

## 2. LBP

### Veterans and injustice

#### **Examining the relationship between perceived injustice, pain, and psychosocial outcomes among veterans with chronic low back pain**

W. Browning, T. Penn, D. Overstreet, C. France, E. Richardson, Z. Trost

#### **BACKGROUND**

Back pain is the leading cause of disability and service leave among military personnel. Perceived injustice has been associated with greater pain and disability, as well as maladaptive pain cognitions (e.g., catastrophizing, pain-related fear) among individuals with chronic low back pain (CLBP) and other musculoskeletal pain conditions. The current study examined the impact of injustice appraisals on pain-relevant outcomes among veterans with CLBP.

#### **METHODS**

Participants (n = 70, 24 female M = 38.79 years 11 active duty) rated average pain intensity and pain interference using a 0-10 numeric rating scale. Perceived injustice, pain catastrophizing, and pain-related fear were assessed using the Injustice Experiences Questionnaire (IEQ), Pain Catastrophizing Scale (PCS), and Tampa Scale of Kinesiophobia (TSK), respectively.

#### **RESULTS**

Bivariate correlation indicated that perceived injustice was significantly positively associated with pain intensity ( $r = .63$ ), pain interference ( $r = .60$ ), pain catastrophizing ( $r = .71$ ), and pain-related fear ( $r = .51$ ). In regression analyses, IEQ score significantly accounted for variance in average pain interference, pain catastrophizing, and pain-related fear when controlling for pain intensity, pain duration, and demographic variables (all  $p$ 's  $< .05$ ). IEQ score likewise significantly accounted for pain intensity when controlling for demographics and pain duration.

#### **CONCLUSION**

To our knowledge, this is the first study to examine the role of perceived injustice in a military sample with CLBP. The results are consistent with findings obtained in civilian samples with CLBP and other musculoskeletal injury. Findings suggest that perceived injustice may represent an important risk factor for negative pain outcomes among military personnel with CLBP. Implications for research and intervention are discussed.

**Response inhibition****Neural correlates of response inhibition in chronic low back pain: a functional magnetic resonance imaging study**

K. Weber, A. Sentis, K. Johnson, K. Martucci, S. Mackey

**ABSTRACT**

Executive function is a cognitive domain responsible for the planning, organization, and execution of goal-directed behavior and involves several cognitive processes including attentional control, inhibitory control, and working memory. Impairments in executive function are commonly identified in chronic pain conditions. Here we investigate differences in the neural correlates of response inhibition between chronic low back pain (CLBP) patients and healthy controls (HC) using a Go/No-go experimental paradigm and functional magnetic resonance imaging.

**METHODS**

Thirty CLBP (average age $\pm$ one standard deviation=37.6 $\pm$ 10.0 years, 14 females) and twenty-six HC participants (39.5 $\pm$ 9.6 years, 16 females) were recruited. During scanning, visual “Go” and “No-go” stimuli were presented, and participants were instructed to respond to the “Go” stimuli with a button response and to refrain from responding to the “No-go” stimuli.

**RESULTS**

Task accuracy did not differ between groups. However, reaction time was significantly longer for the CLBP group (0.473 $\pm$ 0.057 s) compared to the HC group (0.433 $\pm$ 0.050 s,  $p < 0.01$ ). Comparison of brain activation associated with response inhibition (i.e., No-go>Go) revealed increased activity in the left posterior cingulate cortex, left inferior parietal lobule, and bilateral precuneus in the CLBP group compared to the HC group (controlled for age, sex, and reaction time). These areas are known nodes of the default mode network (DMN), a network associated with greater activity at rest and deactivation during cognitive tasks.

**CONCLUSION**

The findings suggest that CLBP patients may have reduced deactivation of the DMN during response inhibition. Reduced DMN deactivation has been associated with poor cognitive function, and therefore, reduced DMN deactivation may underlie cognitive impairments in CLBP. Future studies will investigate the functional connectivity of these DMN regions to further understand altered response inhibition in CLBP.

**Pain inhibition****Attenuation of cortical activity triggering descending pain inhibition in chronic low back pain patients: a functional magnetic resonance imaging study.**

Matsuo Y1, Kurata J2, Sekiguchi M1, Yoshida K1, Nikaido T1, Konno S11.

**PURPOSE:**

A considerable portion of chronic low back pain (cLBP) patients lack anatomical abnormality, resist conventional therapeutic interventions, and their symptoms are often complicated with psychological and social factors. Such patients have been reported to show cerebral abnormalities both in anatomy and function by neuroimaging studies. Here we examined differences in cerebral reactivity to a simulated low back pain stimulus between cLBP patients and healthy controls by functional magnetic resonance imaging (fMRI), and their behavioral correlates from a psychophysical questionnaire.

**METHODS:**

Eleven cLBP patients and 13 healthy subjects (HS) were enrolled in this study. After psychophysical evaluation on-going pain with McGill Pain Questionnaire Short Form (MPQ), they underwent whole-brain fMRI in a 3-Tesla MRI scanner while receiving three blocks of 30-s mechanical pain stimuli at the left low back with a 30-s rest in between, followed by a three-dimensional anatomical imaging. Functional images were analyzed with a multi-subject general linear model for blood oxygenation level-dependent (BOLD) signal changes associated with pain. Individual BOLD signal amplitudes at activated clusters were examined for correlation with psychophysical variables. Two in the cLBP and five data sets in the HS groups were excluded from analysis because of deficient or artifactual data or mismatch in age.

**RESULTS:**

The HS group showed LBP-related activation at the right insular cortex, right dorsolateral prefrontal cortex (DLPFC), left anterior cingulate cortex (ACC), and left precuneus; and deactivation in a large area over the parietal and occipital cortices, including the bilateral superior parietal cortex. On the other hand, the cLBP group did not show any significant activation at those cortical areas, but showed similar deactivation at the bilateral superior parietal cortex and part of the premotor area. An HS > cLBP contrast revealed significantly less activity at the ACC and DLPFC in the cLBP group, which was negatively correlated with higher MPQ scores.

**CONCLUSIONS:**

The cLBP patients showed attenuated reactivity to pain at the ACC and DLPFC, known cortical areas mediating affective component, and top-down modulation, of pain. The present results might be associated with possible dysfunction of the descending pain inhibitory system in patients with chronic low back pain, which might possibly play a role in chronification of pain.

### Telehealth

#### **Effectiveness of telehealth-based interventions in the management of non-specific low back pain: a systematic review with meta-analysis.**

Dario A1, Cabral AM2, Almeida L3, Ferreira ML4, Refshauge K5, Simic M5, Pappas E5, Ferreira PH5.

#### **Abstract**

##### **BACKGROUND:**

Telehealth has emerged as a potential alternative to deliver interventions for low back pain (LBP), however its effectiveness has not been investigated.

##### **PURPOSE:**

The aim of this review was to evaluate whether interventions delivered by telehealth improve pain, disability, function, and quality of life in non-specific LBP.

##### **STUDY DESIGN:**

Systematic review with meta-analysis **METHODS:** Seven databases were searched from the earliest records to August 2015. Eligible studies were randomized controlled trials that investigated the effectiveness of telehealth-based interventions, solo or in combination with other interventions, for non-specific LBP compared to a control group. Trials deemed clinically homogeneous were grouped in meta-analyses.

##### **RESULTS:**

Eleven studies were included (N = 2280). In chronic LBP, telehealth interventions had no significant effect on pain at short [four trials; 1,089 participants; weighted mean difference (WMD) -2.61 points; 95% CI: -5.23 to 0.01] or medium-term follow-up (two trials; 441 participants; WMD: -0.94 points; 95% CI: -6.71 to 4.84) compared to a control group. Similarly, there was no significant effect for disability. Results from three individual trials showed that telehealth was superior to a control intervention for improving quality of life. Interventions combining telehealth and usual care were more beneficial than usual care alone in people with recent onset of LBP symptoms.

##### **CONCLUSION:**

There is moderate-quality evidence that current telehealth interventions, alone, are not more effective than minimal interventions for reducing pain and disability in chronic LBP. To date, modern telehealth media (e.g. apps) and telehealth as an adjunct to usual care remain understudied.

### Sleep problems

#### **Persistent and developing sleep problems: a prospective cohort study on the relationship to poor outcome in patients attending a pain clinic with chronic low back pain.**

Pakpour AH1, Yaghoubidoust M1, Campbell P2.

#### **Abstract**

##### **PURPOSE**

Sleep problems are common in people with low back pain (LBP), however the mechanisms on how sleep influences pain are complex. To date there is a lack of prospective research on the timings and the development of sleep problems in those who have LBP, such information would be useful to identify individuals at risk of poor outcome. Aims are to investigate the predictive role of sleep problems on self-report recovery and pain intensity using logistic regression reporting Odds Ratios (OR).

##### **METHODS**

An observational cohort of 761 chronic LBP patients recruited from a pain management clinic participated, and completed data at baseline, and at 6 month follow-up (n = 682).

##### **RESULTS**

Results show an increased odds of reported non-recovery (OR 1.52) and pain intensity (OR 2.69) for those who report sleep problems at baseline. Further analysis on the experience of sleep problems through time show that those with developing sleep problems (i.e. no sleep problems at baseline but reported sleep problems at follow-up) were at increased odds of reporting non-recovery (OR 2.17) and pain intensity (OR 2.95), as was those who reported sleep problems at both baseline and follow-up, for recovery (OR 2.88), and pain intensity (OR 3.45). Those with resolving sleep problems (i.e. sleep problems present at baseline but not at follow-up) were at a decreased odds of non-recovery (OR 0.50) and pain intensity (0.49).

##### **CONCLUSION**

Presenting, persistent, and developing sleep problems have a significant impact on recovery for those with LBP, clinicians may wish to consider treatment options that can address sleep problems.

**MVA and LBP****The association between a lifetime history of low back injury in a motor vehicle collision and future low back pain: a population-based cohort study.**

Nolet PS1,2,3, Kristman VL4,5,6,7, Côté P8,6,9,10, Carroll LJ11, Cassidy JD4,6,12.

**Abstract****PURPOSE:**

This population-based cohort study investigated the association between a lifetime history of a low back injury in a motor vehicle collision (MVC) and future troublesome low back pain. Participants with a history of a low back injury in a motor vehicle collision who had recovered (no or mild low back pain) were compared to those without a history of injury. Current evidence from two cross-sectional and one prospective study suggests that individuals with a history of a low back injury in a MVC are more likely to experience future LBP. There is a need to test this association prospectively in population-based cohorts with adequate control of known confounders.

**METHODS:**

We formed a cohort of 789 randomly sampled Saskatchewan adults with no or mild LBP. At baseline, participants were asked if they had ever injured their low back in a MVC. Six and 12 months later, participants were asked about the presence of troublesome LBP (grade II-IV) on the Chronic Pain Grade Questionnaire. Multivariable Cox proportional hazards regression analysis was used to estimate the association while controlling for known confounders.

**RESULTS:**

The follow-up rate was 74.8% (590/789) at 6 months and 64.5% (509/789) at 12 months. There was a positive crude association between a history of low back injury in a MVC and the development of troublesome LBP over a 12-month period (HRR = 2.76; 95% CI 1.42-5.39). Controlling for arthritis reduced this association (HRR = 2.25; 95% CI 1.11-4.56). Adding confounders that may be on the casual pathway (baseline LBP, depression and HRQoL) to the multivariable model further reduced the association (HRR = 2.20; 95% CI 1.04-4.68).

**CONCLUSION:**

Our analysis suggests that a history of low back injury in a MVC is a risk factor for developing future troublesome LBP. The consequences of a low back injury in a MVC can predispose individuals to experience recurrent episodes of low back pain.

### Stress and LBP

#### **Recovery-stress patterns and low back pain: Differences in pain intensity and disability.**

Heidari J1, Mierswa T1, Hasenbring M2, Kleinert J3, Levenig C2, Belz J3, Kellmann M1,4.

#### **Abstract**

##### **BACKGROUND:**

Recovery describes a restoring process influencing the health conditions of individuals but a potential link to low back pain (LBP) has not been scrutinized so far. Psychological strategies to deal with LBP have been considered within the biopsychosocial approach but substantial evidence regarding specific psychological underpinnings remains elusive. The current study aimed to compare individuals with different recovery-stress patterns (i.e. specific combinations of recovery/stress) regarding their pain and disability in the lower back.

##### **METHODS:**

Cross-sectional data from 265 physically active individuals with non-specific LBP were collected via standardized questionnaires. The participants engaged in prescribed exercise therapy provided by a healthcare professional owing to their back burden. A k-means cluster analysis identified three clusters.

##### **RESULTS:**

Cluster 1 entailed individuals with high recovery and low stress values, Cluster 2 represented participants with medium scores on both dimensions and Cluster 3 included participants with low recovery and high stress values. The statistical analyses for pain intensity using analyses of covariance indicated significantly higher values for Cluster 3 compared with Clusters 1 and 2 for worst pain intensity ( $p < 0.001$  and  $p = 0.003$ , respectively) and mean pain intensity ( $p < 0.001$  and  $p = 0.001$ , respectively). The disability comparisons using non-parametric tests showed significantly higher LBP-related disability in Cluster 3 than Cluster 1 on two disability measures.

