MUSCULOSKELETAL

IN REVIEW

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Volume 3, Number 6 | Published by Physicians Specializing In Musculoskeletal Medicine | November 5, 2016

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.

COMPRESSION GARMENTS AFTER ENDURANCE EXERCISE

As pilot data have suggested that wearing compression garments during exercise may accelerate recovery, this study was designed to determine the effects on performance recovery of wearing a lower body compression garment for 24 hours following running exercise.

This study included 18 active men with an average age of 22 years. The subjects were randomized to a downhill running group (DHR) or a level surface running group (LR). Each began running at a speed equivalent to 70% of their VO2 max. Following two stages of submaximal running, the running speed was increased each minute until exhaustion. Respiratory gases were collected and analyzed, with heart rate monitored continuously. For both groups, all subjects completed two different trials, either wearing (CG) or not wearing (CON) a lower body compression garment for 24 hours after exercise. Changes in jump performance, circumference of the thigh and calf, subjective muscle soreness and fatigue and blood work variables were measured before and immediately after exercise, and at one, three and 24 hours after exercise. In addition, running economy was assessed 24 hours after exercise.

At 24 hours after DHR, the counter movement jump height and Rebound Jump Index were significantly higher in the CG trial than in the CON trial ($p=0.008$ and $p<0.05$ respectively), but not following the LR trial. Wearing the CG did not affect the time course of changes in blood variables in either group.

Conclusion: This study found that wearing lower extremity compression garments after intense exercise facilitated recovery of jump performance under situations with severe exercise-induced damage.

Mizuna, S., et al. Wearing Compression Garment after Endurance Exercise Promotes Recovery of Exercise Performance. **Int J Sports Med**. 2016, October; 37 (11): 870-877.

CABBAGE LEAF WRAPS FOR OSTEOARTHRITIS OF THE KNEE

Osteoarthritis (OA) of the knee is a common, chronic disease affecting the elderly. A cabbage leaf wrap (CLW), using white or savoy cabbage applied to the painful joint, is a conservative treatment that has been used for centuries. This study investigated the effects of CLWs for the treatment of OA of the knee.

This randomized, controlled, three -armed parallel group trial included patients with OA of the knees with radiographic evidence of Kellgren-Lawrence stage II to III. The subjects were assigned one of three groups, including four weeks of daily CLWs at two hours per day, 10 mg topical diclofenac once daily or usual care (UC). The primary outcome measure was pain intensity, assessed with a visual analogue scale (VAS) after four weeks. Secondary outcomes included the Western Ontario and McMaster Universities Arthritis index (WOMAC), quality of life, self-efficacy, physical function, pressure pain sensitivity, satisfaction and safety after four and 12 weeks.

The subjects included 42 women and 39 men with an average age of 65.9 years. After four weeks, pain scores were significantly more improved in the CLW group than in

the UC group, with a difference of 12.1 points (p=0.033) No significant difference was found between the CLW group and the topical diclofenac group.

Conclusion: This study of patients with osteoarthritis of the knee found that cabbage leaf wraps can significantly reduce pain and improve function and quality of life as compared to usual care, with results similar to those of topical diclofenac.

Lauche, R., et al. Efficacy of Cabbage Leaf Wraps in the Treatment of Symptomatic Osteoarthritis of the Knee. Randomized, Controlled Trial. **Clin J Pain.** 2016, November; 32 (11): 961-971.

GAIT CHANGES AFTER ANKLE ARTHRODESIS

The surgical options for patients with severe tibiotalar arthritis involve either a total ankle arthroplasty or a tibiotalar arthrodesis. The difference in outcomes between these two procedures, and the resulting gate changes, remain unclear. This study assessed the postoperative gait function of patients undergoing ankle arthrodesis.

This prospective study evaluated patients with isolated end-stage ankle arthritis who were treated with tibiotalar arthrodesis. Analysis was completed two weeks before surgery, and then again after surgery. Gait parameters were collected for both the affected and the unaffected limbs. Parameters followed were cadence, step length, walking velocity, and total support time. Kinematic data included range of motion, maximal plantarflexion and dorsiflexion of the ankle.

After surgery, significant increases were noted in step length ($p<0.003$) and gait velocity ($p<0.001$). The mean total range of motion in the sagittal plane did not change significantly after surgery. An increase in maximum dorsiflexion, as well as a decrease in maximal plantarflexion, were noted in the affected limb. Significant increases in the mean ranges of motion for the affected hip joint and knee joint were also noted. Kinematic data revealed significant improvement in the ankle moment and hip power after surgery.

