease in VAS pain ($p=0.04$). There was a significant difference in the change in pain free opening of the mouth from week one to week three ($p<0.01$), but not at week six ($p=0.24$).

Conclusion: This study of female patients with chronic temporomandibular disorders found that high definition transcranial direct current stimulation can produce meaningful, long-term pain relief.

Donnell, A., et al. High Definition and Noninvasive Brain Modulation of Pain and Motor Dysfunction in Chronic TMD. **Brain Stim**. 2015, November- December; 8(6): 1085-1092.

EMERGENCY ROOM VISITS FOR DIETARY SUPPLEMENT REACTIONS

Approximately half of the adults in the United States have reported using at least one dietary supplement in the past month. As the regulatory framework for supplements differs from that of prescription or over-the- counter pharmaceuticals, neither safety testing nor FDA approval is required before these substances are marketed. As the safety of dietary supplements remains poorly described, this study was designed to estimate the number of emergency department (ED) visits for adverse events related to dietary supplements.

Data for this study were collected by the National Electronic Injury Surveillance System-Cooperative Adverse Drug Event Surveillance (NEISS-CADES) between January 1, 2004, and December 31, 2013. From these data, ED visits were identified for which the treating physician explicitly attributed to the use of dietary supplements. Adverse events were categorized as allergic reactions, excess doses, unsupervised ingestion by children, or other.

Extrapolating from the sample, the authors estimated an average of 23,005 annual ED visits for adverse events, with 2,154 hospitalizations. Of the total, 21.2% of the ED visits involved unsupervised ingestion by children, and 28% involved adults between the ages of 20 and 34 years. After excluding unsupervised ingestion by children, 65.9% of ED visits involved a single herbal or complementary nutritional product. Cardiac symptoms were the most common symptoms associated with weight loss products and energy products, with the most common adverse events from most micronutrients being mild to moderate allergic reactions. **Conclusion:** This study estimated that dietary supplements are implicated in an average of 23,000 emergency room visits and 2,000 hospitalizations annually.

Geller, A., et al. Emergency Department Visits for Adverse Events Related to Dietary Supplements. **N Engl J Med.** 2015, October 15; 373:1531-1540.

COMBINING STEM CELLS AND ULTRASOUND PROMOTES BONE HEALING

Low intensity pulsed ultrasound (LIPUS) has been found to have up to an 80% cure rate for nonunion, comparable in efficacy to surgery. Recent reports have shown that mesenchymal stem cells also participate in bone tissue repair and regeneration. This study investigated the efficacy of combining stem cells with LIPUS for the healing of bone.

Sprague Dawley rats with surgically created femoral defects were placed in four groups of 10, including sodium alginate plus sham

ultrasound (US), LIPUS plus sodium alginate, stem cells plus sham US or LIPUS plus stem cells. Those in the LIPUS group underwent sonication for 10 minutes per day for five consecutive days. Stem cell proliferation was monitored with an MTT assay, with cell proliferation determined with flow cytometry. Bone reparation was evaluated by x-ray.

Cell proliferation in the LIPUS group was higher than that in the controls. At the end of two weeks, the combination group demonstrated homogeneous bone that was similar in density to the normal surrounding bone. After four weeks, bone defects could not be observed by x-ray in all four groups.

Conclusion: This study demonstrates that ultrasound can enhance cell proliferation, with this process enhanced by the addition of stem cells.

He, R., et al. Combination of Low Intensity Pulsed Ultrasound and C3H10T1/2 Cells Promotes Bone Defect Healing. **Int Orthop**. 2015, November; 39(11): 2181-2189.

Conclusion: This large study of commercial insurance and Medicare claims data found that after fragility fractures, treatment with anti-osteoporotic medications can result in a significant risk reduction in such fractures.

Bawa, H et al. Anti-– Osteoporotic Therapy after Fragility Fracture Lowers Rate of Subsequent Fracture. J Bone Joint Surg (Am). 2015, October 7; 97(19):1555 – 1562.