##### **CONCLUSIONS:**

The findings indicate an association between detrimental recovery-stress patterns and LBP. Examining the role of recovery has innovative practical relevance for LBP prevention and rehabilitation through the implementation of approaches to enhance recovery in relevant programmes.

## PT training in Psychology

*The Journal of Pain*

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**Changes in physical therapist attitudes, beliefs, and confidence about low back pain management following participation in a Psychologically Informed Physical Therapy (PIPT) training course**

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The purpose of this study was to assess attitudes, beliefs, and confidence outcomes following a psychologically informed physical therapy (PIPT) training course for low back pain management.

Six cohorts of physical therapists (n=184) from 4 clinical sites in different geographical regions participated in this PIPT course as part of a large pragmatic LBP clinical trial. The PIPT course consisted of viewing of online educational modules and a live 8-hour workshop prior to participating in the clinical trial. Treatment orientation was assessed by the Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT). The PABS-PT consists of biomedical (range 10 to 60) and behavioral (range 9 to 54) subscales, with higher scores indicating increased respective treatment orientation. Confidence in implementing PIPT principles was assessed with an 11-point scale (range 0 to 10), with higher scores indicating increased confidence. Paired samples t-tests assessed pre- to post-course changes in PABS-PT and confidence scores. Linear regression was used to assess the influence of viewing online modules on PABS-PT and confidence scores. PABS-PT biomedical scale scores decreased from 30.5 (sd = 6.2) to 24.3 (6.1) ( $p < 0.01$ ) and behavioral scale scores increased from 37.4 (3.7) to 42.4 (4.1) ( $p < 0.01$ ). Confidence in the ability to implement PIPT principles increased from 4.7 (2.2) to 6.8 (2.4) ( $p < 0.01$ ). Participants who viewed the pre-course online modules had increased confidence ( $p < 0.01$ ) when compared to those who did not ( $M = 7.7$  vs. 6.6). However, viewing online modules was not associated with differences in post-course PABS-PT scores. PABS-PT changes were similar to previous studies that were more highly controlled, providing support that this training has translational potential for pragmatic application.

Viewing pre-course online education modules was associated with increased confidence in implementing PIPT principles during clinical practice. Follow-up studies are needed to evaluate if these findings are associated with treatment fidelity and clinical outcomes.

**Opioid use and QOL LBP**

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**Effects of long-term opioid use in chronic low back pain patients: results from quantitative sensory testing and behavioral measures**

K. Scherrer, K. Johnson, J. Kong, A. Nilakantan, S. Middleton, A. Foote, S. Mackey

Treatment of chronic low back pain (CLBP) with opioids is controversial given the high abuse liability and variable efficacy.

To examine the effects of CLBP and opioid use on pain processing, we assessed heat pain thresholds (HPTr), cold pain tolerance (CPTol) measured by duration in a cold pressor test (CPT at 5°C), and conditioned pain modulation (CPM) in which HPTr is assessed before and following CPT. We studied four groups: healthy controls (HC, n=36), CLBP on opioids (CLBP\_O+, n=11), CLBP not on opioids (CLBP\_O-, n=34) and methadone maintenance therapy (MM, n=30). Participants also completed a variety of questionnaires assessing demographics, mood, function and disability. Analyses revealed no significant group differences for HPTr before and following the CPT, or for CPM ( $p > 0.05$ ). However, CLBP\_O+ patients had the highest CPTol among all groups ( $F_{(3,107)} = 3.18, p < 0.05$ ). Interestingly, despite increased CPTol, CLBP\_O+ showed more depression (Beck Depression Inventory) and disability (modified Oswestry Disability Index) compared to all groups except MMTP, which were also higher than CLBP\_- and HC ( $p < 0.05$ ). Additionally, self-reported pain ratings or catastrophizing (Pain Catastrophizing scale) did not significantly differ between groups ( $p > 0.05$ ).

Of most significance, we found that their despite increased CPTol, CLBP\_O+ patients reported lower quality of life, comparable to MM patients, suggesting a strong relationship between long-term opioid use and low quality of life despite seemingly better sensory testing results. Supported by Stanford University (Bio-X NeuroVentures), NIH K23DA031808, K23AT008477, P01AT006651, and K24DA029262.

**Females increase pain with increase BMI**

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**Body mass index is differentially associated with physical and psychosocial outcomes among men and women with chronic low back pain**

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Clinical pain conditions disproportionately affect women. Moreover, up to 70% of obese adults in the U.S. report chronic musculoskeletal pain.

The current study examined whether sex moderated the association between Body Mass Index (BMI), pain, functional, and psychosocial outcomes in a sample of individuals with chronic low back pain (CLPB).

Participants included 75 men (Mean age = 43, SD = 12.3) and 67 women (Mean Age = 39.38, SD = 12.23). Male and female participants did not differ in age, pain duration, or BMI (BMI = 28.87 and 29.28, respectively). Higher BMI was associated with greater self-reported pain in female but not male participants, representing a marginal moderation effect of sex ( $B=.44$ ,  $p=.06$ ). Sex was found to moderate the association between BMI and participants' self-reported disability ( $B=.28$ ,  $p<.05$ ) and depression ( $B=.44$ ,  $p<.01$ ) in that higher BMI was associated with greater disability and depression in female but not male participants.

Sex significantly moderated the association between BMI and both anticipated and experienced pain in response to standardized laboratory tasks ( $B=.11$ ,  $B=.12$ ,  $p<.05$ , respectively), in that higher BMI was associated with higher pain ratings only among female participants.

Findings from the current study suggest that sex influences the relationship between body composition, pain, disability, and psychological outcomes. Understanding sex differences in these relationships may better guide evaluation and treatment strategies for CLBP.

**MRI findings change**

*Spine* 2017 Apr 1;42(7):504-512.

**Do MRI Findings Change Over a Period of Up to 1 Year in Patients With Low Back Pain and/or Sciatica?: A Systematic Review.**

Panagopoulos J<sup>1</sup>, Hush J, Steffens D, Hancock MJ.

**Abstract*****STUDY DESIGN:***

Systematic review

**OBJECTIVE.:** The aim of the study was to investigate whether magnetic resonance imaging (MRI) findings change over a relatively short period of time (<1 yr) in people with low back pain (LBP) or sciatica. We also investigated whether there was an association between any change in MRI findings and change in clinical outcomes.

***SUMMARY OF BACKGROUND DATA:***

MRI offers the potential to identify possible pathoanatomic sources of LBP and/or sciatica; however, the clinical importance of MRI findings remains unclear. Little is known about whether lumbar MRI findings change over the short term and if so whether these changes are associated with changes in clinical outcomes.

***METHODS:***

Medline, EMBASE, and CINAHL databases were searched. Included were cohort studies that performed repeat MRI scans within 12 months in patients with LBP and/or sciatica. Data on study characteristics and change in MRI findings were extracted from included studies. Any data describing associations between change in MRI findings and change in clinical outcomes were also extracted.

***RESULTS:***

A total of 12 studies met the inclusion criteria and were included in the review. Pooling was not possible due to heterogeneity of studies and findings. Seven studies reported on changes in disc herniation and reported 15% to 93% of herniations reduced or disappeared in size. Two studies reported on changes in nerve root compression and reported 17% to 91% reduced or disappeared. Only one study reported on the association between change in MRI findings and change in clinical outcomes within 1 year, and found no association.

***CONCLUSION:***

This review found moderate evidence that the natural course of herniations and nerve root compression is favorable over a 1-year period in people with sciatica or LBP. There is a lack of evidence on whether other MRI findings change, and whether changes in MRI findings are associated with changes in clinical outcomes. LEVEL OF EVIDENCE: 1.

## 6. PELVIC GIRDLE

### Pelvic fractures

#### **Operative versus conservative treatment of apophyseal avulsion fractures of the pelvis in the adolescents: a systematical review with meta-analysis of clinical outcome and return to sports.**

Eberbach H1, Hohloch L2, Feucht MJ2, Konstantinidis L2, Südkamp NP2, Zwingmann J2.

#### **Abstract**

##### **BACKGROUND:**

Avulsion fractures of the pelvic apophyses typically occur in adolescent athletes due to a sudden strong muscle contraction while growth plates are still open. The main goals of this systematic review with meta-analysis were to summarize the evidence on clinical outcome and determine the rate of return to sports after conservative versus operative treatment of avulsion fractures of the pelvis.

##### **METHODS:**

A systematic search of the Ovid database was performed in December 2016 to identify all published articles reporting outcome and return to preinjury sport-level after conservative or operative treatment of avulsion fractures of the pelvis in adolescent patients. Included studies were abstracted regarding study characteristics, patient demographics and outcome measures. The methodological quality of the studies was assessed with the Coleman Methodology Score (CMS).

##### **RESULTS:**

Fourteen studies with a total of 596 patients met the inclusion criteria. The mean patient age was  $14.3 \pm 0.6$  years and 75.5% of patients were male. Affected were the anterior inferior iliac spine (33.2%), ischial tuberosity (29.7%), anterior superior iliac spine (27.9%), iliac crest (6.7%) lesser trochanter (1.8%) and superior corner of the pubic symphysis (1.2%). Mean follow-up was  $12.4 \pm 11.7$  months and most of the patients underwent a conservative treatment (89.6%). The overall success rate was higher in the patients receiving surgery (88%) compared to the patients receiving conservative treatment (79%) ( $p = 0,09$ ). The rate of return to sports was 80% in conservative and 92% in operative treated patients ( $p = 0,03$ ). Overall, the methodological quality of the included studies was low, with a mean CMS of 41.2.

##### **CONCLUSION:**

On the basis of the present meta-analysis, the overall success and return to sports rate was higher in the patients receiving surgery. Especially in patients with fragment displacement greater 15 mm and high functional demands, surgical treatment should be considered.

**SI pain and MRI findings****The association between inflammatory back pain characteristics and MRI findings in the spine and sacroiliac joints.**

Arnbak B1,2, Jurik AG1,2,3, Jensen TS1,2,3, Manniche C1,2.

**Abstract****OBJECTIVE:**

To investigate the association between MRI findings at the sacroiliac joints (SIJs) and vertebral endplates and pain characteristics assumed to be indicative of axial inflammation.

**METHODS:**

Patients aged 18-40 years with persistent low back pain referred to an outpatient spine clinic participated, including an unknown proportion of axial spondyloarthritis patients. Data included MRI of the spine and SIJs and self-reported responses to questions covering the Calin, Berlin, ASAS and Bailly inflammatory back pain (IBP) definitions.

**RESULTS:**

In the 1,020 included patients, 53% were females and the median age was 33 years. Positive associations were found between the SIJ MRI findings and pain characteristics, odds ratios ranging from 1.4-2.7; 'SIJ bone marrow edema (BME)' was associated with 'morning stiffness >60 minutes', 'SIJ erosions' with the Calin, Berlin, and Bailly IBP definitions, 'alternating buttock pain' and 'good response to NSAID'; 'SIJ fatty marrow deposition (FMD)' with 'insidious onset'; and 'SIJ sclerosis' with 'pain at night'. Also, the spinal MRI changes were associated with IBP, odds ratios ranging from 1.4-2.0; 'vertebral endplate BME' with, 'morning stiffness', and 'vertebral endplate FMD' with the Calin and Bailly IBP definitions, 'improvement with exercise', 'morning stiffness >30 min' and 'pain worst in the morning'.

**CONCLUSIONS:**

The identified associations between inflammatory MRI findings and pain characteristics indicate that axial inflammation to some degree induces a specific pain pattern. Thus, the results add to knowledge of axial inflammatory processes. However, all identified associations were weak, which compromise the use of IBP as a marker of axial inflammation. This article is protected by copyright. All rights reserved.

## 8. VISCERA

### Anal fissure management

J Gastroenterol. 2017 Apr 10. doi: 10.1007/s00535-017-1335-0.

#### **Operative and medical treatment of chronic anal fissures-a review and network meta-analysis of randomized controlled trials.**

Ebinger SM1,2, Hardt J3, Warschkow R1,4, Schmied BM1, Herold A3, Post S3, Marti L5,6.

#### **Abstract**

Anal fissures are a common problem and have a cumulative lifetime incidence of 11%. Previous reviews on anal fissures show inconsistent results regarding post-interventional healing and incontinence rates. In this review our aim was to compare the treatments for chronic anal fissures by incorporating indirect comparisons using network meta-analysis. The PubMed database was searched for randomized controlled trials (RCTs) published between 1975 and 2015. The primary outcome measures were healing and incontinence rates after lateral internal sphincterotomy (LIS), anal dilatation (DILA), anoplasty and/or fissurectomy (FIAP), botulinum toxin (BT) and noninvasive treatment (NIT). Random effects network meta-analyses were complemented by fixed effects and Bayesian models. The present analysis included 44 RCTs and 3268 patients. After a median follow-up of 2 months, the healing rates for LIS, DILA, FIAP, BT and NIT were 93.1, 84.4, 79.8, 62.6, and 58.6% and the incontinence rates were 9.4, 18.2, 4.9, 4.1, and 3.0%, respectively. Compared with NIT, the odds ratio (OR) [95% confidence interval (CI)] for healing after LIS, DILA, FIAP and BT was 9.9 (5.4-18.1), 8.6 (3.1-24.0), 3.5 (1.0-12.7) and 1.9 (1.1-3.5), respectively, on network meta-analysis. The OR (95% CI) for incontinence after LIS, DILA, FIAP and BT was 6.8 (3.1-15.1), 16.9 (6.0-47.8), 3.9 (1.0-15.1) and 1.6 (0.7-3.7), respectively. Ranking of treatments, fixed effects and Bayesian models confirmed these findings. In conclusion, based on our meta-analysis LIS is the most efficacious treatment but is compromised by a high rate of postoperative incontinence. Given the trade-offs between the risks and benefits, FIAP and BT might be good alternatives for the treatment of chronic anal fissures.