Conclusion: This study of patients with severe osteoarthritis undergoing ankle arthrodesis found significant improvements in numerous temporal-spatial, kinematic and kinetic measures.

Brodsky, J., et al. Abnormalities of Gait Caused by Ankle Arthritis Are Improved by Ankle Arthrodesis. **Bone Joint J.** 2016; 98-B: 1369-1375.

INVASIVE OCCIPITAL NERVE STIMULATION FOR CLUSTER HEADACHE

Cluster headache is among the most disabling of the primary headaches. Among the small percentage who are considered to be drug-resistant, occipital nerve stimulation has been proposed to be a good alternative to more invasive and risky hypothalamic deep brain stimulation. This study assessed the long-term clinical utility of invasive occipital nerve stimulation (iONS).

Subjects were 15 patients with drug-resistant, chronic cluster headaches who underwent iONS implantation. Of those, five had their stimulators removed, with the remaining 10 undergoing a mean follow-up of 71 months.

At midterm, 80% of the patients reported improvement in the frequency of cluster headaches, and 60% were pain-free. At long-term follow-up, 40% evolved to an episodic form of cluster headache, while six reported that their attack frequency decreased by 70% as compared to baseline.

Conclusion: This study of patients with refractory, chronic cluster headaches found that, among those who were initially tolerant of the procedure, Invasive Occipital Nerve Stimulation resulted in significant pain relief benefits at nine-year follow-up.

Magis, D., et al. Invasive Occipital Nerve Stimulation for Refractory Chronic Cluster Headache: What Evolution at Long-Term? Strengths and Weaknesses of the Method. **J Headache Pain**. 2016; 17:8. DOI 10.1186/s10194-016-0598-9

STRENGTH TRAINING AND MORTALITY

While increased activity has been found to be associated with improved quality of life and a decreased risk of mortality, the data concerning the effects of strength training on mortality are not as clear. This study was designed to better understand the association between strength training and the risk of mortality in older adults. This cohort study included data from the 1997-2001 National Health Interview Survey and death certificate data from the National Center for Health Statistics National Death Index. The survey employed a multistage stratified sampling to collect health, disease and disability data concerning the United States population. Limiting data to those 65 years of age and older, strength training practices among participants were compared with all-cause mortality. Covariates for the analysis included demographics, past medical history and other health behaviors.

Of the 30,162 adults aged 65 years of age and older, 9.6% reported being engaged in strength training at least twice per week, consistent with guidelines from the American College of Sports Medicine and the American Heart Association. Of the cohort, 31.6% died during the 15-year follow-up. Those who reported performing strength training at least twice a week had a 45% lower all-cause mortality, a 19% lower odds of death from cancer, and a 41% lower odds of cardiac death. After adjusting for demographic covariates those who reported guideline- concordant strength training had a 37% lower all- cause mortality than those who did not ($p<0.001$).

Conclusion: This study of older patients engaged in biweekly strength training found a significant association between this training and a decrease in overall mortality.

Kraschnewski, J et al. Is Strength Training Associated with Mortality Benefits? A 15 Year Cohort Study of US Older Adults. **Prev Med**. 2016, June; 87:121-127.

TRANSCRANIAL MAGNETIC STIMULATION ON MOTOR RECOVERY AFTER STROKE

In recent years, noninvasive brain stimulation techniques, such as repetitive transcranial magnetic stimulation (rTMS), have been used to promote functional recovery among patients with stroke. Positive effects have primarily been found among those treated with rTMS at an early stage of stroke. This study was designed to investigate the effects of rTMS on motor recovery at three month follow-up. Subjects were 87 consecutive patients with middle cerebral artery stroke and motor deficits, recruited at three to 30 days after stroke. Those subjects were randomized to receive high- frequency, 3 Hz, low-frequency, 1 Hz or sham rTMS, daily for five consecutive days. Stroke severity was measured by the National Institutes of Health Stroke Scale (NIHSS). The primary outcome measure was the score on the Fugl-Meyer (FM), with secondary outcomes including the Barthel Index(BI) and the Modified Rankin Scale (MRC), assessed at baseline, after treatment, and then at one, two and three months.

As compared to sham rTMS, both rTMS groups demonstrated significant improvements in NIHSS, BI and MRC scores. In the motor performance analysis, the upper limb scores of the FM and the MRC improved with 1 Hz stimulation, with no substantial difference noted with the other groups. For the lower limb scores of the FM and MRC, significant improvements were noted with both stimulation groups compared with the sham group. The therapeutic effects persisted beyond the intervention by at least three months.