FASCIA CRURIS TEAR AT THE ATTACHMENT OF THE ACHILLES TENDON

Injury to the fascia cruris at the attachment to the Achilles is not often considered to be a cause of achillodynia. This paper describes a case series of athletes with pain in the Achilles region and tears of the fascia cruris.

This retrospective review describes a series of nine patients presenting with pain in the Achilles, all seen in a single sports injury clinic between 2008 and 2012. All subjects were identified by ultrasound as having tears in the fascia cruris at the attachment to the Achilles tendon.

The patients presented at a mean of 4.5 weeks after symptom onset. The patients typically reported a sensation of calf tightness over the preceding days or weeks, and then a rapid onset of pain in the Achilles region during activity. The pain and tenderness were localized over the medial or lateral border of the Achilles and were associated with swelling. Clinically, mild swelling was seen over the mid-upper portion of the Achilles tendon, which was tender to the touch. Diagnostic ultrasound identified findings compatible with a tear of the fascia cruris at the attachment to Achilles tendon. Treatment involved a combination of conservative measures, resulting in a return to full activities at an average of 5.2 weeks.

Conclusion: This case series describes patients with a tear to the fascia cruris at its attachment to the Achilles tendon, thought to be related to the patients' Achillodynia.

Webborn, N., et al. Acute Tear of the Fascia Cruris at the Attachment to the Achilles Tendon: A New Diagnosis. **Br J Sport Med.** 2015, November; 49 (11):1398-1403.

FRACTURE PREVALENCE AMONG WOMEN UNDERGOING CHRONIC GLUCOCORTICOID THERAPY

Glucocorticoid (GC) medications are widely used to treat various inflammatory and autoimmune disorders. As GC therapy is associated with an increased risk of fractures, this study reviewed the prevalence of fractures in patients using GC therapy for autoimmune disorders.

This population-based, cross-sectional, outpatient study was conducted in 28 centers in Spain including adult, female outpatients, diagnosed with rheumatoid arthritis and/or systemic lupus erythematous, all of whom were prescribed GC treatment at 2.5 mg or more on a daily basis for at least three months. At visits to their rheumatologists, the participants were assessed for vertebral and non-vertebral fractures, as well as for health-related quality-of -life. Vertebral fractures were assessed using x-rays, with non-vertebral fractures assessed by questionnaire. The primary outcome measure was the percentage of women with morphometric vertebral fractures.

Of the 576 included in the study, morphometric vertebral fractures were found in 18.9% overall, with only 6.4% aware of the vertebral fractures before x-ray. In the radiographic assessments, 235 vertebral fractures were detected in 109 patients. Non-vertebral fractures were reported by 9.8% of patients with RA and by 5.3% of those with SLE. The cumulative dose of GC and the time from the start of GC use were not significantly different between those with and those without morphometric vertebralfractures. The cumulative GC dose was 40% higher for patients with, as compared to those without, self-reported vertebral fractures (p=0.026).

Conclusion: This study found a higher rate of vertebral fractures in

women with rheumatoid arthritis and/ or systemic lupus erythematous who were chronically treated with glucocorticoid steroids, with negative impacts on quality-of-life, particularly physical functioning.

Rentero, M., et al. Prevalence of Fractures in Women with Rheumatoid Arthritis and/or Systemic Lupus Erythematous on Chronic Glucocorticoid Therapy. **BMC Musculoskel Dis**. 2015, October; 16:300.

HIGH-FREQUENCY SPINAL CORD STIMULATION FOR CHRONIC BACK AND LEG PAIN

Spinal cord stimulation (SCS) is approved for the treatment of chronic, intractable pain of the trunk and limbs. Traditional SCS success has been less than optimal. As previous work has suggested an advantage of higher frequency stimulation (HFS), this study compared the effects of HFS at 10kHZ to those of traditional low-frequency (LFS) at 5kHZ for the treatment of chronic back pain.

Subjects were 171 patients with chronic intractable pain of the trunk and/or limbs who qualified to receive implanted SCS systems. These patients were randomized to two groups, one receiving HFS and one receiving LFS. Outcome measures included a visual analogue scale for pain (VAS), the Oswestry Disability index, the Global Assessment of Functioning, subject satisfaction, adverse events, and a standard neurologic assessment. Evaluations were performed at baseline and at three, six, nine and 12 months after the follow-up.