#### **KEYWORDS:**

Botulinum toxin; Chronic anal fissures; Lateral internal sphincterotomy; Network meta-analysis; Noninvasive treatment

**Bowel function recovery****Comparison of the effects of patient-controlled epidural and intravenous analgesia on postoperative bowel function after laparoscopic gastrectomy: a prospective randomized study.**

Cho JS<sup>1,2</sup>, Kim HI<sup>3</sup>, Lee KY<sup>1,2</sup>, Son T<sup>3</sup>, Bai SJ<sup>1,2</sup>, Choi H<sup>1</sup>, Yoo YC<sup>4,5</sup>.

**Abstract****BACKGROUND:**

Although laparoscopic surgery significantly reduces surgical trauma compared to open surgery, postoperative ileus is a frequent and significant complication after abdominal surgery. Unlike laparoscopic colorectal surgery, the effects of epidural analgesia on postoperative recovery after laparoscopic gastrectomy are not well established. We compared the effects of epidural analgesia to those of conventional intravenous (IV) analgesia on the recovery of bowel function after laparoscopic gastrectomy.

**METHOD:**

Eighty-six patients undergoing laparoscopic gastrectomy randomly received either patient-controlled epidural analgesia with ropivacaine and fentanyl (Epi PCA group) or patient-controlled IV analgesia with fentanyl (IV PCA group), beginning immediately before incision and continuing for 48 h thereafter. The primary endpoint was recovery of bowel function, evaluated by the time to first flatus. The balance of the autonomic nervous system, pain scores, duration of postoperative hospital stay, and complications were assessed.

**RESULTS:**

The time to first flatus was shorter in the epidural PCA group compared with the IV PCA group ( $61.3 \pm 11.1$  vs.  $70.0 \pm 12.3$  h,  $P = 0.001$ ). Low-frequency/high-frequency power ratios during surgery were significantly higher in the IV PCA group, compared with baseline and those in the epidural PCA group. The epidural PCA group had lower pain scores during the first 1 h postoperatively and required less analgesics during the first 6 h postoperatively.

**CONCLUSIONS:**

Compared with IV PCA, epidural PCA facilitated postoperative recovery of bowel function after laparoscopic gastrectomy without increasing the length of hospital stay or PCA-related complications. This beneficial effect of epidural analgesia might be attributed to attenuation of sympathetic hyperactivation, improved analgesia, and reduced opioid use.

**KEYWORDS:**

Epidural analgesia; Heart rate variability; Ileus; Laparoscopic gastrectomy

**10 A. CERVICAL SPINE****Extrinsic feedback helps**

*Musculoskelet Sci Pract.* 2017 Apr 8;29:132-143. doi: 10.1016/j.msksp.2017.04.005.

**Effectiveness of Physiotherapy interventions plus Extrinsic Feedback for neck disorders: A systematic review with meta-analysis.**

Araujo FX<sup>1</sup>, Scholl Schell M<sup>2</sup>, Ribeiro DC<sup>3</sup>.

**PURPOSE:**

To systematically review the effectiveness of Physiotherapy interventions combined with extrinsic feedback (EF) compared to Physiotherapy interventions alone or control for the management of neck pain and disability.

**METHODS:**

Randomized clinical trials were searched and retrieved from six databases, from inception through August 2016. Risk of bias of included studies was assessed using the PEDro scale. When possible data were pooled and Meta-analyses were conducted. The quality and strength of evidence for each outcome was assessed using the GRADE approach.

**RESULTS:**

Eight studies (n = 677) were included in the review. The pooled estimates suggested Physiotherapy intervention + EF was not superior to Physiotherapy intervention alone for disability (MD = -0.38; 95%CI = -0.91 to 0.18; I<sup>2</sup> = 82%), but was superior for pain (MD = -0.37; 95%CI = -0.73 to -0.01; I<sup>2</sup> = 68%). Physiotherapy intervention + EF was not superior than control for disability scores (SMD = -3.94; 95%CI = -12.06 to 4.18; I<sup>2</sup> = 92%). Physiotherapy intervention + EF intervention was more effective than control for pain scores at short-term (SMD = -1.44; 95%CI = -2.25 to -0.63; I<sup>2</sup> = 50%). Most studies did not specify nor use the ideal characteristics of EF.

**CONCLUSION:**

There is very low quality of evidence that Physiotherapy intervention + EF is more effective than Physiotherapy intervention alone or control for short-term pain, but not for disability. Physiotherapy intervention plus EF was more effective than Physiotherapy alone for acute neck pain, but not for chronic pain or disability. There was high risk of bias within included studies. Future studies are likely to change the estimates of the effects of Physiotherapy intervention plus EF on neck rehabilitation.

### 13. CRANIUM/TMJ

#### Trigeminal neuralgia

The Journal of Pain April 2017 Volume 18, Issue 4, Supplement, Page S69

#### **Trigeminal neuralgia: pharmacotherapy and surgical treatment patterns in the United States**

N. Wu, J. Lee, J. Zakrzewska, B. Werneburg, D. Hoffman, Y. Liu  
Biogen, Cambridge, MA

Trigeminal neuralgia (TN) is a rare orofacial pain condition characterized by severe, unilateral, paroxysmal pain in the region of the trigeminal nerve.

Clinical guidelines recommend carbamazepine (the only drug FDA-approved for TN) and oxcarbazepine as first-line therapies. Evidence for effectiveness of other pharmacotherapies, anesthetic/botulinum toxin injections, or neurosurgical procedures in TN is limited. We examined treatment patterns among a cohort of TN patients from the US TruvenHealth MarketScan® database. Patients included were aged  $\geq 18$  years, newly-diagnosed with TN ( $\geq 2$  TN diagnoses  $\geq 14$  days apart, no diagnosis in prior year), and had  $\geq 3$  years' follow-up after first TN diagnosis. Utilization of selected pharmacotherapies (carbamazepine, oxcarbazepine, pregabalin, gabapentin, baclofen, duloxetine, and topiramate) or procedures (includes anesthetic/botulinum toxin injections and neurosurgical procedures) for TN was assessed. A total of 3685 patients were included (2425 commercial, 1260 Medicare enrollees; 72% female, mean[SD] age 59[15] years). Overall, 76% received  $\geq 1$  treatment regimen (studied pharmacotherapy [monotherapy/combination] or procedure) in the 3 years after diagnosis, of whom 65% received  $\geq 2$  and 45%  $\geq 3$  unique regimens (defined by a change in pharmacotherapy or a procedure). 72% received  $\geq 1$  studied pharmacotherapy; most commonly carbamazepine (38% of patients), gabapentin (35%), pregabalin (17%), or oxcarbazepine (15%). 18% underwent procedures; of these patients, 70% received further medications after the first procedure.

Our study indicates that a variety of treatments are used for TN in the US, despite carbamazepine being the only approved medication. Almost half of treated patients receive  $\geq 3$  unique regimens within 3 years after initial diagnosis, suggesting frequent switching of therapy potentially due to suboptimal efficacy/tolerability. A substantial proportion utilize invasive procedures, with the majority of these patients requiring further treatments.

Overall these data indicate a high burden-of-illness associated with TN and its treatment, and unmet needs with current therapies. This study was sponsored by Biogen.

## 14. HEADACHES

### BOTOX for Migraine's helps

Plastic and Reconstructive Surgery - Global Open: March 2017 - Volume 5 - Issue 3 - p e1270

#### **Targeted Peripheral Nerve-directed Onabotulinumtoxin A Injection for Effective Long-term Therapy for Migraine Headache**

Janis, Jeffrey E. MD, FACS; Barker, Jenny C. MD, PhD; Palettas, Marilly MPH

##### **Background:**

Onabotulinumtoxin A (BOTOX) is an FDA-approved treatment for chronic migraine headaches (MHs) that involves on-label, high-dose administration across 31 anatomic sites. Anatomically specific peripheral nerve trigger sites have been identified that contribute to MH pathogenesis and are amenable to both BOTOX injection and surgical decompression. These sites do not always correlate with the on-label FDA-approved injection pattern, but represent a more targeted approach. The efficacy of peripheral nerve-directed BOTOX injection as an independent long-term therapeutic option has not been investigated.

##### **Methods:**

The technique for peripheral nerve-directed therapeutic long-term BOTOX injection is described. A retrospective review was subsequently completed for 223 patients with MH. Sixty-six patients elected to proceed with diagnostic BOTOX injections. Of these, 24 continued long-term therapeutic BOTOX injections, whereas 42 matriculated to surgery. Outcomes were tracked.

##### **Results:**

Initial outcomes included significant improvement in migraine headache index (MHI) ( $53.5 \pm 83.0$ ,  $P < 0.006$ ), headache days/mo ( $9.2 \pm 12.7$ ,  $P < 0.0009$ ), and migraine severity ( $2.6 \pm 2.5$ ,  $P < 0.00008$ ) versus baseline. MHI improved from the initiation of diagnostic injections to the establishment of steady-state injections ( $P < 0.002$ ), and further improved over time ( $P < 0.05$ , mean follow-up 615 days) with no desensitization observed. Decompressive surgery resulted in significant improvement in MHI ( $100.8 \pm 109.7$ ,  $P < 0.0000005$ ), headache days/mo ( $10.8 \pm 12.7$ ,  $P < 0.000002$ ), migraine severity ( $3.0 \pm 3.8$ ,  $P < 0.00001$ ), and migraine duration in hours ( $16.8 \pm 21.6$ ,  $P < 0.0007$ ). MHI improvement with surgery was better than long-term BOTOX injections ( $P < 0.05$ ).

##### **Conclusions:**

Though inferior to surgical decompression, preliminary data demonstrate that targeted peripheral nerve-directed BOTOX injection is an effective primary therapy for MH representing a possible alternative to nondirected BOTOX injection with decreased dosage requirements and potentially decreased cost.

**Menstrual migraine**

J Headache Pain. 2017 Dec;18(1):45. doi: 10.1186/s10194-017-0752-z. Epub 2017 Apr 17.

**Treatment of menstrual migraine; multidisciplinary or mono-disciplinary approach.**

Witteveen H<sup>1</sup>, van den Berg P<sup>2</sup>, Vermeulen G<sup>3</sup>.

**Abstract****BACKGROUND:**

The aim of this study was to compare a multidisciplinary approach of menstrual (related) migraine, combining the neurological and gynaecological consultation, to a mono-disciplinary approach involving neurological treatment. There is a clear relationship between the menstruation cycle and the occurrence of migraine (menstrual migraine). Nowadays the treatment of menstrual (related) migraine is performed by a neurologist. A treatment with attention to hormonal treatment seems more convenient.

**METHODS:**

This retrospective study was performed in a cohort using data of 88 women with menstrual (related) migraine who visited the menstrual migraine clinic between 2012 and 2014 (intervention group). The results were compared to a historical control group, which consisted of women with menstrual (related) migraine who were treated before 2012 and received a mono-disciplinary approach.

**RESULTS:**

In the intervention group the Headache Impact (HIT) score significantly improved (65 to 59 points). The mean headache days per month declined significantly (from 6 to 3.83 days) and these women needed less use of pain medication. In the control group the decline in HIT score was less striking (65 to 63.5 points) and the mean headache days per month increased (6 to 6,5 days). It appeared that 20 out of 27 patients in the control group required a gynaecological consultation in course of time.

**CONCLUSION:**

A multidisciplinary treatment of women with menstrual (related) migraine gives better results compared to a mono-disciplinary approach. These results should be interpreted with caution as we performed a retrospective study with a relative small control group.

**KEYWORDS:**

Hormonal treatment; Menstrual migraine; Menstrual related migraine; Multidisciplinary approach

## 16. CONCUSSIONS

### In hockey players

#### **Cognitive and psychosocial function in retired professional hockey players.**

Esopenko C1,2, Chow TW3, Tartaglia MC4,5, Bacopulos A1, Kumar P1,6, Binns MA1,7, Kennedy JL8,9, Müller DJ8,9, Levine B1,7.

#### **BACKGROUND AND OBJECTIVE:**

The relationship between repeated concussions and neurodegenerative disease has received significant attention, particularly research in postmortem samples. Our objective was to characterise retired professional ice hockey players' cognitive and psychosocial functioning in relation to concussion exposure and apolipoprotein  $\epsilon$ 4 status.

#### **METHODS:**

Alumni athletes (N=33, aged 34-71 years) and an age-matched sample of comparison participants (N=18) were administered measures of cognitive function and questionnaires concerning psychosocial and psychiatric functioning.