Conclusion: This randomized, controlled trial found significant motor improvements through the use of repetitive transcranial magnetic stimulation at an early stage of stroke.

Du, J., et al. Effects of Repetitive Transcranial Magnetic Stimulation on Motor Recovery and Motor Cortex Excitability in Patients with Stroke: A Randomized, Controlled Trial. **Eur J Neurol**. 2016, November; 23 (11): 1666-1672.

CONTRALATERAL FUNCTIONAL ELECTRICAL STIMULATION IN CHRONIC HEMIPARESIS

Data suggest that cyclic neuromuscular electrical stimulation (cNMES) of the paretic wrist and finger extensors can improve upper extremity function in patients with subacute and chronic stroke. Contralateral controlled functional electrical stimulation (CCFES) is a new modality that enables the patient to actively open the paretic hand. The patient controls the stimulus in real-time by opening and closing the unaffected hand. This study compared the efficacy of CCFES to that of cNMES.

This parallel group study included patients at least six months out from a hemorrhagic or ischemic stroke, each of whom had unilateral finger extensor paresis. For each participant in the CCFES group, surface electrodes were positioned over the forearm finger and thumb extensors to produce hand opening. Using electrodes, pulses of electric current with a frequency of 35 Hz and amplitude of 40 mA were applied. The stimulus was programmed to increase the pulse duration for each electrode in proportion to the amount of opening of an instrumented glove worn on the contralateral nonparetic hand. The cNMES group was treated with the stimulator automatically and repetitively applying stimulus. A total of 20 sessions of therapist-guided, and 10 sessions of self-administered therapy were administered at 60 minutes per session over 12 weeks. The primary outcome measure was the Box and Block Test, a measure of manual dexterity.

During the study, 72 patients completed the treatment. By six months, both groups had realized significant improvement in BBT scores, with the gain significantly greater in the CCFES group than in the cNMES group ($p=0.045$). Both groups improved on the upper extremity Fugl-Meyer, with no significant difference between groups. Those with the greatest gains were less than two years post-stroke.

Conclusion: This study of patients with chronic, moderate to severe hand impairment after stroke found that 12 weeks of CCFES therapy improves manual dexterity more than does an equivalent dose of cNMES.

Knutson, J., et al. Contralaterally Controlled Functional Electrical Stimulation Improves Hand Dexterity in Chronic Hemiparesis. A Randomized Trial. **Stroke.** 2016; 47:00-00.

BONE MARROW ASPIRATE FOR KNEE OSTEOARTHRITIS

Osteoarthritis (OA) of the knee is a painful, degenerative condition that affects millions of patients. The American Academy of Orthopedic Surgeons recently published a position paper which recommended against most conservative therapies. This study reviewed the effects of bone marrow aspirate concentrate (BMAC), without additives, as a treatment for OA of the knee.

Subjects included 25 patients seen for bilateral knee OA between 2013 and 2015. All had been unresponsive to conventional treatments. Each patient received a randomly determined intra-articular injection of BMAC, (harvested from the patient's superior iliac crest) into one knee, and a similar volume of normal saline placebo into the contralateral knee. At baseline and follow-up, the patients were assessed using the Osteoarthritis Research Society International (OARSI) measures, the Intermittent and Constant Osteoarthritis Pain (ICOAP) questionnaire and visual analog scale (VAS) pain scores.

Significant improvement was noted in both groups in ICOAP scores and VAS pain scores, with no significant difference found between the treatment groups. In addition, while there was significant improvement in the activity levels of both groups compared to baseline, there was no significant difference in the degree of improvement between the two treatment groups at any of the follow-up periods.

Conclusion: This study of patients with chronic osteoarthritis of the knee found that injections with saline produced similar results in pain reduction and functional abilities as did injections with bone marrow aspirate concentrate.

Shapiro, S., et al. A Prospective, Single-Blind, Placebo-Controlled Trial of Bone Marrow Aspirate Concentrate for Knee Osteoarthritis. **Amer J Sports**

Med. DOI: 10.1177/0363546516662455.

ALCOHOL INJECTIONS FOR MERALGIA PARESTHETICA

Meralgia paresthetica (MP) is a rare sensory mononeuropathy caused by compression or entrapment of the lateral femoral cutaneous nerve (LFCN) as it passes under the inguinal ligament. While this neuropathy usually runs a benign course, some patients present with intractable pain requiring surgical decompression or neurolysis. This case series describes the clinical course of patients undergoing alcohol neurolysis of the LFCN for intractable MP.