At three months, among permanently implanted subjects, 84.5% were back pain responders (≥50% reduction in VAS score) with HFS therapy, as compared with 43.8% with traditional LFS treatment ($p<0.001$) The relative ratio for responders to high versus low frequency stimulation was 1.9 for back and 1.5 leg pain. The advantage of HFS over LFS for both leg and back pain was sustained at 12 months. One third of the subjects in the HFS group reduced or eliminated their opioid analgesic intake despite an average of 13 years of chronic pain.

Conclusion: This study of patients with chronic back and leg pain found that spinal cord stimulation at 10 kHz frequency is superior to traditional spinal cord stimulation for treating leg and back pain.

Kapural, L., et al. Novel 10 Khz High-Frequency Therapy (HF 10 Therapy) is Superior to Traditional Low- Frequency Spinal Cord Stimulation for the Treatment of Chronic Back and Leg Pain. Anesthesiology. 2015, October; 123 (4): 851-860

HIP AND KNEE STRENGTHENING EXERCISES FOR KNEE PAIN

For patients with knee osteoarthritis (OA), there is consistent evidence that exercise therapy is beneficial for improving pain, function and quality of life. However, the most effective exercise prescription for these patients has yet to be established. This study compared the isolated effects of hip strengthening to leg strengthening exercise for patients with knee OA.

This single-blinded study included patients with knee OA and a pain subscale score of 68 or less on the knee injury and osteoarthritis score (KOOS). Patients were randomly assigned to 12 weeks of either isolated hip or isolated leg strength and flexibility exercises, completed three to five days per week. Outcome measures included the KOOS, and the Western Ontario and McMaster Arthritis Index (WOMAC) questionnaire, the six-minute walk test, range of motion and muscle strength.

Of the 71 patients completing the study, both groups demonstrated significant improvement on the KOOS and the WOMAC pain subscale scores. No clinically or statistically significant differences were found between the two groups on the KOOS scores with a statistically significant difference in the WOMAC scores. No significant changes in the six-minute walk test or range of motion were noted in either group.

Conclusion: This study of patients with osteoarthritis of the knee found that knee and leg strengthening exercises provided equal improvement in pain and knee function.

Lun, V., et al. Efficacy of Hip Strengthening Exercises Compared with Like Strengthening Exercises on Knee Pain, Function Quality-Of-Life in Patients with Knee Osteoarthritis. **Clin J Sports Med.** 2015, November; 25 (6): 509-517.

HORMONE REPLACEMENT THERAPY AND ARTHROPLASTY SURVIVAL

As there is no known cure for osteoarthritis (OA), total joint arthroplasty remains the most effective treatment for severe knee and hip OA. The main causes for failure in the first year after surgery are osteolysis and aseptic loosening, accounting for 75% and 40% of revision surgeries after total hip arthroplasty and total knee arthroplasty, respectively. As hormone replacement therapy (HRT) has anti-resorptive effects, this study reviewed the effects of this treatment on implant survival following knee or hip arthroplasty.

This population based, retrospective cohort study included patients with data recorded in the General Practice Research Database of the United Kingdom, who were seen between 1986 and 2006 for total hip arthroplasty or total knee arthroplasty. Women with at least six months of HRT were identified as users. A total of 2,700 HRT users were compared with 8,100 nonusers, with data followed for a median of 3.3 years after surgery to assess the survival of the implants.

The overall cumulative revision rates at three years were 0.97% for total hip arthroplasty and 0.76% for total knee arthroplasty. HRT use for least six months was associated with a reduction in risk of failure, with a corresponding hazard ratio of 0.62 ($p=0.023$). The use of HRT for a year or more was related to a further

reduction in failure risk, with a hazard ratio of 0.48 (p=0.003).

Conclusion: This study of patients undergoing total hip or total knee arthroplasty for osteoarthritis of the joint found that hormone replacement therapy for at least six months was related to a significant increase in implant survival.