#### **RESULTS:**

No significant group differences were found on neuropsychological measures of speeded attention, verbal memory or visuospatial functions, nor were significant differences observed on computerised measures of response speed, inhibitory control and visuospatial problem solving. Reliable group differences in cognitive performance were observed on tests of executive and intellectual function; performance on these measures was associated with concussion exposure. Group differences were observed for cognitive, affective and behavioural impairment on psychosocial questionnaires and psychiatric diagnoses. There was no evidence of differential effects associated with age in the alumni athletes. Possession of an apolipoprotein  $\epsilon$ 4 allele was associated with increased endorsement of psychiatric complaints, but not with objective cognitive performance.

#### **CONCLUSION:**

We found only subtle objective cognitive impairment in alumni athletes in the context of high subjective complaints and psychiatric impairment. Apolipoprotein  $\epsilon$ 4 status related to psychiatric, but not cognitive status. These findings provide benchmarks for the degree of cognitive and behavioural impairment in retired professional athletes and a point of comparison for future neuroimaging and longitudinal studies.

### Diagnosis

#### Can visible signs predict concussion diagnosis in the National Hockey League?

Echemendia RJ1,2, Bruce JM2, Meeuwisse W3, Hutchison MG4, Comper P5, Aubry M6.

#### Abstract

##### BACKGROUND

Early identification and evaluation of concussions is critical. We examined the utility of using visible signs (VS) of concussion in predicting subsequent diagnosis of concussion in NHL players.

##### METHODS

VS of concussion were identified through video review. Coders were trained to detect and record specific visual signs while viewing videos of NHL regular season games. 2460 games were reviewed by at least two independent coders across two seasons. The reliability, sensitivity and specificity of these VS were examined.

##### RESULTS

VS were reliably coded with inter-rater agreement rates ranging from 73% to 98.9%. 1215 VS were identified in 861 events that occurred in 735 games. 47% of diagnosed concussions were associated with a VS but 53% of diagnosed concussions had no VS. Of the VS, only loss of consciousness, motor incoordination, and blank/vacant look had positive likelihood ratios greater than 1, indicating a positive association with concussion diagnoses. Slow to get up and clutching of the head were observed frequently but had low positive predictive values. Sensitivity decreased and specificity increased when multiple VS occurred together.

##### CONCLUSIONS

Non-medical personnel can be trained to reliably identify events in which VS occur and to reliably identify specific VS within each of those events. VS can be useful to detect concussion early but they are not enough since more than half of physician diagnosed concussions occurred without the presence of a visual sign. The results underscore the complexity of this injury and highlight the need for comprehensive approaches to injury detection.

### Rest

#### **Rest and treatment/rehabilitation following sport-related concussion: a systematic review.**

Schneider KJ1, Leddy JJ2, Guskiewicz KM3, Seifert T4, McCrea M5, Silverberg ND6, Feddermann-Demont N7,8, Iverson GL9, Hayden A10, Makdissi M11,12.

#### **Abstract**

##### **AIM OR OBJECTIVE:**

The objective of this systematic review was to evaluate the evidence regarding rest and active treatment/rehabilitation following sport-related concussion (SRC).

##### **DESIGN:**

Systematic review.

##### **DATA SOURCES:**

MEDLINE (OVID), CINAHL (EbscoHost), PsycInfo (OVID), Cochrane Central Register of Controlled Trials (OVID), SPORTDiscus (EbscoHost), EMBASE (OVID) and Proquest DissertationsandTheses Global (Proquest) were searched systematically.

##### **ELIGIBILITY CRITERIA FOR SELECTING STUDIES:**

Studies were included if they met the following criteria: (1) original research; (2) reported SRC as the diagnosis; and (3) evaluated the effect of rest or active treatment/rehabilitation. Review articles were excluded.

##### **RESULTS:**

Twenty-eight studies met the inclusion criteria (9 regarding the effects of rest and 19 evaluating active treatment). The methodological quality of the literature was limited; only five randomised controlled trials (RCTs) met the eligibility criteria. Those RCTs included rest, cervical and vestibular rehabilitation, subsymptom threshold aerobic exercise and multifaceted collaborative care.

##### **SUMMARY/CONCLUSIONS:**

A brief period (24-48 hours) of cognitive and physical rest is appropriate for most patients. Following this, patients should be encouraged to gradually increase activity. The exact amount and duration of rest are not yet well defined and require further investigation. The data support interventions including cervical and vestibular rehabilitation and multifaceted collaborative care. Closely monitored subsymptom threshold, submaximal exercise may be of benefit.

## 23. SURGERY

### Return to Sport

Knee Surg Sports Traumatol Arthrosc. 2017 Apr 13.

#### **Return to sport after shoulder arthroplasty: a systematic review and meta-analysis.**

Liu JN<sup>1</sup>, Steinhaus ME<sup>2</sup>, Garcia GH<sup>2</sup>, Chang B<sup>3</sup>, Fields K<sup>3</sup>, Dines DM<sup>4</sup>, Warren RF<sup>4</sup>, Gulotta LV<sup>4</sup>.

#### **Abstract**

##### **PURPOSE:**

With increasing incidence and indications for shoulder arthroplasty, there is an increasing emphasis on the ability to return to sports. The main goal of this study was to determine the rate of return to sport after shoulder arthroplasty.

##### **METHODS:**

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed to perform this systematic review and meta-analysis. A search was performed on MEDLINE, Scopus, EMBASE, and the Cochrane Library. The quality of the included studies was evaluated according to the Methodological Index for Nonrandomized Studies checklist. The main judgement outcome was the rate of return to sports activity after shoulder arthroplasty and the level of play upon return (identical or higher/lower level).

##### **RESULTS:**

Thirteen studies were reviewed, including 944 patients (506 athletes), treated with shoulder arthroplasty at an average follow-up of 5.1 years (range, 0.5-12.6 years). The most common sports were swimming (n = 169), golf (n = 144), fitness sports (n = 71), and tennis (n = 63). The overall rate of return to sport was 85.1% (95% CI, 76.5-92.3%), including 72.3% (95% CI, 60.6-82.8%) returning to an equivalent or improved level of play, after 1-36 months. Patients undergoing anatomic total shoulder arthroplasty returned at a significantly higher rate (92.6%) compared to hemiarthroplasty (71.1%, p = 0.02) or reverse total shoulder arthroplasty (74.9%, p = 0.003).

##### **CONCLUSION:**

Most patients are able to return to one or more sports following shoulder arthroplasty, with anatomic total shoulder arthroplasty having the highest rate of return.

##### **LEVEL OF EVIDENCE:**

IV.

##### **KEYWORDS:**

Meta-analysis; Return to sport; Reverse total shoulder replacement; Shoulder arthroplasty; Shoulder hemiarthroplasty; Systematic review; Total shoulder replacement

**28. REPLACEMENTS****AS and total hips****Ankylosing spondylitis increases peri- and post-operative complications after total hip arthroplasty****BACKGROUND**

Ankylosing spondylitis (AS) is a chronic autoimmune spondyloarthropathy that primarily affects the axial spine and hips. Progressive disease leads to pronounced spinal kyphosis, positive sagittal balance, and altered biomechanics. The purpose of this study is to determine the complication profile of patients with AS undergoing total hip arthroplasty (THA).

**METHODS**

The Medicare sample was searched from 2005-2012 yielding 1006 patients with AS that subsequently underwent THA. Risk-ratios (RR) with 95% confidence intervals (CIs) were calculated for 90-day, 2-year and final post-operative follow-up for complications including: hip dislocation, periprosthetic fracture, wound complication, revision THA, and post-operative infection.

**RESULTS**

Compared to controls, patients with AS had a RR of 2.50 (CI:1.04-5.99) for 90-day and a RR of 1.99 (CI:1.10-3.59) for 2-year THA component breakage. The RR of periprosthetic hip dislocation was elevated at 90-days (1.44, CI:0.93-2.22) and significantly increased at 2-years (1.67, CI:1.25-2.23) and overall follow-up (1.49, CI:1.14-1.93). Similarly, the RR for THA revision was elevated at 90-days (1.46, CI:0.97-2.18) and significantly increased at 2-years (1.69, CI:1.33-2.14) and overall follow-up (1.51, CI:1.23-1.85). The risk of periprosthetic infection and wound complications was higher in the AS group at all time-points with RRs ranging from 1.46-2.44.

**CONCLUSION**

Patients with AS are at increased risk for complications following THA. Altered biomechanics from a rigid, kyphotic spine place increased demand on the hip joints. The elevated peri- and post-operative risks should be discussed pre-operatively and these patients may require increased pre-operative medical optimization as well as possible changes in component selection and position to compensate for altered spinopelvic biomechanics.

**29. OA****DC current****Efficacy of Transcranial Direct Current Stimulation on Clinical Pain Severity in Older Adults with Knee Osteoarthritis Pain: A Double-Blind, Randomized, Sham-Controlled Pilot Clinical Study**

H. Ahn, A. Woods, E. Choi, N. Padhye, R. Fillingim

**BACKGROUND**

Arthritis is a leading cause of pain, impaired daily activity, and disability in people 45 years and older. Osteoarthritis (OA) is the most common arthritic condition, and the knee is the most commonly affected joint. Because pharmacologic treatments can increase the risk of adverse events among older adults, there is a growing interest in non-pharmacologic interventions targeting central nervous system pain processing for this population. Specifically, noninvasive brain stimulation, such as transcranial direct current stimulation (tDCS), has received significant attention for the treatment of pain in chronic conditions owing to its neuromodulatory effects. Thus, we sought to assess the preliminary efficacy of tDCS on clinical pain severity in adults with knee OA pain.

**METHODS**

We conducted a double-blind, randomized, sham-controlled pilot clinical study in 40 community-dwelling participants with knee OA who were 50–70 years old. The participants were randomly assigned to receive either five daily sessions of 2mA tDCS for 20 minutes or sham tDCS. The anode electrode was placed over the primary motor cortex of the hemisphere contralateral to the affected knee, and the cathode electrode was placed over the supraorbital region ipsilateral to the affected knee.

**RESULTS**

Clinical pain severity was measured at baseline and after tDCS via a numeric scale (0 to 100) rating current knee pain. The mean age was 59 years ( $SD = 8$  years), and 53% were female. After five daily sessions, the tDCS group had a greater reduction in knee pain ( $18.50 \pm 3.60$ ) than the sham group ( $6.45 \pm 2.26$ ). The mean difference between groups was 12.05 ( $t=2.83$ ,  $df=38$ ,  $p=.007$ , Cohen's  $d = 0.90$ ).

**CONCLUSION**

Our preliminary results show that tDCS reduced clinical pain severity in adults with knee OA. Further studies with larger samples and longer-term follow-ups are needed.

**Exercise in knee OA management****Considerations of the Principles of Resistance Training in Exercise Studies for the Management of Knee Osteoarthritis; a Systematic Review.**

Minshull C1, Gleeson N2.

**OBJECTIVE**

To evaluate the methodological quality of resistance training interventions for the management of knee osteoarthritis.

**DATA SOURCES**

A search of the literature for studies published up to 10th August 2015 was performed on Medline (OVID platform), PubMed, EMBase and PEDRo databases. Search terms associated with 'osteoarthritis'; 'knee' and 'muscle resistance exercise' were used..

**STUDY SELECTION**

Studies were included in the review if they were published in the English language and met the following criteria : 1) muscle resistance training was the primary intervention; 2) RCT design; 3) treatment arms included at least a muscle conditioning intervention and a non-exercise control group; 4) participants had osteoarthritis of the knee; . Studies employing pre-operative (joint replacement) interventions with only post-operative outcomes were excluded. The search yielded 1574 results. The inclusion criteria were met by 34 studies.

**DATA EXTRACTION**

Two reviewers independently screened the papers for eligibility. Critical appraisal of the methodology was assessed according to the principles of resistance training (PoRT) and, separately for the reporting of adherence using a specially designed scoring system. A rating for each was assigned.

**DATA SYNTHESIS**

34 studies described a strength training focus of the intervention, however, the PoRT were inconsistently applied and inadequately reported across all. Methods for adherence monitoring were incorporated in to the design of 28 of the studies but only 13 reported sufficient detail to estimate average dose of exercise.

**CONCLUSIONS**

These findings impact the interpretation of the efficacy of muscle resistance exercise in the management of knee osteoarthritis. Clinicians and health-care professionals cannot be confident whether non-significant findings are due to lack of efficacy of muscle resistance interventions, or occur through limitations in treatment prescription and patient adherence. Future research that seeks to evaluate the effects of muscle strength training interventions on symptoms of OA should be properly designed and adherence diligently reported.

**30 A. IMPINGEMENT****Diagnosis of****Current concepts in the diagnosis and management of extra-articular hip impingement syndromes.**

Nakano N1, Yip G1, Khanduja V2

**Abstract****PURPOSE**

Extra-articular hip impingement syndromes encompass a group of conditions that have previously been an unrecognised source of pain in the hip and on occasion been associated with intra-articular hip impingement as well. As arthroscopic techniques for the hip continue to evolve, the importance of these conditions has been recognised recently and now form an important part of the differential of an individual presenting with hip pain. The aim of this article, therefore, is to provide the reader with an evidence-based and comprehensive update of these syndromes.

**METHODS**

By reviewing past literature, the anatomy, pathophysiology, clinical features and the management of the five common extra-articular hip impingement syndromes were described.