This retrospective case series included patients with a diagnosis of MP, identified by clinical exam and verified by electrodiagnostic study. All were resistant to conservative treatment and verified by bupivicaine block. Therapeutic neurolysis was completed using three mm of 50% alcohol in 0.25% bupivicaine. The participants were assessed for pain intensity, medication use and quality of life at three months.

The six patients averaged 45.5 years of age, with an average duration of pain of 79 days. Pain intensity improved from 8.83 before the injection to 2.23 at two weeks and 1.83 at 12 weeks. Quality of life, as measured by the SF-36, improved, in the physical health domain, at two and 12 weeks ($p<0.05$), with only mild improvement noted in the mental health domain. There was a >50% improvement in pain intensity, as measured by the Numeric Rating Scale, and quality of life, as measured by the SF-36, in all patients.

Conclusion: This study of six patients with intractable meralgia paresthetica found that a guided neurolysis of the lateral femoral cutaneous nerve with alcohol was safe and effective for pain relief.

Ahmed, A., et al. Ultrasound-Guided Alcohol Neurolysis of Lateral Femoral Cutaneous Nerve for Intractable Meralgia Paresthetica: A Case Series. **Br J Pain.** 2016, November; 10(4):232-237.

ARTHROKINEX FOR KNEE OSTEOARTHRITIS

The American College of Rheumatology recommends several nonpharmacologic and pharmacologic options to treat knee osteoarthritis (KOA), with the goal to provide analgesic relief and decrease inflammation. This study reviewed the efficacy of Arthrokinex autologous conditioned serum for reducing pain and improving function in patients with KOA. This method has been shown to inhibit IL - 1beta through the induction of IL- 1 -Ra.

This retrospective chart review included 100 patients with symptomatic KOA. For each participant, 60 mL of venous blood was drawn and conditioned through the Arthrokinex process. Each patient received a 1 mL injection of autologous conditioned serum on days zero, seven, 14, 90, 180 and 270. Outcome measures included the Visual Analogue Pain Scale and the Extra Short Musculoskeletal Functional Assessment Survey (XSMFA-D), completed on each injection day and at one year.

The subjects averaged 61.2 years of age with body mass index averaging 33 kg/m^2. Significant reductions in the VAS scores were noted at each time point, and were sustained for at least one year ($p<0.0001$). The participants reported pain relief after the first injection. Subjects reported a 47% reduction of pain at three months, 46% at six months and 61% at one year. At one year patients reported a 33% increase in knee function, 36% increase in knee activity, 36% increase in knee mobility and a 38% improvement in the amount of time bothered by KOA ($p<0.0001$ for all). Using a patient global impression of change survey, at one year, 30% reported being very much improved, 44% much improved and 18% minimally improved.

Conclusion: This retrospective review of 100 patients receiving a series of knee injections with autologous conditioned serum (Arthrokinex), reported a significant and sustained reduction in pain, and an improvement in function.

Baretto, A., et al. A New Treatment for Knee Osteoarthritis: Clinical Evidence for the Efficacy of Arthrokinex Autologous Conditioned Serum. **J Ortho.** 2017, March; 14(1): 4-9.

PERCUTANEOUS RADIOFREQUENCY TREATMENT FOR SACROILIAC JOINT PAIN

For patients with sacroiliac (SI) joint pain, among the treatments described in literature is radiofrequency denervation. This study explored the utility of a device targeting the lateral branches S1 to S4 for the treatment of SI joint pain.

This randomized, sham control, double-blind, multicenter, clinical trial included patients with SI joint pain of at least three months' duration. All patients underwent a test SI joint injection with lidocaine, two percent. Those with a reduction in pain of two or more on a numeric rating scale were randomized into the study. Those in the treatment group underwent percutaneous radiofrequency lesions at the lateral branches of S1 to S4 nerve roots and the posterior rami dorsalis of L-5. Those in the sham group underwent the same procedure without radiofrequency lesions. The groups were compared for changes in scores on the Numeric Rating Scale of pain.

At three months, no significant difference in pain level was found between the treatment and sham treatment groups. Further, no significant difference was found between the groups in the level of satisfaction over time.

Conclusion: This study of patients with sacroiliac joint pain did not find that percutaneous radiofrequency heat lesions are more effective than placebo for improving symptoms.