Prieto-Alhambra, D., et al. Hormone Replacement Therapy and Mid-Term Implant Survival following Knee or Hip Arthroplasty for Osteoarthritis: A Population Based Cohort Study. **Annals of Rheumatic Dis.** 2015; 74(3):557-563.

TRANSCRANIAL MAGNETIC STIMULATION ANDCERVICAL DYSTONIA

Studies have suggested that people with cervical dystonia (CD) may have impaired sensorimotor integration and plasticity, with overactivity of the primary motor cortex (M1) with reduced intracortical inhibition. This study examined whether the use of repetitive transcranial magnetic stimulation (rTMS) to inhibit the sensorimotor cortex can normalize evoked potential amplitudes and short latency afferent inhibition (SAI) in patients with CD.

Twelve patients with CD underwent one session of rTMS over the left primary sensory cortex as an active condition and a separate session at the left primary motor cortex, as a control condition. Eight, healthy, control patients underwent one session of rTMS over the left primary sensory cortex only. Motor evoked potential (MEP) amplitudes and short latency afferent inhibition (SAI) were measured before and after rTMS at the right first dorsal interosseous muscle and the right index finger, respectively.

At baseline, MEP amplitudes did not differ between the groups. However, the SAI was relatively decreased in subjects with CD. After the inhibitory rTMS to the primary sensory cortex, MEP amplitudes increased. This was not true with stimulation to the primary motor cortex. In contrast, SAI normalized after rTMS to both the primary sensory and motor cortices.

Conclusion: This study of patients with cervical dystonia found that their impaired sensorimotor integration could be normalized by inhibitory stimulation to the primary sensory and motor cortices using rTMS.

Zittel, S., et al Normalization of Sensorimotor Integration by Repetitive Transcranial Magnetic Stimulation in Cervical Dystonia. **J Neur. 2015, August; 262 (8): 1883-1889.**

HUMAN GROWTH FACTOR TO MAINTAIN CARTILAGE HEALTH

The lifetime risk of symptomatic knee osteoarthritis (OA) is 45%. To date no disease modifying OA drug (DMOAD) has been shown to modify structural pathologic progression in the synovial tissue. Most studies of DMOADs have evaluated structural progression as a reduction in radiographic joint space width. This study evaluated the effect of recombinant human growth factor 18 (Spriferman) on cartilage loss.

This multicenter, randomized, double-blind, placebo-controlled trial included patients with radiographic evidence of OA of the knee. The initial study evaluated 168 patients using Spriferman intraarticular injections at 10, 30 and 100 µg or placebo. Medications were received once per week for three weeks and again administered three months later, given over three weeks. Magnetic resonance imaging was completed at baseline and at three, six and 12 months after treatment, with comparisons made between subjects at sub-regions of the joint that displayed cartilage loss and at those that displayed cartilage gain.

One year from baseline, the difference in cartilage thickness loss in sub-regions experiencing loss was significantly less in those treated with100 µg Spriferman, compared to placebo (p= 0.03). In the sub-regions demonstrating gain, those treated with 100 µg Spriferman displayed greater cartilage thickening than did those treated with placebo (p= 0.028).

Conclusion: This study of patients with knee osteoarthritis suggests that, when compared with placebo, treatment with recombinant human growth factor 18, Sprifermin, results in added cartilage in some locations and reduced cartilage loss in others.

Eckstein, F., et al. Intra-Articular Spriferman Not Only Increases Cartilage Thickness, but Also Reduces Cartilage Loss: Location-Independent Post-Hoc Analysis Using Magnetic Resonance Imaging. **Arthritis Rheum**.2015, November;67 (11):2916-2922.

INFRAPATELLAR FAT PAD VOLUME AND KNEE STRUCTURE CHANGES IN OSTEOARTHRITIS

Osteoarthritis (OA) is the most common form of arthritis, with well-known risk factors including age, gender and body mass index. As the Infrapatellar fat pad (IPFP) is located close to cartilage and bone surfaces, it is hypothesized that this structure may serve to reduce loading on the joint, thus limiting the progression of knee OA. This study assessed the association between the volume of the IPFP and structural measures among patients with OA of the knee.