**RESULTS**

The common extra-articular impingement syndromes are: 1) Ischiofemoral impingement: quadratus femoris muscle becomes compressed between the lesser trochanter and the ischial tuberosity. 2) Subspine impingement: mechanical conflict occurs between an enlarged or malorientated anterior inferior iliac spine and the distal anterior femoral neck. 3) Iliopsoas impingement: mechanical conflict occurs between the iliopsoas muscle and the labrum, resulting in distinct anterior labral pathology. 4) Deep gluteal syndrome: pain occurs in the buttock due to the entrapment of the sciatic nerve in the deep gluteal space. 5) Pectineofoveal impingement: pain occurs when the medial synovial fold impinges against overlying soft tissue, primarily the zona orbicularis. Knowledge for these syndromes still remains limited for reasons mostly relating to their low prevalence and their co-existence with typical femoro-acetabular impingement.

**CONCLUSIONS**

The knowledge of extra-articular hip impingement syndromes is essential and should form a part of the differential diagnoses alongside intra-articular pathology including femoro-acetabular impingement particularly in the younger patient with a non-arthritic hip.

**Cam recurrence****Functional Outcomes and Cam Recurrence After Arthroscopic Treatment of Femoroacetabular Impingement in Adolescents.**

Degen RM1, Mayer SW2, Fields KG2, Coleman SH2, Kelly BT2, Nawabi DH2.

**Abstract****PURPOSE:**

To compare the functional outcomes after arthroscopic treatment of femoroacetabular impingement (FAI) in adolescent patients and non-adolescent patients, and to report on the rate of cam recurrence within 2 years after femoral osteoplasty in a limited sample of the adolescent group.

**METHODS:**

From 2010 to 2014, patients younger than 18 years with symptomatic FAI (alpha angle  $>50^\circ$ ) who underwent hip arthroscopy with minimum 2-year follow-up or reoperation were identified. A group of non-adolescent patients with identical inclusion criteria, except age of 18 years or older, was also identified for comparison. In addition, a separate group of adolescent patients with 2-year postoperative radiographs was reviewed for cam recurrence. Demographic data, operative data, and radiographic and clinical outcomes (modified Harris Hip Score [mHHS], Hip Outcome Score-Activities of Daily Living [HOS-ADL], Hip Outcome Score-Sport-Specific Subscale [HOS-SSS], and International Hip Outcome Tool 33 [iHOT-33] score) were collected.

**RESULTS:** We identified 34 adolescent patients (38 hips) with an average age of 16 years (range, 13-17 years). The mean clinical follow-up period was  $36.1 \pm 11.6$  months (range, 24.1-71.7 months) and  $29.6 \pm 2.4$  months (range, 27.9-31.3 months) without and with reoperation, respectively. A control group of 296 non-adolescent patients (306 hips), with a mean age of 31 years (range, 18-59 years), was identified as our non-adolescent group. The mean clinical follow-up period was  $34.1 \pm 11$  months (range, 24.0-77.4 months) and  $15.1 \pm 9.1$  months (range, 3.6-34.6 months) without and with reoperation, respectively. Significant improvement was noted in adolescents in the changes in outcome scores (mHHS, 22.2 [95% confidence interval (CI), 15.4-29.0]; HOS-ADL, 18.6 [95% CI, 11.9-25.2]; HOS-SSS, 33.5 [95% CI, 24.5-42.5]; and iHOT-33 score, 30.5 [95% CI, 21.8-39.2];  $P < .001$ ). Similar improvements were observed in non-adolescents (mHHS, 21.0 [95% CI, 19.0-23.0]; HOS-ADL, 16.6 [95% CI, 14.6-18.6]; HOS-SSS, 30.1 [95% CI, 26.6-33.6]; and iHOT-33 score, 34.9 [95% CI, 31.5-38.3];  $P < .001$ ). There was no evidence of a difference in follow-up survey scores between groups ( $P > .203$ ). Revision surgery was required in 2 adolescent hips (5.3% [95% CI, 1.5%-17.3%]) and 19 non-adolescent hips (6.2% [95% CI, 4.0%-9.5%]). Minimum 2-year radiographs were available for review in 24 adolescent patients (30 hips). The alpha angle (mean  $\pm$  standard deviation) was reduced from  $55.4^\circ \pm 12.1^\circ$  preoperatively to  $38.7^\circ \pm 4.9^\circ$  at 6 weeks postoperatively (mean difference,  $-16.4^\circ$  [95% CI,  $-19.8^\circ$  to  $-12.9^\circ$ ];  $P < .001$ ). At 2 years, the alpha angle remained at  $39.2^\circ \pm 11.2^\circ$ , which did not differ from 6-week measurements (mean difference,  $0.5^\circ$  [95% CI,  $-2.9^\circ$  to  $3.9^\circ$ ];  $P = .784$ ). There were no cases of cam recurrence (0% [95% CI, 0%-11.4%]).

**CONCLUSIONS:**

Significant improvement in clinical outcomes can be anticipated after arthroscopic treatment of FAI in adolescents. From a limited sample of our adolescent population, the risk of cam recurrence appears low; however, further follow-up is needed to ensure this does not represent a biased sample of the initial population. **LEVEL OF EVIDENCE:** Level III, retrospective comparative study.

**32 A. KNEE/ACL****MRI not reliable****MRI is not reliable in diagnosing of concomitant anterolateral ligament and anterior cruciate ligament injuries of the knee.**

Devitt BM1, O'Sullivan R2, Feller JA3, Lash N3, Porter TJ3, Webster KE4, Whitehead TS3.

**Abstract****PURPOSE:**

There has been a renewed interest in the anterolateral structures of the knee, including description of the anterolateral ligament (ALL) as a distinct structure. Recognizing injury to the ALL is challenging, particularly given the subjective nature of physical examination. Consequently, focus has turned to magnetic resonance imaging (MRI) to reach a preoperative diagnosis of this region. The aim of this study was to examine the ability of 3-Tesla (3T) MRI to identify the ALL in ACL-injured patients compared to a matched control group of ACL-intact patients. The hypothesis was that the ALL would be more difficult to identify in ACL-injured patients compared to ACL-intact patients.

**METHODS:**

A prospective case control study was performed comparing 3T MRI scans of 63-patients with an ACL rupture with a control group of 64-patients without ACL injury. An experienced musculoskeletal radiologist and an orthopaedic surgeon evaluated the scans performed using standard knee protocols. The ALL was considered in three regions for analysis: femoral, meniscal, and tibial. The status of the ALL was determined as visualized or non-visualized, and the integrity was assessed as intact, attenuated, or focal discontinuity.

**RESULTS:**

The detection rate of at least a portion of the ALL was 41/64 (64%) in the control group and 45/63 (72%) in the ACL-injured cohort, respectively. The entire length of the ALL could only be identified in 15/64 (23%) of the control group and 13/63 (21%) of the ACL-injured cases. In both groups, the visibility of the ALL was poorest at the femoral region and greatest at the tibial regions. The ALL, when visualized, was deemed to be intact in 55/63 (87%) of cases. Although the inter-observer reliability was excellent for detection of the ALL in the control group ( $\kappa = 0.86$ ), this decreased to only moderate reliability in the ACL-injured group ( $\kappa = 0.52$ ).

**CONCLUSION:**

This study demonstrates that MRI alone should not be relied upon to make a diagnosis of ALL injury in the setting of concomitant ACL injury due to the inability to accurately visualize this structure consistently in its entirety. To make a diagnosis of ALL injury or anterolateral instability of the knee and clinical correlation remains essential.

**LEVEL OF EVIDENCE:** Case-control study, Level III.

## 34. PATELLA

### Alignment and OA

#### **Association between lateral patellar osteoarthritis and knee morphology and alignment in young adults.**

Sebro R1, Weintraub S2.

#### **Abstract**

##### **AIM:**

To assess whether patellar and trochlea morphology and patellar alignment are associated with lateral patellar osteoarthritis/chondrosis (OAC) in young adults.

##### **MATERIALS AND METHODS:**

Magnetic resonance imaging (MRI) images of 183 subjects (81 cases, 102 controls) aged 21-35 years of age were evaluated. Quantitative measurements of patella and trochlea morphology and patellar alignment were obtained. Axial and sagittal MRI images were reviewed to grade the severity of focal cartilage defects along the lateral facet of the patella. Controls had knees without any abnormalities and were compared to cases with mild and severe lateral patellar OAC. Multivariable logistic regression was used to assess associations between measurements and lateral patellar OAC adjusting for body mass index.

##### **RESULTS:**

Cases were more likely to have higher Insall-Salvati ratios (OR=350;  $p<0.001$ ), shorter ratios of the medial to lateral facets of the patella (OR=1.63 $\times 10^{-3}$ ;  $p<0.001$ ), a shallower (angle closer to 180°) median eminence of the patella (OR=1.063;  $p=0.009$ ), decreased trochlear cartilage overlap with the patellar cartilage (OR=0.086;  $p=0.023$ ), and a less angulated lateral patellofemoral angle (OR=0.903;  $p=0.028$ ), compared to controls. Cases were also more likely to have patellar tendinosis (OR=5.265;  $p=0.045$ ) and oedema in the superolateral aspect of Hoffa's fat pad (OR=9.872;  $p<0.001$ ).

##### **CONCLUSION:**

Patellar and trochlear morphology and patellar alignment are associated with lateral patellofemoral compartment OAC in young adults.

### 35. KNEE/TOTAL

#### New score

#### What is the Responsiveness and Respondent Burden of the New Knee Society Score?

Maniar RN1, Maniar PR2, Chanda D3, Gajbhare D4, Chouhan T5.

**BACKGROUND:** Although the new Knee Society score (NKSS) has been validated by a task force, a longitudinal study of the same cohort of patients to evaluate the score's responsiveness and respondent burden has not been reported, to our knowledge.

**QUESTIONS/PURPOSES:** We analyzed the NKSS for (1) responsiveness; (2) respondent burden; and (3) convergent validity in 148 patients studied longitudinally during more than 1 year.

**METHODS:** During an 8-month period, 165 patients underwent TKA by the same surgeon at our institution, of whom 148 (90%) completed this study; the others were excluded because of distance to travel or loss to followup at the specified time. The NKSS, WOMAC, and SF-12 were completed by each patient 1 day before surgery and at 3 and 12 months postoperatively. At the same times, the original KSS (OKSS) which is designed as an observer's assessment, was completed by the same orthopaedic fellow for all patients. Responsiveness of the NKSS was assessed by determining effect size, standardized response mean (SRM), and ceiling and floor effects. Respondent burden was assessed through time to completion recorded in minutes and ease of completion which was measured objectively on a Likert scale of 1 to 5 by the patients. Convergent validity was assessed by correlating the NKSS with the WOMAC, SF-12, and OKSS (current, widely used scales) by Pearson's correlation coefficient.

**RESULTS:** Effect size was largest (2.83 and 3.38) and SRM was highest (2.29 and 2.68) for the NKSS at 3 and 12 months respectively, indicating the NKSS to be the most-responsive score followed by the OKSS, WOMAC, and SF-12. The NKSS exhibited no ceiling and floor effects. The NKSS took a longer time to complete ( $5.49 \pm 3.56$  minutes) compared with the WOMAC ( $4.64 \pm 3.19$  minutes) and SF-12 ( $4.35 \pm 3.27$  minutes). The mean difference in time taken for the NKSS versus the WOMAC was 0.85 minutes (95% CI, 0.54-1.17 minutes;  $p < 0.001$ ) and the mean difference for the NKSS versus the SF-12 was 1.14 minutes (95% CI, 0.76-1.15 minutes;  $p < 0.001$ ). Its ease of completion generally was comparable to that of the WOMAC and SF-12. Convergent validity showed a strong correlation ( $r > 0.6$ ;  $p < 0.001$ ) of the NKSS with the WOMAC at all times and moderate to strong correlation ( $r = 0.4-0.6$ ;  $p < 0.001$ ) with the SF-12 and OKSS at the first two assessments, which became strong ( $r > 0.6$ ;  $p < 0.001$ ) at 12 months.

**CONCLUSIONS:** The NKSS exhibited greater responsiveness than the WOMAC, SF-12, and OKSS scales and showed no ceiling effect, indicating adequate potential for recording future improvement. The NKSS also showed reliable convergent validity when correlated with these other scores. However, it posed a greater respondent burden in terms of time to completion.

**CLINICAL RELEVANCE:** As independent nondevelopers of the NKSS, we found it to be a responsive tool for assessment of TKA outcomes. We have confirmed that the NKSS can be used interchangeably for this purpose with the WOMAC scale and that it correlates positively with other established scales of the SF-12 and OKSS. Further study of the short-form version will establish whether it also can be used effectively while reducing the respondent burden.

## Opioid use

*Journal of Arthroplasty***Pre-Operative Opiate Use Independently Predicts Narcotic Consumption and Complications Following Total Joint Arthroplasty**

Joshua C. Rozell, MD, P. Maxwell Courtney, MD, Jonathan R. Dattilo, MD, Chia H. Wu, MD, MBA, Gwo-Chin Lee, MD  Correspondence information about the author MD Gwo-Chin Lee

**Abstract****Background**

Multimodal pain protocols have reduced opioid requirements and decreased complications following elective total hip (THA) and total knee (TKA) arthroplasty. However, these protocols are not universally effective. The purposes of this study are to determine the risk factors associated with increased opioid requirements and the impact of preoperative narcotic use on length of stay and in-hospital complications following THA/TKA.