Van Tilburg, C., et al. Randomized, Sham-Controlled, Double-Blind, Multicenter, Clinical Trial to Ascertain the Effect of Percutaneous Radiofrequency Treatment for Sacroiliac Joint Pain. Three-Month Results. **Clin J Pain**. 2016, November; 32(11): 921-926. DOI: 10.1161/ STROKEAHA.116.013791.

BLOOD FLOW RESTRICTION TRAINING AFTER KNEE ARTHROPLASTY

Clinical practice guidelines recommend the use of aggressive

strengthening to return patients' strength and function after knee surgery. While those guidelines suggest a minimum of 60% of a single repetition maximum for strengthening, many patients are limited by post-operative discomfort. As blood flow restriction training (BFR) uses partial venous blood flow restriction, combined with exercise at 20% to 30% of the patient's one rep maximum, this study assessed whether this technique could be beneficial in the rehabilitation of patients with non-reconstructive knee arthroscopy.

Patients scheduled for non-reconstructive surgery were randomized to receive either BFR plus standard therapy or standard physical therapy alone. Both groups followed the same accelerated physical therapy protocol consisting of immediate weight-bearing and unrestricted range of motion. The BFR group performed leg exercises at 30% of the one rep max, with blood flow restricted with a tourniquet set at 80% of the total limb occlusion pressure (the pressure required to eliminate a detectable pulse using ultrasound). All patients underwent 12 sessions, with outcome measures including, strength testing and thigh girth, as well as four physical performance and two patient-reported outcome measures.

Seventeen subjects completed the study, including 10 in the BFR group. While both groups demonstrated improvement in outcome measures at follow-up, the BFR group demonstrated a 78% change in quadriceps extension strength as compared with 41% in the control group ($p=0.097$). On physical performance measures, including the Self Selected Walking Velocity, the Sit-To-Stand 5Times, and the 4 Square Step Test, generally greater, though not significant improvements were seen in the BFR group, with outcomes on the Timed Stair Ascent significantly better ($p=0.0149$) than in the control group.

Conclusion: This pilot study of patients undergoing non-reconstructive knee surgery found that blood flow restriction exercise, added to conventional therapy, may accelerate gains in strength and physical function.

Tennant, D., et al. Blood Flow Restriction Training after Knee Arthroscopy: A Randomized, Controlled, Pilot Study. **Clin J Sport Med.**2016; DOI:10.1097/ JSM.0000000000000377.

BOTOX FOR MEDICATION OVERUSE HEADACHES

Patients with chronic migraine headaches (CMHs) have greater healthcare resource utilization than do those with episodic migraines. It is estimated that approximately 50 to 80% of patients with CMH, referred to a headache clinic, show analgesic overuse that may lead to the development of medication overuse headaches (MOHs). This study of patients with CMH and MOH explored the efficacy of treatment with OnabotulinumtoxinA at two different dosing regimens.

Subjects were 143 patients with CMH with MOH, referred to a headache clinic between January of 2012 and January of 2013. The participants were treated with OnabotulinumtoxinA 195 U repeated every three months during the two- year study. Headache days, migraine days, acute pain medication intake, as well as the Headache Impact Test (HIT-6) scores were used as efficacy measures. The outcomes of this study were compared with those of a sample of patients treated with OnabotulinumtoxinA 155 U, and followed for two years.

In the OnabotulinumtoxinA 195 U group, headache days per month, as well as the migraine days per month, decreased from the first to the eighth session of therapy ($p<0.001$ for both comparisons).

In addition, medication intake days decreased significantly, as did the mean HIT-6 scores ($p<0.001$). Compared to the group treated with 155 U, the mean headache days and migraine headache days were significantly fewer in the 195 U dosed group ($p<0.001$).

Conclusion: This study of patients with chronic migraines and medication overuse headaches suggests that injections of 195 units of OnabotulinumtoxinA may be superior to injections of the standard 155 units.

Negro, A., et al. A Two-Years, Open Label, Prospective Study of OnabotulinumtoxinA 195 U in Medication Overuse Headache: A Real-World Experience. **J Headache Pain.** 2016; 17:1 DOI 10.1186/ s10194-016-0591-3.

CAPSAICIN PATCH FOR LUMBOSACRAL PAIN

Topical capsaicin formulations are widely used to manage pain. This study assessed the efficacy of a capsaicin eight percent patch in patients with lumbosacral pain.

Subjects were adults diagnosed with lumbosacral pain of at least three months' duration, with a visual analogue scale (VAS) score of greater than five on a 10 point scale. The participants were initially anesthetized with EMLA cream with the capsaicin eight percent patch then applied over the most painful area of the back, remaining in place for one hour. The patients were assessed for pain at two, eight and 12 weeks after treatment. At weeks two and 12, the patients completed the EQ-5D Health-Related Quality of Life instrument.