Subjects included 174 patients diagnosed with knee OA, with a mean age of 55.5 years. The subjects were assessed by anthropometric and radiographic evaluations, with T1- weighted MRI used to evaluate knee cartilage. Comparisons were made between structural changes of the cartilage and the IPFP.

After adjusting for potential confounders, a greater IPFP volume was found to be associated with

greater tibial and patellar cartilage volume, and fewer cartilage defects, at all sites measured. The IPFP was not significantly associated with joint space narrowing.

Conclusion: This study of patients clinically diagnosed with osteoarthritis of the knee found that a greater infrapatellar fat pad volume was associated with fewer structural abnormalities, suggesting a protective role.

Cai, J., et al. Association between Infrapatellar Fat Pad Volume and Knee Structural Changes in Patients with Knee Osteoarthritis. **J Rheum.** 2015, October; 42 (10): 1878-1884.

KINESIO TAPE AND POSTURAL CONTROL IN STROKE

Postural instability among patients with stroke is thought to impact activities of daily living, independent living and gait. As previous studies have demonstrated that kinesio tape (KT) can improve postural control and gait, this study was designed to determine the short-term effects of KT on ankle stability in patients with stroke.

Subjects were 40 patients with chronic stroke, between the ages of 30 and 60 years. The participants scored 21 to 56 on the Berg Balance Scale (BBS), and spasticity levels of two to three on the modified Ashworth Scale. All were able to stand for at least 30 seconds, change walking direction and understand instructions. For all patients, KT was applied to the affected ankle in the direction of dorsiflexion and eversion to correct the equinovarus deformity. Postural control was evaluated by functional tests and force plate measurements before and after the application of the tape.

At 24 hours, significant differences were seen between groups in the functional reach test (p=0.04), and mediolateral center of pressure and displacement (p=0.04). Immediately after KT, the BBS scores improved significantly in the KT group (p=0.02), with no other immediate improvements noted.

Conclusion: This study of patients with chronic stroke found that kinesio tape can improve elements of postural control, with these effects most apparent at 24 hours after taping.

Rojhani-Shirazi, Z., et al. Effects of Ankle Kinesio Taping on Postural Control in Stroke Patients. J Stroke **Cerebrovasc Dis.** 2015, November; 24(11): 2565-2571.

ONE-YEAR FOLLOW-UP OF BANKART REPAIRS

Anterior shoulder instability can be managed surgically by an anterior capsulolabral repair (Bankart repair). The recurrent dislocation rate after Bankart repair is high, with estimates ranging from nine to 58%. This study reports on recurrence rates of anterior shoulder instability without osseous lesions 20 years after Bankart repair.

This retrospective cohort analysis reported on the shoulder dislocation recurrence rates of 47 patients who underwent a Bankart procedure between 1989 and 1994 for recurrent anterior shoulder instability. Preoperative imaging excluded patients with significant glenoid bone loss or a large Hill-Sacks lesion. Of the 47 patients, 40 underwent clinical follow-up 20 years after surgery.

At 20-year follow-up, 40 of the 47 patients were contacted and agreed to be evaluated. Of those, 27 were examined clinically with the Western Ontario Shoulder Instability Index, the Rowe score, the Subjective Shoulder Value, a visual analogue scale for pain and range of motion.

Recurrent instability during the follow-up period occurred in seven (17.5%) of the patients. Of those, five sustained a complete dislocation requiring reduction by a physician. Six of the seven experienced the first postoperative instability episode after more than eight years without symptoms. Three late failures were the result of a high-energy sports injury while two occurred due to a minor trauma.

Conclusion: This study of patients undergoing open Bankart repair found that, even after excluding osseous glenoid defects, the recurrence of instability was 17.5%, with most episodes of failure associated with shoulder specific activity.