**Patients and Methods**

We prospectively evaluated a consecutive series of 802 patients undergoing elective primary THA and TKA over a 9-month period. All patients were managed using a multimodal pain protocol. Data on medical comorbidities and history of preoperative narcotic use were collected and correlated with deviations from the protocol.

**Results**

Of the 802 patients, 266 (33%) required intravenous (IV) narcotic rescue. Patients younger than age 75 (Odds Ratio (OR) 1.85, 95% Confidence Interval (CI) 1.10-3.12,  $p=0.019$ ) and with preoperative narcotic use (OR 2.74, 95% CI 2.01-3.75,  $p<0.001$ ) were more likely to require rescue. Multivariate logistic regression demonstrated that preoperative narcotic use (OR 2.74, 95% CI 2.01-3.75,  $p<0.001$ ) was the largest independent predictor of increased postoperative opioid requirements. These patients developed more in-hospital complications (OR 1.92, 95% CI 1.34-2.76,  $p<0.001$ ). This was associated with increased length of stay (OR 1.59, 95% CI 1.06-2.37,  $p=0.025$ ) and a 2.5 times risk of requiring oral narcotics at 3 months postoperatively (OR 2.48, 95% CI 1.61-3.82,  $p<0.001$ ).

**Conclusion**

Despite the effectiveness of multimodal postoperative pain protocols, younger patients with preoperative history of narcotic use require additional opioids and are at higher risk for complications and greater length of stay.

**Keywords:**

total joint arthroplasty, opiates, narcotics, complications

**37. OSTEOARTHRITIS/KNEE****CBT for OA****Internet cognitive behaviour therapy for depression in older adults with knee osteoarthritis: A randomized controlled trial.**

O'Moore KA<sup>1,2,3</sup>, Newby JM<sup>1,2</sup>, Andrews G<sup>1,2</sup>, Hunter DJ<sup>4,5</sup>, Bennell K<sup>6</sup>, Smith J, Williams AD<sup>1,7</sup>.

**Abstract****OBJECTIVE**

To determine the efficacy of an internet-based cognitive behavioural therapy (iCBT) program for depression in older adults with osteoarthritis of the knee and comorbid major depressive disorder (MDD).

**METHODS**

We conducted a RCT in sixty-nine adults ( $\geq 50$  years) meeting criteria for MDD and osteoarthritis of the knee with 1-week post intervention (week 11) and 3-month follow-up (week 24) end points. Patients were allocated to either a 10-week iCBT program for depression added to treatment as usual (TAU) or to a TAU control group. Primary outcomes were depression symptoms (PHQ-9) and psychological distress (K-10). Secondary outcomes included arthritis self-efficacy (ASES), osteoarthritis pain, stiffness, physical function (WOMAC), and physical and mental health (SF-12 PSC and MCS). Depression status was assessed by blinded diagnostic interview (MINI) at intake and follow-up.

**RESULTS**

Intention-to-treat analyses indicated between-group superiority of iCBT over TAU on the primary outcomes (PHQ-9; Hedges  $g=1.01$ , 95% CI= .47-1.54; K-10; Hedges  $g=.75$ , 95% CI=.23-1.28) at post intervention and 3-month follow-up (PHQ9; Hedges  $g=.90$ , 95% CI= .36-1.44 and K-10; Hedges  $g=.94$ , 95% CI=.41-1.48), and on secondary OA-specific measures (ASES; Hedges  $g=-.81$ , 95% CI= -.29 to -1.33; WOMAC; Hedges  $g's=.56-.65$  95% CIs=.04-1.18) at 3-month follow-up. The majority of iCBT participants (84%) no longer met diagnostic criteria at 3-month follow-up.

**CONCLUSION**

Results support the efficacy of an iCBT program (requiring no face-to-face contact) for depression in individuals with comorbid depression and osteoarthritis of the knee. Importantly, the benefits of the program extended beyond reduced depressive symptoms and distress, to increased self-efficacy and improved pain, stiffness and physical function at follow-up. This article is protected by copyright. All rights reserved.

**Importance of optimism***The Journal of Pain*

April 2017 Volume 18, Issue 4, Supplement, Page S49

**The association of psychological resilience and conditioned pain modulation is moderated by optimism in adults with symptomatic knee osteoarthritis**K. Thompson, H. Bulls, K. Sibille, E. Bartley, L. Bradley, B. Goodin, R. Fillingim  
University of Alabama at Birmingham, Birmingham, AL

Existent evidence indicates that a greater optimistic outlook positively influences pain experiences in both experimental and clinical settings.

Our group has previously shown that optimism was associated with enhanced endogenous pain inhibition. It remains unclear whether individuals with low optimism (i.e., pessimists) demonstrate deficits in endogenous pain modulatory processes, or if they might engage other psychological resources that could beneficially impact pain processing. One possible resource is resiliency, which refers to one's ability to successfully adapt to stressful tasks in the face of adverse conditions. This cross-sectional study examined the associations among optimism, psychological resilience, and endogenous pain modulation. A total of 100 (42% female) individuals with symptomatic knee osteoarthritis (OA) completed the Life Orientation Test-Revised (LOT-R) and the Brief Resilience Scale (BRS) to assess optimism and psychological resilience, respectively. Endogenous pain modulation was examined experimentally using a conditioned pain modulation (CPM) protocol with algometry (test stimulus) and a cold pressor task (conditioning stimulus). Optimism was shown to not be significantly correlated with psychological resilience ( $r = .153$ ,  $p = .128$ ). In an adjusted model, results indicated that optimism moderated the association between psychological resilience and CPM ( $R^2 \text{ delta} = .055$ ,  $p = .023$ ). Specifically, it was found that greater psychological resilience was associated with enhanced CPM (i.e., greater pain inhibition) in individuals with low optimism ( $b = .380$ ,  $p = .03$ ), but not for those with intermediate ( $b = .140$ ,  $p = .293$ ) or high optimism ( $b = .101$ ,  $p = .538$ ).

These findings suggest that individuals with low optimism (and thus less positive outlooks towards the future) may be more adept at engaging other psychological resources such as resiliency when confronted with a stressor like experimental pain testing. Engaging psychological resilience could, in turn, positively affect endogenous pain modulation. Supported by a grant from NIH/NIA R37AG033906.

**Transcranial DC helped OA pain***The Journal of Pain*

April 2017 Volume 18, Issue 4, Supplement, Pages S87–S88

**Efficacy of Transcranial Direct Current Stimulation on Clinical Pain Severity in Older Adults with Knee Osteoarthritis Pain: A Double-Blind, Randomized, Sham-Controlled Pilot Clinical Study**

H. Ahn, A. Woods, E. Choi, N. Padhye, R. Fillingim

The University of Texas Health Science Center at Houston, Houston, TX

Arthritis is a leading cause of pain, impaired daily activity, and disability in people 45 years and older.

Osteoarthritis (OA) is the most common arthritic condition, and the knee is the most commonly affected joint. Because pharmacologic treatments can increase the risk of adverse events among older adults, there is a growing interest in non-pharmacologic interventions targeting central nervous system pain processing for this population. Specifically, noninvasive brain stimulation, such as transcranial direct current stimulation (tDCS), has received significant attention for the treatment of pain in chronic conditions owing to its neuromodulatory effects. Thus, we sought to assess the preliminary efficacy of tDCS on clinical pain severity in adults with knee OA pain. We conducted a double-blind, randomized, sham-controlled pilot clinical study in 40 community-dwelling participants with knee OA who were 50–70 years old. The participants were randomly assigned to receive either five daily sessions of 2mA tDCS for 20 minutes or sham tDCS. The anode electrode was placed over the primary motor cortex of the hemisphere contralateral to the affected knee, and the cathode electrode was placed over the supraorbital region ipsilateral to the affected knee. Clinical pain severity was measured at baseline and after tDCS via a numeric scale (0 to 100) rating current knee pain. The mean age was 59 years (SD = 8 years), and 53% were female.

After five daily sessions, the tDCS group had a greater reduction in knee pain ( $18.50 \pm 3.60$ ) than the sham group ( $6.45 \pm 2.26$ ). The mean difference between groups was 12.05 ( $t=2.83$ ,  $df=38$ ,  $p=.007$ , Cohen's  $d = 0.90$ ). Our preliminary results show that tDCS reduced clinical pain severity in adults with knee OA. Further studies with larger samples and longer-term follow-ups are needed.

**38 A. FOOT AND ANKLE****US guided injections****Ultrasound-guided steroid tendon sheath injections in juvenile idiopathic arthritis: a 10-year single-center retrospective study.**

Peters SE1, Laxer RM2, Connolly BL3, Parra DA4.

**Abstract****BACKGROUND:**

The aims of this study were to: (a) Identify tendon sheaths most commonly treated with steroid injections in a pediatric patient population with Juvenile Idiopathic Arthritis (JIA); (b) Describe technical aspects of the procedure; (c) Characterize sonographic appearance of tenosynovitis in JIA; (d) Assess agreement between clinical request and sites injected.

**METHODS:**

This was a 10 year single-center retrospective study (May 2006-April 2016) of patients with JIA referred by Rheumatology for ultrasound-guided tendon sheath injections. Patient demographics, clinical referral information, sonographic appearance of the tendon sheaths and technical aspects of the procedure were analyzed.

**RESULTS:**

There were 308 procedures of 244 patients (75% female, mean age 9.6 years) who underwent a total of 926 tendon sheath injections. Ankle tendons were most commonly injected (84.9%), specifically the tendon sheaths of tibialis posterior (22.3%), peroneus longus (20%) and brevis (19.7%). The majority of treated sites (91.9%) showed peritendinous fluid and sheath thickening on ultrasound. There were 2 minor intra-procedure complications without sequelae. A good agreement between clinical request and sites injected was observed.

**CONCLUSIONS:**

Ultrasound-guided tendon sheath injections with steroids are used frequently to treat patients with JIA. It is a safe intervention with a high technical success rate. The ankle region, specifically the medial compartment, is the site most commonly injected in this group of patients. The most common sonographic finding is peritendinous fluid and sheath thickening. These findings might assist clinicians and radiologists to characterize and more effectively manage tenosynovitis in patients with JIA.

**KEYWORDS:** JIA; Steroid injections; Tendon sheath; Tenosynovitis in children; US-guidance

**AP mob help****Effects of Anteroposterior Talus Mobilization on Range of Motion, Pain, and Functional Capacity in Participants With Subacute and Chronic Ankle Injuries: A Controlled Trial**

Rafael Duarte Silva, PhD, Luciana Mundim Teixeira, MSc, Tarcísio Santos Moreira, MSc, Luci Fuscaldi Teixeira-Salmela, PhD, Marcos Antônio de Resende, PhD

**Objective**

The purpose of this study was to measure the acute (1 session) and chronic effects (6 sessions) and the follow-up (2 weeks) of anteroposterior articular mobilization of the talus, grade III of Maitland, on the dorsiflexion range of motion (ROM), pain, and functional capacity of individuals with subacute and chronic traumatic injuries of the ankle.

**Methods**

Thirty-eight volunteers, men and women, with a mean age of 40.8 years, with subacute and chronic ankle injuries participated. The volunteers were blinded to the study purpose and were allocated into the experimental group (EG) or sham group (SG). Dorsiflexion ROM, pain, and functional capacity were measured using the universal goniometer, visual analog scale, and Foot and Ankle Ability Measure, respectively. Measurements were taken on 4 different occasions: (1) baseline, (2) after the first session, (3) after the sixth session, and (4) at follow-up. Articular anteroposterior mobilization of the talus grade III of Maitland was applied to the EG, whereas manual contact was applied to the SG. Three series of 30 seconds each with a 30-second rest interval between the series were conducted.

**Results**

Significant increases in ankle dorsiflexion ROM were observed only for the EG after the first (EG:  $9.5 \pm 1.1$ ; SG:  $7.6 \pm 1.1$ ) and sixth (EG:  $12.8 \pm 1.2$ ; SG:  $8.4 \pm 1.2$ ) sessions and were maintained at follow-up (EG:  $13.2 \pm 1.1$ ; SG:  $9.3 \pm 1.3$ ). Decreases in pain and improvements in functional capacity (FC) were identified for both groups after the first and sixth sessions (Pain, EG:  $1.3 \pm 0.5$ ; SG:  $1.8 \pm 0.6$  and EG:  $0.7 \pm 0.3$ ; SG:  $0.7 \pm 0.3$ ; FC, EG:  $64.6 \pm 3.5$ ; SG:  $67.4 \pm 4.4$  and EG:  $79.9 \pm 3.3$ ; SG:  $86.2 \pm 3.3$ ) and remained at follow-up (Pain, EG:  $0.3 \pm 0.2$ ; SG:  $0.5 \pm 0.3$ ; FC, EG:  $86.8 \pm 2.7$ ; SG:  $89.8 \pm 3.7$ ).

**Conclusion**

Articular grade III mobilization improved ankle dorsiflexion ROM, when compared with the SG. Changes in pain and functional capacity were similar in both groups.

### **Polydactyly**

#### **Does timing of surgery influence the long-term results of foot polydactyly treatment?**

Ozren Kubat, Darko Antičević

#### **BACKGROUND**

There is an evident lack of research on timing of polydactyly surgery and its effects on treatment results.