Ninety patients completed the study. At baseline, the mean VAS score was 7.6, falling to 5.6 at week two ($p<0.001$), 3.2 at week eight ($p<0.001$) and 2.6 at week 12 ($p<0.001$). The change in VAS scores at week 12, as compared to baseline, was negatively correlated with body mass index and age. Between baseline and weeks two, eight, and 12 significant improvements were noted in all five dimensions of the EQ-5D questionnaire ($p<0.001$).

Conclusion: This uncontrolled study of patients with lumbosacral pain found that the use of a capsaicin eight percent patch can significantly reduce pain and improve quality of life.

Zis, P., et al. Effectiveness and Impact of Capsaicin 8% Patch on Quality of Life in Patients with Lumbosacral Pain: An Open-label Study. **Pain Physician.** 2016:19:E1049-E1053.

EARLY PHYSICAL THERAPY FOR ACUTE ANKLE SPRAIN

Ankle sprains are among the most common musculoskeletal injuries. This study was designed to

determine the role of supervised physiotherapy in the management of acute ankle sprain.

This prospective study included patients presenting for acute medical treatment of an ankle sprain (grades 1 to 2) at one of two acute care settings. The participants were randomized to a usual care arm or a physiotherapy arm. Those in the usual care arm received standard emergency department care consisting of a medical assessment and a one-page written summary of instructions for basic management of the injury at home. The physiotherapy group were provided with usual care plus a regimen of therapy including a progression of functional exercises. Treatment sessions were 30 minutes in length, with augmentation by standardized home exercise instructions. The primary outcome measure was the Foot and Ankle Outcome Score (FAOS). The primary outcome of efficacy was excellent recovery, defined as a total FAOS score of at least 450/500 at three months.

Between October of 2009 and April of 2013, 504 patients were randomized into this study. In the intention to treat analysis, at three months, excellent recovery was achieved in 43% of the physiotherapy and 37% of the usual care group (p=0.26). Differences between groups in the mean change of the FAOS scores were not significant at any time point during follow-up.

Conclusion: This study of patients presenting with acute ankle sprain failed to demonstrate that early, supervised physiotherapy leads to improved clinical function up to six months after injury, as compared to usual care alone.

Brison, R., et al. Effect of Early Supervise Physiotherapy on Recovering from Acute Ankle Sprain: Randomized, Controlled Trial. **Br Med J.** 2016; 355: i6153.

DULOXETINE IN PAINFUL DIABETIC NEUROPATHY

With a worsening of the global epidemic of diabetes, it is expected that painful diabetic neuropathy (PDN) will also increase. Three categories of drugs are commonly used to treat PDN. These include antiepileptics, tricyclic antidepressants and nonspecific analgesics. The guidelines recommend pregabalin as a front-line treatment. This meta-analysis reviewed the effectiveness of duloxetine for the management of diabetic peripheral neuropathic pain.

A literature search was completed for articles assessing the effects of duloxetine for patients with PDN, published between 2005 and 2015. Of the studies identified, nine met the inclusion criteria. A review of the studies found that the dosing use and pain assessment methods differed, precluding statistical pooling of the data. Therefore, a best evidence synthesis was created, based upon eight, high-quality studies.

The data from the high-quality studies, including 4,084 participants, suggested that duloxetine is beneficial for reducing pain, as compared with placebo. The data further suggested that duloxetine may be advantageous over pregabalin, with poor evidence of superiority over amitriptyline.

Conclusion: This study of patients with painful diabetic neuropathy found that duloxetine has beneficial effects over placebo and pregabalin, although the effects compared to amitriptyline need further review.

Hossain, S., et al. Duloxetine in Painful Diabetic Neuropathy. A Systematic Review. **Clin J Pain.** 2016, November; 32(11): 1005-1010.

HEEL TO TOE DROP OF RUNNING SHOES VERSUS RISK OF INJURY

Despite advances in running shoe technology, the effect of specific footwear features on the risk of running related injury have had little attention from the scientific community. This randomized, controlled trial investigated the relationship between shoe drop (the height difference between the forward and rear of the inside of the shoe) and the risk of injury.

This randomized, controlled trial included leisure-time adult runners 18 to 65 years of age. The runners were randomized to receive one of three versions of a running shoe, identical except for the height of the sole at the heel and the forefoot, to generate predefined foot drops of 10 mm (D10), 6 mm (D6) and 0 mm (D0).