Moroder, P., et al. Open Bankart Repair for the Treatment of Anterior Shoulder Instability without Substantial Osseous Glenoid Defects: Results after a Minimum Follow-Up of 20 Years. **J Bone Joint Surg (Am).** 2015, September 2; 97 (17): 1398-1405.

OUTCOME OF UNREPAIRED MENISCUS TEARS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Anterior cruciate ligament (ACL) tears are frequently accompanied by tears of the meniscus. The management of these associated tears varies from leaving tears *in situ*, to repair and partial meniscectomy. While previous studies have suggested that certain tears of the meniscus left *in situ* can result in positive clinical results, it is thought that clinical outcomes depend upon lesion characteristics. This study reports on the six-year outcomes of meniscal tears, identified during ACL reconstruction, left *in situ*.

This multicenter trial included 194 patients with 208 identified meniscal tears, treated between January of 2002 and December of 2004. Data collected included demographic variables and comorbidities, meniscal tear characteristics and information regarding subsequent surgery. The primary outcome measure was repeat surgery.

Of the 1,399 patients, 914 (65.3%) had concomitant meniscus tears at the time of the index ACL reconstruction. All bucket handle tears were treated. Of the 914, 208

patients (23%) had meniscus tears left *in situ*, with 137 lateral (65.9%) and 71 medial (34.1%). Of these, 97.8% of the lateral and 94.4% of the medial untreated tears required no repeat surgery.

Conclusion: This study of patients undergoing anterior cruciate ligament reconstruction found that meniscal tears identified during the surgery, and left unrepaired, rarely required surgery during the following six-years.

Duchman, K., et al. The Fate of Meniscus Tears Left *in Situ* at the Time of Anterior Cruciate Ligament Reconstruction. A 6-Year, Follow-Up Study From the MOON Cohort. **Am J Sp Med.** 2015, November; 43(10):2688-2695.

PLATELET RICH PLASMA FOR LONG BONE NON-UNION

Nonunion remains a significant source of morbidity, with a negative impact on quality-of-life. While autologous cancellous bone is considered to be the gold standard for the treatment of nonunions, the limited supply and donor site morbidity have led researchers to explore alternatives. As previous studies have demonstrated that platelet rich plasma (PRP) has the ability to accelerate bone and soft tissue healing, this study reviewed the efficacy of PRP in the treatment of established fracture nonunion of long bones.

Subjects were 94 patients with established nonunion of long bone fractures, with stable internal fixation/ stable reduction plaster immobilization, acceptable alignment fracture fragments and more than 90% contact between the fragments. The average time between injury and platelet injection was 9.1 months. The participants underwent autologous PRP preparation, with injection of 15 to 20 ML of PRP under image intensified guidance. All subjects were assessed clinically and radiologically for the healing of the fracture at monthly intervals until three months. The absence of localized tenderness, abnormal mobility and pain were considered the clinical criteria for union.

Of the 94 patients, 82 had fracture healing at four months. In the patients with early fracture healing, the PRP injection had been given within two to four months of the diagnosis of nonunion. Of the 12 patients with failed union, the PRP had been injected 12 months or later from the diagnosis of nonunion.

Conclusion: This study of patients with nonunion of long bone fractures found that the administration of platelet rich plasma could assist with healing.

Malhotra, R., e t al. Role of Autologous Platelet Rich Plasma in Treatment of Long-Bone Nonunions: A Prospective Study. **Musculoskel Surg**. 2015 DOI 10.1007/s12306 – 015 – 0378 – 8

NAPROXEN WITH CYCLOBENZAPRINE VERSUS OPIOIDS FOR ACUTE LOW BACK PAIN

Low back pain (LBP) is responsible for 2.4% of visits to the emergency department (ED) in the United States, with ED physicians often prescribing nonsteroidal anti-inflammatory drugs, skeletal muscle relaxants and opioids in combination. This study was designed to better understand the efficacy of muscle relaxers or opioids, as compared to nonsteroidal anti-inflammatory drugs, for the treatment of nontraumatic non- radicular back pain.