#### **METHODS**

Retrospective comparative study on foot polydactyly patients treated at our Department from 1995 to 2009. Patients were divided into 2 groups, group A – under the age of 5 at surgery, and group B – 5 years and older.

#### **RESULTS**

There were 24 patients (8 male, 16 female), 30 feet. Median age at surgery was 1 year (range, 9 months to 4.5 years) for group A, and 8.5 years (range, 6 to 37 years) for group B. Median follow-up was 16.2 years (range, 7 to 21 years). There were 16 postaxial and 8 preaxial cases. At the last follow-up 12 patients' feet were "excellent" and 12 "good". No significant differences were identified between the two groups at final follow-up.

#### **CONCLUSION**

Timing of surgery for foot polydactyly is not crucial for final results.

## 42. PLANTAR SURFACE

### PRP better than cortisone

#### **A systematic review and meta-analysis of platelet-rich plasma versus corticosteroid injections for plantar fasciopathy.**

Singh P1, Madanipour S2, Bhamra JS3, Gill I4.

#### **Abstract**

##### **PURPOSE:**

To determine whether platelet-rich plasma (PRP) injections are associated with improved pain and function scores when compared with corticosteroid injections for plantar fasciopathy.

##### **METHODS:**

A systematic review of published literature was performed for studies comparing PRP injections and corticosteroid injections for plantar fasciopathy. Studies were assessed using the Cochrane Risk of Bias Tool and the Newcastle Ottawa Scale (NOS). The primary endpoint was pain and function score at three and six month follow-up. Sensitivity analysis was performed for high quality studies and randomised studies.

##### **RESULTS:**

Ten studies totalling 517 patients were included. Seven studies were randomised. All studies included patients who had failed conservative measures and excluded patients with systemic illness and other causes of foot pain. Studies reported outcomes using the visual analogue score (VAS) and American Orthopaedic Foot and Ankle Score (AOFAS). At 3-month follow-up, PRP injections were associated with improved VAS scores (standard mean difference [SMD], -0.66; 95% CI, -1.3 to -0.02;  $p = 0.04$ ) and AOFAS scores (SMD, 1.87; 95% CI, 0.16-3.58;  $p = 0.03$ ). At 6-month follow-up, there was no difference in VAS score (SMD, -0.66; 95% CI, -1.65 to 0.3;  $p = 0.17$ ) or AOFAS scores (SMD, 1.69; 95% CI, -1.06 to 4.45;  $p = 0.23$ ). No studies reported adverse event rates or cost analysis. There was no difference in pain or function score at one, six- or 12-month follow-up. Sensitivity analyses of high-quality studies showed no differences between the PRP and steroid group at any of the follow-up points.

##### **CONCLUSIONS:**

PRP injections are associated with improved pain and function scores at three-month follow-up when compared with corticosteroid injections. Information regarding relative adverse event rates and cost implications is lacking. Further, large-scale, high-quality, randomised controlled trials with blinding of outcome assessment and longer follow-up are required.

## 44. RHUMATOID ARTHRITIS

### Hand exercises

#### **Hand exercises for patients with rheumatoid arthritis: an extended follow-up of the SARAH randomised controlled trial.**

Williamson E1, McConkey C2, Heine P1, Dosanjh S2, Williams M3, Lamb SE1,2.

#### **Abstract**

##### **OBJECTIVES:**

The Stretching And strengthening for Rheumatoid Arthritis of the Hand (SARAH) randomised controlled trial evaluated the effectiveness of a hand exercise programme and demonstrated it was clinically effective and cost-effective at 12 months. The aim of this extended follow-up was to evaluate the effects of the SARAH programme beyond 12 months.

##### **METHODS:**

Using postal questionnaires, we collected the Michigan Hand Questionnaire hand function (primary outcome), activities of daily living and work subscales, pain troublesomeness, self-efficacy and health-related quality of life. All participants were asked how often they performed hand exercises for their rheumatoid arthritis. Mean difference in hand function scores were analysed by a linear model, adjusted for baseline score.

##### **RESULTS:**

Two-thirds (n=328/490, 67%) of the original cohort provided data for the extended follow-up. The mean follow-up time was 26 months (range 19-40 months). There was no difference in change in hand function scores between the two groups at extended follow-up (mean difference (95% CI) 1.52 (-1.71 to 4.76)). However, exercise group participants were still significantly improved compared with baseline (p=0.0014) unlike the best practice usual care group (p=0.1122). Self-reported performance of hand exercises had reduced substantially.

##### **CONCLUSIONS:**

Participants undertaking the SARAH exercise programme had improved hand function compared with baseline >2 years after randomisation. This was not the case for the control group. However, scores were no longer statistically different between the groups indicating the effect of the programme had diminished over time. This reduction in hand function compared with earlier follow-up points coincided with a reduction in self-reported performance of hand exercises. Further intervention to promote long-term adherence may be warranted.

**Exercise and RA****Progressive resistance training (PRT) improves rheumatoid arthritis outcomes: A district general hospital (DGH) model.**

Morsley K1, Berntzen B1, Erwood L1, Bellerby T1, Williamson L1.

**Abstract****OBJECTIVE:**

Rheumatoid cachexia is common in rheumatoid arthritis (RA) patients and develops soon after diagnosis, despite adequate drug therapy. It is associated with multiple adverse effects on body composition, function and mortality. Progressive resistance training (PRT) improves these outcomes but is not widely prescribed outside of a research setting. The aim of the present study was to explore the practicality and effectiveness of providing PRT to patients in a district general hospital within the constraints of existing resources.

**METHODS:**

Patients attending a rheumatology clinic were invited to participate in a weekly PRT class for 6 weeks, supervised by a physiotherapist. Outcome measures included: body composition measures (waist and hip circumference, weight, percentage body fat); functional measures (grip strength, 60-s sit-to-stand test, single leg stance, Health Assessment Questionnaire); mood; fatigue and disease activity measures (sleep scale, hospital anxiety and depression scale, Functional Assessment of Chronic Illness Therapy, pain visual analogue scale). These were measured at baseline and at 6 weeks.

**RESULTS:**

A total of 83 patients completed the programme (60% female, mean age 51.2 years), of whom 34.9% had early RA. Improvements were seen in multiple measures inpatients with early RA and with established inflammatory arthritis, and were not affected by age or gender.

**CONCLUSIONS:**

Patients with early and established inflammatory arthritis alike benefited from a 6-week PRT programme provided within a National Health Service setting. Although further work is needed to look at long-term effects, we suggest that this intervention should be more widely available.

**45 D. MANUAL THERAPY EXTREMITIES****AP ankle mobs help****Effects of Anteroposterior Talus Mobilization on Range of Motion, Pain, and Functional Capacity in Participants With Subacute and Chronic Ankle Injuries: A Controlled Trial**

Rafael Duarte Silva, PhD, Luciana Mundim Teixeira, MSc, Tarcísio Santos Moreira, MSc, Luci Fuscaldi Teixeira-Salmela, PhD, Marcos Antônio de Resende, PhD

**Objective**

The purpose of this study was to measure the acute (1 session) and chronic effects (6 sessions) and the follow-up (2 weeks) of anteroposterior articular mobilization of the talus, grade III of Maitland, on the dorsiflexion range of motion (ROM), pain, and functional capacity of individuals with subacute and chronic traumatic injuries of the ankle.

**Methods**

Thirty-eight volunteers, men and women, with a mean age of 40.8 years, with subacute and chronic ankle injuries participated. The volunteers were blinded to the study purpose and were allocated into the experimental group (EG) or sham group (SG). Dorsiflexion ROM, pain, and functional capacity were measured using the universal goniometer, visual analog scale, and Foot and Ankle Ability Measure, respectively. Measurements were taken on 4 different occasions: (1) baseline, (2) after the first session, (3) after the sixth session, and (4) at follow-up. Articular anteroposterior mobilization of the talus grade III of Maitland was applied to the EG, whereas manual contact was applied to the SG. Three series of 30 seconds each with a 30-second rest interval between the series were conducted.

**Results**

Significant increases in ankle dorsiflexion ROM were observed only for the EG after the first (EG:  $9.5 \pm 1.1$ ; SG:  $7.6 \pm 1.1$ ) and sixth (EG:  $12.8 \pm 1.2$ ; SG:  $8.4 \pm 1.2$ ) sessions and were maintained at follow-up (EG:  $13.2 \pm 1.1$ ; SG:  $9.3 \pm 1.3$ ). Decreases in pain and improvements in functional capacity (FC) were identified for both groups after the first and sixth sessions (Pain, EG:  $1.3 \pm 0.5$ ; SG:  $1.8 \pm 0.6$  and EG:  $0.7 \pm 0.3$ ; SG:  $0.7 \pm 0.3$ ; FC, EG:  $64.6 \pm 3.5$ ; SG:  $67.4 \pm 4.4$  and EG:  $79.9 \pm 3.3$ ; SG:  $86.2 \pm 3.3$ ) and remained at follow-up (Pain, EG:  $0.3 \pm 0.2$ ; SG:  $0.5 \pm 0.3$ ; FC, EG:  $86.8 \pm 2.7$ ; SG:  $89.8 \pm 3.7$ ).

**Conclusion**

Articular grade III mobilization improved ankle dorsiflexion ROM, when compared with the SG. Changes in pain and functional capacity were similar in both groups.

## 52. EXERCISE

### Comparison

#### **Effects of regular water- and land-based exercise on physical function after 5 years: A long-term study on the well-being of older Japanese adults.**

Tsujimoto T1, Ikemoto T2,3, Kurisuno M1, Akao M1,3, Miyagawa H2,3, Inoue M2, Arai YP2, Ushida T2, Deie M1,3.

#### **Abstract**

##### **AIM**

To investigate the effects of 5 years of physical exercise on functional parameters among older Japanese adults who carried out water- or land-based exercise.

##### **METHODS**

We retrospectively investigated data from 5707 medical examinations and enrolled 77 older adults into the study. Eligible participants had to be aged  $\geq 60$  years, and engaged in water-based exercise ( $n = 38$ ) or a combination of water- and land-based exercise ( $n = 39$ ) for at least 80% of their total exercise time for over 5 years at our fitness center. In statistical analysis, a two-way repeated-measures analysis of variance was carried out to examine the effects over time and by exercise type, and the changes in each parameter over 5 years were also compared between the two groups.

##### **RESULTS**

We found significant main effects and an interaction between time and exercise type for gait speed, with an early decline in the combined exercise group, as well as significant main effects of time, showing a functional decline in grip strength, one-leg standing time and step/height ratio in both exercise types at the 5-year follow up. The 5-year changes in each parameter did not differ between the two groups despite the frequency of exercise, even though we found a negative correlation between changes in one-leg standing time and total amount of water-based exercise.

##### **CONCLUSION**

Contrary to expectations, these results suggest that regular engagement in water-based exercise, even combined with land-based exercise, might have poor long-term benefits for maintaining physical performance in older adults.

**Benefits of PA****Progressive skeletal benefits of physical activity when young as assessed at the midshaft humerus in male baseball players.**

Warden SJ1,2, Weatherholt AM3,4, Gudeman AS3, Mitchell DC3, Thompson WR5, Fuchs RK5,3.

**Abstract**

Physical activity benefits the skeleton, but there is contrasting evidence regarding whether benefits differ at different stages of growth. The current study demonstrates that physical activity should be encouraged at the earliest age possible and be continued into early adulthood to gain most skeletal benefits.

**INTRODUCTION**

The current study explored physical activity-induced bone adaptation at different stages of somatic maturity by comparing side-to-side differences in midshaft humerus properties between male throwing athletes and controls. Throwers present an internally controlled model, while inclusion of control subjects removes normal arm dominance influences.

**METHODS**

Throwing athletes (n = 90) and controls (n = 51) were categorized into maturity groups (pre, peri, post-early, post-mid, and post-late) based on estimated years from peak height velocity (<-2, -2 to 2, 2 to 4, 4 to 10, and >10 years). Side-to-side percent differences in midshaft humerus cortical volumetric bone mineral density (Ct.vBMD) and bone mineral content (Ct.BMC); total (Tt.Ar), medullary (Me.Ar), and cortical (Ct.Ar) areas; average cortical thickness (Ct.Th); and polar Strength Strain Index (SSIP) were assessed.

**RESULTS**

Significant interactions between physical activity and maturity on side-to-side differences in Ct.BMC, Tt.Ar, Ct.Ar, Me.Ar, Ct.Th, and SSIP resulted from the following: (1) greater throwing-to-nonthrowing arm differences than dominant-to-nondominant arm differences in controls (all  $p < 0.05$ ) and (2) throwing-to-nonthrowing arm differences in throwers being progressively greater across maturity groups (all  $p < 0.05$ ). Regional analyses revealed greatest adaptation in medial and lateral sectors, particularly in the three post-maturity groups. Years throwing predicted 59% of the variance of the variance in throwing-to-nonthrowing arm difference in SSIP ( $p < 0.001$ ).

**CONCLUSION**

These data suggest that physical activity has skeletal benefits beginning prior to and continuing beyond somatic maturation and that a longer duration of exposure to physical activity has cumulative skeletal benefits. Thus, physical activity should be encouraged at the earliest age possible and be continued into early adulthood to optimize skeletal benefits.