Data collected included type of activity, duration of session, subjective perceived intensity, distance covered, running surface, shoe pair used and whether the participant experienced any pain during the session.

Of the 553 participants, 25% sustained an injury during the follow - up period. Neither of the shoe models with reduced drop were associated with the injury risk as compared with D10. An adjusted regression model revealed that previous injury (p=0.012) and weekly running frequency (p<0.001) were risk factors for injury, while running duration was found to be a protective factor. In a secondary analysis, among occasional runners, the rate of injury was found to be lower while using low drop shoes, while, in the regular runners, that injury rate was higher.

Conclusion: This randomized trial involving recreational runners found that, overall, shoe drop is not associated with injury risk.

Malisoux, L., et al. Influence of the Heel-to-Toe Drop of Standard, Cushioned Running Shoes on Injury Risk in Leisure Time Runners. A Randomized, Controlled Trial with Six-Month Follow-Up. **Am J Sports Med.** 2016, November, 44(11): 2933-2940.

TRANSVERSE MEDIAN NERVE MOVEMENT IN THE CARPAL TUNNEL

Some have reported that, during carpal tunnel release, the median nerve is adherent to the flexor retinaculum. This study investigated the effects of finger motions on the movement of the median nerve in patients with carpal tunnel syndrome (CTS).

Subjects were 23 healthy controls and 22 patients with CTS. Control subjects were healthy volunteers with no history of numbness, pain or finger weakness. For patients with CTS, the more affected side was studied, while both sides were studied in the controls. The diagnosis of CTS was verified by electrodiagnostic studies, with CTS rated as mild, moderate or severe. All subjects underwent ultrasound examination, during which they were asked to flex and extend the first, and then the second and third fingers, while keeping the others extended. Ultrasound images were

captured before and after each motion, with movement of the nerve calculated. Movement was compared between the control and CTS subjects.

The median nerve motions while moving the first and second fingers and grip motion differed significantly between those with and those without CTS in the radioulnar axis. The third finger motions and grip motions differed significantly with respect to median nerve movement between groups in the dorsopalmar axis. The movement of the nerve correlated negatively with CTS severity.

Conclusion: This study found a significant decrease in movement of the median nerve among patients with carpal tunnel syndrome, with this decrease in movement correlated with the severity of carpal tunnel syndrome.

Kang, H., et al. Effect of Finger Motion on Transverse Median Nerve Movement in the Carpal Tunnel. **Muscle Nerve.** 2016, October; 54 (4):738-742.

NEUROPATHIC PAIN AND OBESITY

Some have considered obesity to be a risk factor for musculoskeletal system disorders, although this relationship remains controversial. This study was designed to better clarify the relationship between obesity and neuropathic pain.

Subjects were adults diagnosed with neuropathic pain, with a neuroanatomically plausible distribution. Subjects were asked to quantify the average intensity of their pain in the prior week on an 11-point numerical rating scale (NRS). Neuropathic pain symptoms were assessed with the Neuropathic Pain Symptom Inventory (NPSI). The subjects were assessed for body mass index (BMI), with a cutoff of 25 kg/m² for overweight.

Forty-four patients participated in the study. The total NPSI score was significant higher in the overweight group than in the normal weight group ($p<0.01$), as were the paroxysmal scores ($p=0.049$), pain intensity ratings ($p=0.04$) and the McGill Pain Questionnaire scores ($p=0.049$).

Conclusion: This study of patients with neuropathic pain found that those whose body mass index was above 25 kg/m² had higher pain scores than did those with a normal body mass index

Hozumi, J. et al. Relationship between Neuropathic Pain and Obesity. **Pain Research Management.** 2016. doi.org/10.1155/2016/2487924.

RADIOFREQUENCY DENERVATION OF THE MEDIAL CALCANEAL NERVE

Heel pain is a frequent complaint of athletes with plantar fasciosis, estimated to involve seven percent of running related injuries. A number of conservative measures have been suggested, with more invasive interventions including injections, extracorporeal shockwave therapy or surgery. This study was designed to establish whether ultrasound (US) guided radiofrequency denervation of the medial calcaneal nerve (MCN) can provide symptomatic improvement for patients with refractory heel pain.