Subjects were patients 21 to 64 years of age, presenting to the ED primarily for the management of acute LBP. Patients excluded had radicular pain, back pain from direct trauma to the back within the previous month, pain of more than two weeks' duration or a recent history of LBP of more than one episode per year. All patients received naproxen 500 mg, q 12 hours. In addition subjects were randomized to receive, every eight hours, placebo, cyclobenzaprine 5 mg, or oxycodone 5 mg/ acetaminophen 325. The primary outcome variable was improvement on the Roland-Morris Disability Questionnaire (RMDQ).

At week one, improvement on the RMDQ for those in the placebo group was 9.8, for those in the cyclobenzaprine was 10.1 and for those in the oxycodone/ acetaminophen group was 11.1. There were no significant differences between groups. Three months after the emergency department visit, one fourth of each study group reported moderate or severe LBP and use of medication for that pain.

Conclusion: This study of patients with acute low back pain, seen in the emergency department, found that adding cyclobenzaprine or oxycodone/acetaminophen to naproxen did not improve functional outcome or pain at one week follow-up.

Friedman, B., et al. Naproxen, Cyclobenzaprine, Oxycodone/ Acetaminophen or Placebo for Treating Acute Low Back Pain. A Randomized, Clinical Trial. **JAMA**. 2015, October 20; 314(15): 1572-1580.

PROGESTERONE VERSUS CORTICOSTEROIDS FOR CARPAL TUNNEL SYNDROME

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper limb. Among conservative, nonsurgical treatments, local corticosteroid injections have been found to provide symptomatic relief for many patients. As progesterone has been found to have neuroprotective effects, this study compared the effects of local steroid injections with those of local progesterone injections for patients with CTS.

This prospective study included 60 hands of patients with bilateral mild or moderate, idiopathic CTS. Subjects in the corticosteroid group received a single injection of 0.5 mL triamcinolone acetate, 40 mg per mL, and 0.5% of two percent

lidocaine. Those in a progesterone group received a single local injection of 0.5 mL 17-alpha hydroxy progesterone (500 mg/2 mL) and 0.5 mL lidocaine (2%). The groups were compared for symptom severity, functional status and electrodiagnostic test results before and 10 weeks after treatment. Pain was assessed on a visual analogu scale. Symptoms and function were assessed using the Bostone/Levine symptom severity and functional status scales. Electrodiagnostic studies were completed before and after treatment. Pain severity decreased significantly in both groups (p=0.00001 for both), with no significant difference between the two groups. Median distal sensory latency improved in the corticosteroid as well as the progesterone group (p=0.0002) and p=0.009 respectively) as did the motor onset latencies (p=0.003 and p=0.014 respectively). There was no meaningful difference in these measures between the two groups. Patient satisfaction with the injections was greater in the corticosteroid group 10 weeks after injection than in the progesterone group (p=0.005).

Conclusion: This study of patients with carpal tunnel syndrome found that both progesterone and corticosteroids produce significant improvement in patient symptoms, with no significant difference found between the two interventions.

Bahrami, M., et al. Comparison between the Effects of Progesterone versus Corticosteroid Local Injections in Mild and Moderate Carpal Tunnel Syndrome: A Randomized, Clinical Trial. ***BMC Musculoskel* Dis.** 2015. 16: 322.

THE FIFA 11+ SOCCER INJURY PREVENTION PROGRAM

Soccer (football) is the most widely played sport worldwide, with approximately 300,000,000 registered players globally. The Federation Internationale de Football Association (FIFA) and its medical assessment and research center have developed an injury prevention program, the FIFA 11+ program, in an effort to reduce the incidence of all injuries sustained during participation. This study evaluated the efficacy of the FIFA 11+ in preventing injuries in collegiate male soccer players.

All NCAA Division I and II men's collegiate soccer programs were contacted to participate in this prospective, cluster randomized, controlled trial. Sixty-one teams completed the study, with 34 control (C) and 27 intervention groups (I). The FIFA 11+ program was delivered to each athletic trainer in I group. Data concerning athletic exposure, injury, utilization of the program and compliance were compiled into an injury surveillance system. Injuries were calculated as the number of injuries per 1,000 athletic exposures (AEs).

The athletes in C group were found to have 15.04 injuries per 1,000 AEs, as compared with 8.09 injuries per 1,000 AE in group I ($p<0.001$). The intervention group also had fewer missed days due to injury and fewer game injuries than did the control group. Three anterior cruciate ligament injuries were noted in the intervention group and 16 in the control group ($p<0.001$).

Conclusion: This randomized, controlled trial, reviewing the efficacy of FIFA 11+ in reducing injuries in men's collegiate soccer players, found a 46.1% reduction in injuries as compared to a control group.

Silvers-Granelli, H., et al. Efficacy of the FIFA 11+ Injury Prevention Program in the Collegiate Male Soccer Player. **Am J Sports Med.** 2015, Nov; 43(11):2628-2657.

LOWER EXTREMITY SURGERY FOR SPASTIC PARAPLEGIA

During the past two decades, the use of three-dimensional gait analysis has permitted multiple deformities to be corrected during one surgery. This study of patients with cerebral palsy (CP) was designed to determine whether such surgeries improve gait parameters and gait function over time.

Subjects included 34 children with an average age 11.6 years, all diagnosed with CP with spastic diplegia. Among the patients, 195 lower extremity surgical procedures were performed. Preoperatively, as well as one and five years post-operatively, the children underwent physical examination and instrumented, three-dimensional gait analysis. Gait function was compared between baseline and five -year follow-up.

Gait function, as evaluated by the Functional Mobility Scale, improved from baseline to the one-year follow-up for the 5 m and 50 m distances (p=0.04 and p=0.01, respectively), without significant change in the 500 m distance (p=0.07). At five years, improvement in all three distances was significant, as compared with baseline. Measures of gait quality, using the gait profile score, improved from baseline to five-year follow-up, although no significant difference was noted between one year and five years. The mean parental satisfaction score was 7.7 on a 10 point scale.

Conclusion: This five-year follow-up of children with CP and spastic diplegia found that surgery to correct gait abnormalities resulted in improved gait at five-year follow-up, based upon findings of gait analysis.

Terjesen, T., et al. Gait Improvement Surgery in Ambulatory Children with Diplegic Cerebral Palsy. A Five-Year, Follow-Up Study of 34 Children. **Acta Orthopedica.** 2015, August; 86(4):511-517.

CONSTRAINT INDUCED MOVEMENT THERAPY IN EARLY STROKE REHABILITATION

Constraint induced movement therapy (CIMT) was originally developed for patients with chronic stroke, and included 10 days of therapy for six hours per day. This study assessed the effect of a modified CIMT protocol conducted in the early phase of rehabilitation after stroke.

This single-blinded, multi-center, randomized, controlled trial included patients with a first-ever or recurrent stroke at more than five, and less than 26 days prior to recruitment. Subjects randomized to a CIMT group received treatment for 10 consecutive workdays for three hours per day. The patients were encouraged to wear a constraining mitt on the unaffected hand for up to 90% of waking hours. The control group was treated according to the Norwegian guidelines for stroke patients. The primary outcome measure was the Wolf Motor Function test (WMFT), with secondary outcome measures including the Fugl-Meyer upper extremity motor assessment, the Nine-Hole Peg test (NHPT), the arm use ratio and the Stroke Impact Scale.

Of the 22 CIMT participants available for post-treatment assessment, 19 completed all 10 treatment days, with a mean time in treatment of 27 hours. After treatment, WMFT functional ability scores were significantly better in the treatment group (p=0.01). In addition, dexterity, as measured by the NHPT, was significantly better in the treatment group than in the control group. However, at six months, those differences had disappeared.

Conclusion: This study of patients with ischemic stroke found that constraint induced movement therapy may accelerate short-term recovery, with no evidence of long-term benefit over conventional treatment.

Thrane, G., et al. Efficacy of Constraint-Induced Movement Therapy in Early Stroke Rehabilitation: A Randomized, Controlled Multisite Trial. **Neuorehab and Neural Repair**. 2015, July; 29(6): 517-525.

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

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