Subjects were patients referred with refractory heel pain for MCN radiofrequency denervation. The denervation was performed under US guidance, with either three periods of three minutes or six periods of two minutes, targeting temperatures above 80°C. After denervation, 2 mL bupivicaine was administered as procedural analgesia, with 1 mL of dexamethasone provided to reduce related inflammation. The efficacy of the procedure, as compared to previous treatments, was assessed by telephone questionnaire. Subjects were divided into group 1, including those assessed more than six months after the procedure, and group 2, assessed at 6 months or less from the procedure.

Pain scores decreased significantly in both groups, with significant changes from baseline in best pain scores ($p<0.01$ for both groups), as well as residual improvement ($p<0.01$ for both groups). Satisfaction ("very" or "somewhat" satisfied) with the results was reported by 69% of group 1 and 54% of group 2.

Conclusion: This retrospective study of patients with recalcitrant heel pain found that radiofrequency denervation of the medial calcaneal nerve may provide pain relief for at least six months after the procedure.

Counsel, P., et al. Ultrasound-Guided Radiofrequency Denervation of the Medial Calcaneal Nerve. **Clin J Sports Med**. 2016, November; 26 (6): 465-470.

MELATONIN AND FRACTURE RISK

Previous studies have demonstrated an association between anxiolytic or hypnotic drug use and the risk of hip fracture in the elderly. As an alternative, melatonin has been increasingly used, rising in the United Kingdom (U.K.) by 21% over the past 10 years. This study compared the fracture risk associated with melatonin and hypnotic drugs among older adults.

The data for this study were obtained from The Health Improvement Network (THIN), a database of electronic medical records from over 1,500 general practitioners in 380 U.K. medical practices. Data were reviewed to identify patients who were 45 years of age or older who were prescribed melatonin (cohort 1), at least two prescriptions of hypnotic benzodiazepines (cohort 2) at least two prescriptions of Z drugs including zolpidem and zopiclone (cohort 2B), or who had never been prescribed any of these drugs (control). The outcome was any fracture following study entry. Potential confounders identified were gender, age, medical morbidity, prescriptions for non-study drugs, body mass index, socioeconomic status, smoking and alcohol use status.

Compared to the control cohort, the unadjusted risks of fracture at follow-up were 1.90 for melatonin ($p<0.001$), 1.70 for hypnotic benzodiazepines ($p<0.001$) and 2.03 for Z drugs ($p<0.001$). In the adjusted model, significant hazard ratios were again found for melatonin ($p=0.04$) and Z drugs ($p=0.03$).

Conclusion: This British study of adults 45 years of age or older, found that melatonin and Z drugs are both independently associated with an increased risk of fracture.

Frisher, M., et al. Melatonin, Hypnotics and Their Association with Fracture: A Matched, Cohort Study. **Age and Ageing**. 2016, November; 45(6): 801-806.

NASAL CALCITONIN VERSUS GABAPENTIN FOR LUMBAR SPINE STENOSIS

Lumbar spine stenosis (LSS) is a chronic and prevalent disorder which affects a large portion of the older population. Calcitonin is a polypeptide hormone which affects skeletal mineralization, releases beta endorphins and can be used as an analgesic agent. This study compared calcitonin with gabapentin for the treatment of patients with symptomatic LSS.

From 2013 to 2015, nine patients with symptoms of neurogenic claudication and MRI demonstrated LSS were recruited. These subjects were randomized to receive salmon calcitonin, 200 international units daily for eight weeks, gabapentin 300 mg three times per day for eight weeks or a placebo daily for eight weeks. This regimen was followed by a washout period of four weeks.

All subjects were assessed by physical exam and with the Oswestry Disability Index (ODI) and the Patient Satisfaction Index. At eight weeks, the ODI scores in the calcitonin, gabapentin, and control groups were 31, 30.42 and 36 respectively ($p=0.91$). Three months after treatment, improvement in the ODI scores for the calcitonin group was significantly better than the gabapentin group ($p<0.05$) or the placebo group ($p<0.01$). At three-month follow-up, the mean patient satisfaction index score was 93% in the calcitonin group, 77.2% in the gabapentin group and 74.3% in the control group ($p<0.01$).

Conclusion: This study of patients with symptomatic lumbar spine stenosis suggests that 200 international units of nasal calcitonin spray is more effective than 300 mg of gabapentin three times daily for the relief of pain and symptoms.

Haddadi, K., et al. Effects of Nasal Calcitonin versus Oral Gabapentin on Pain and Symptoms of Lumbar Spinal Stenosis: A Clinical Trial Study. **Clin Med Insights Arthrit Musculoskelet Disord.** 2016, July; 9:132-138.

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IN REVIEW

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

Expanding the frontier of medicine in research, teaching, and patient care