### Walking exercise

#### **Efficacy of rhythmic exercise and walking exercise in older adults' exercise participation rates and physical function outcomes.**

Park YS<sup>1,2</sup>, Koh K<sup>2</sup>, Yang JS<sup>3</sup>, Shim JK<sup>2,4,5,6</sup>.

#### **Abstract**

##### **AIM:**

The purpose of the present study was to evaluate the efficacy of two different exercise types, rhythmic exercise designed from local music and dance (RE) and walking exercise (WE), in terms of exercise participation and physical function changes in older adults over a period of 12 weeks.

##### **METHODS:**

Exercise participation was assessed through the attendance rate and retention rate, and physical function was evaluated through the Short Physical Performance Battery, static balance test and gait test.

##### **RESULTS:**

The RE group showed significantly higher attendance and retention rates; greater improvement in Short Physical Performance Battery scores; and greater improvement in static balance, as compared with the WE. No differences were found between the RE and WE groups in gait parameters.

##### **CONCLUSIONS:**

The results suggest that RE was more effective than WE in retaining exercise participation and improving physical function in older adults.

**54. POSTURE****Hip strengthening****Effectiveness of Hip External Rotator Strengthening Exercise in Korean Postural Bowleg Women.**

Park SH1, Lee JW1, Kim JH1, Tak KS2, Lee BH1, Suh IS3.

**Abstract**

Postural bowleg is a subclinical entity with both aesthetic and functional outcomes and appears to be common in East Asian countries. Internal rotation of the hip joint is associated with varus alignment at the knee joint of the bowleg. Strengthening exercise for the hip external rotator muscles seems to be effective in improving varus alignment of bowleg, but no standardized exercise program exists. A standardized active resistance strengthening exercise for hip external rotator muscles could improve varus alignment of the lower limb in bowlegged Korean women.

**METHODS**

In this article, a case series study was conducted to observe changes following a standardized 3-month program using equipment designed for strengthening of the hip external rotator muscles.

**RESULTS**

Photogrammetric and radiographic data were used to compare the gap between knees and tibiofemoral (TF) angles before and after the exercise program. As a result, on average, the knee gap decreased by 1.6 cm. The TF angle decreased by 1.5°. Regression analysis revealed a statistically significant association between changes in knee gap and TF angle.

**CONCLUSION**

The standardized 3-month active resistance strengthening exercise program of hip external rotator muscles was effective in improving postural deviation and cosmetic outcomes in bowlegged Korean women.

**Wheel chair fitting****Increased Seat Dump Angle in a Manual Wheelchair is Associated with Changes in Thoracolumbar Lordosis and Scapular Kinematics during Propulsion.**

Cloud BA1, Zhao KD2, Ellingson AM3, Nassr A3, Windebank AJ4, An KN3.

**Abstract****OBJECTIVE:**

To quantify and compare spinal curvature and shoulder kinematics throughout the manual wheelchair propulsion cycle for individuals with spinal cord injury (SCI) who were seated at 2 different seat dump angles.

**DESIGN:**

Single-group, repeated-measures study.

**SETTING:**

Academic medical center.

**PARTICIPANTS:**

Twenty-eight individuals completed the telephone screening; 21 were eligible and completed the study.

**INTERVENTIONS:**

Participants' personal manual wheelchairs were modified to have seat dump angles of 0° or 14°, with a vertical backrest. Participants completed at least 3 propulsion cycles in each condition, during which spine and shoulder motion data were collected with fiber optic and electromagnetic sensors, respectively.

**MAIN OUTCOME MEASURES:**

Thoracolumbar spinal curvature, glenohumeral kinematics, and scapulothoracic kinematics at the start of push (SP), mid push (MP), end of push (EP), and mid recovery (MR).

**RESULTS:**

Participants had significantly less lordosis in the 14° condition for all propulsion events. Median differences ranged from 2.0° to 4.6°. Lordosis differences were more pronounced in those with low SCI. Scapulothoracic internal rotation was increased in the 14° condition at SP and MP (mean differences of 2.5° and 2.7°, respectively). Relative downward rotation increased in the 14° condition at SP and MP (mean differences of 2.4° and 2.1°, respectively). Scapulothoracic differences were more pronounced in those with high SCI. No glenohumeral rotations were significantly different between the conditions.

**CONCLUSIONS:**

Scapulothoracic kinematics and spinal curvature differences during propulsion may be associated with the position of other body segments or postural stability. Because no differences were observed at the glenohumeral joint, risk of subacromial impingement may not be affected by this seat angle change.

**55. SCOLIOSIS****Impact on PA****Adults With Idiopathic Scoliosis Diagnosed at Youth Experience Similar Physical Activity and Fracture Rate as Controls.**

Diarbakerli E1, Grauers A, Danielsson A, Gerdhem P.

**Abstract****STUDY DESIGN:**

Cross-sectional.

**OBJECTIVE:**

To describe physical activity level and fracture rates in adults with idiopathic scoliosis, diagnosed before maturity, and to compare with a control group.

**SUMMARY OF BACKGROUND DATA:**

A previous study found a lower level of sporting activities in adults treated for idiopathic scoliosis compared with controls. Other studies have shown a lower bone mass in adults with idiopathic scoliosis compared with controls.

**METHODS:**

One thousand two hundred seventy-eight adults (aged 18-71 yr) with idiopathic scoliosis and 214 controls (aged 18-70 yr) were included and answered the International Physical Activity Questionnaire - Short Form (IPAQ-SF) and questions about previous fractures. The three scoliosis treatment groups (untreated n=360, brace n=460, and surgically treated n=458) were compared. Furthermore, a comparison based on onset (juvenile n=169 or adolescent n=976) was performed. Achieved weekly moderate activity level and metabolic equivalent task (MET) minutes/week were assessed for patients and controls. Statistical comparisons were made with analysis of covariance with adjustments for age, body mass index, and sex.

**RESULTS:**

The proportion achieving weekly moderate activity level was 962 out of 1278 for individuals with idiopathic scoliosis (75%) and 157 out of 214 (73%) for controls (P=0.40). The scoliosis patients reported 2016MET-minutes/week (median value) and the controls 2456 (P=0.06). Fracture rates did not differ (P=0.72). Fewer surgically treated individuals achieved moderate activity level (P=0.046) compared with the untreated and the previously braced individuals. No difference was seen regarding MET-minutes/week (P=0.86). No differences were seen between individuals with a juvenile onset compared with individuals with an adolescent onset (all P ≥ 0.05).

**CONCLUSION:**

Adults with idiopathic scoliosis have similar physical activity level and do not sustain more fractures compared with controls. Adults with surgically treated idiopathic scoliosis have slightly lower physical activity level than previously braced and untreated patients. Onset of idiopathic scoliosis does not affect physical activity level.

## QOL following surgery

**An observational study on surgically treated adult idiopathic scoliosis patients' quality of life outcomes at 1- and 2-year follow-ups and comparison to controls.**

Theis JC1,2, Grauers A2,3, Diarbakerli E2, Savvides P2, Abbott A1,4,5,6, Gerdhem P2.

**Abstract****BACKGROUND:**

Prospective data on health-related quality of life in patients with idiopathic scoliosis treated surgically as adults is needed. We compared preoperative and 1- and 2-year follow-up data in surgically treated adults with idiopathic scoliosis with juvenile or adolescent onset. Results were compared to untreated adults with scoliosis and population normative data.

**METHODS:**

A comparison of preoperative and 1- and 2-year follow-up data of 75 adults surgically treated for idiopathic scoliosis at a mean age of 28 years (range 18 to 69) from a prospective national register study, as well as a comparison with age- and sex-matched data from 75 untreated adults with less severe scoliosis and 75 adults without scoliosis, was made. Outcome measures were EuroQol-5 dimensions (EQ-5D) and Scoliosis Research Society (SRS)-22r questionnaire.

**RESULTS:**

In the surgically treated, EQ-5D and SRS-22r scores had statistically significant improvements at both 1- and 2-year follow-ups (all  $p < 0.015$ ). The effect size of surgery on EQ-5D at 1-year follow-up was large ( $r = -0.54$ ) and small-medium ( $r = -0.20$ ) at 2-year follow-up. The effect size of surgery on SRS-22r outcomes was medium-large at 1- and 2-year follow-ups ( $r = -0.43$  and  $r = -0.42$  respectively). At the 2-year follow-up, the EQ-5D score and the SRS-22r subscore were similar to the untreated scoliosis group ( $p = 0.56$  and  $p = 0.91$  respectively), but lower than those in the adults without scoliosis ( $p < 0.001$  for both comparisons).

**CONCLUSIONS:**

Adults with idiopathic scoliosis experience an increase in health-related quality of life following surgery at 2-year follow-up, approaching the health-related quality of life of untreated individuals with less severe scoliosis, but remain lower than normative population data.

**56. ATHLETICS****Runners illness pre race****Recent acute prerace systemic illness in runners increases the risk of not finishing the race: SAFER study V.**

Gordon L1, Schweltnus M2,3, Swanevelder S4, Jordaan E4, Derman W5.

**Abstract****AIM:**

There are limited data on the negative effects of exercise in athletes with acute infective illness. The aim of this study was to determine whether a recently diagnosed prerace acute illness in runners affects the ability to finish a race.

**METHODS:**

Runners were prospectively evaluated in the 3 days before the race for acute infective illness and then received participation advice using clinical criteria based on systemic or localised symptoms/signs. We compared the did-not-start and the did-not-finish frequencies of ill runners (Ill=172: localised=58.7%; systemic=41.3%) with that of a control group of runners (Con=53734).

**RESULTS:**

Runners with a systemic illness were 10.4% more likely not to start compared with controls (29.6% vs 19.2%) ( $p=0.0073$ ). The risk difference of not starting the race in runners who were advised not to run the race compared with controls was 37.3% (56.5% vs 19.2%,  $p<0.0001$ ). Compared with controls, runners with illness had a significantly ( $p<0.05$ ) greater risk (any illness (5.2% vs 1.6%), systemic illness (8.0% vs 1.6%), illness <24 hours before the race (11.1% vs 1.6%)) and relative risk (prevalence risk ratio) (any illness=3.4, systemic illness=4.9, systemic illness <24 hours before the race=7.0) of not finishing the race.

**CONCLUSIONS:**

Runners with prerace acute systemic illness, and particularly those diagnosed <24 hours before race day, are less likely to finish the race, indicating a reduction in race performance.

### Return to play after hamstring injuries

#### **Return to play after hamstring injuries in football (soccer): a worldwide Delphi procedure regarding definition, medical criteria and decision-making.**

van der Horst N1, Backx F2, Goedhart EA3, Huisstede BM2; HIPS-Delphi Group.

#### **Abstract**

There are three major questions about return to play (RTP) after hamstring injuries: How should RTP be defined? Which medical criteria should support the RTP decision? And who should make the RTP decision? The study aimed to provide a clear RTP definition and medical criteria for RTP and to clarify RTP consultation and responsibilities after hamstring injury.

#### **METHOD**

The study used the Delphi procedure. The results of a systematic review were used as a starting point for the Delphi procedure. Fifty-eight experts in the field of hamstring injury management selected by 28 FIFA Medical Centres of Excellence worldwide participated. Each Delphi round consisted of a questionnaire, an analysis and an anonymised feedback report.

#### **RESULTS/CONCLUSION**

After four Delphi rounds, with more than 83% response for each round, consensus was achieved that RTP should be defined as 'the moment a player has received criteria-based medical clearance and is mentally ready for full availability for match selection and/or full training'. The experts reached consensus on the following criteria to support the RTP decision: medical staff clearance, absence of pain on palpation, absence of pain during strength and flexibility testing, absence of pain during/after functional testing, similar hamstring flexibility, performance on field testing, and psychological readiness.

It was also agreed that RTP decisions should be based on shared decision-making, primarily via consultation with the athlete, sports physician, physiotherapist, fitness trainer and team coach. The consensus regarding aspects of RTP should provide clarity and facilitate the assessment of when RTP is appropriate after hamstring injury, so as to avoid or reduce the risk of injury recurrence because of a premature RTP.

**Shoulder arthroplasty and return to sports****Return to sport after shoulder arthroplasty: a systematic review and meta-analysis.**

Liu JN1, Steinhaus ME2, Garcia GH2, Chang B3, Fields K3, Dines DM4, Warren RF4, Gulotta LV4.

**Abstract****PURPOSE:**

With increasing incidence and indications for shoulder arthroplasty, there is an increasing emphasis on the ability to return to sports. The main goal of this study was to determine the rate of return to sport after shoulder arthroplasty.

**METHODS:**

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed to perform this systematic review and meta-analysis. A search was performed on MEDLINE, Scopus, EMBASE, and the Cochrane Library. The quality of the included studies was evaluated according to the Methodological Index for Nonrandomized Studies checklist. The main judgement outcome was the rate of return to sports activity after shoulder arthroplasty and the level of play upon return (identical or higher/lower level).

**RESULTS:**

Thirteen studies were reviewed, including 944 patients (506 athletes), treated with shoulder arthroplasty at an average follow-up of 5.1 years (range, 0.5-12.6 years). The most common sports were swimming (n = 169), golf (n = 144), fitness sports (n = 71), and tennis (n = 63). The overall rate of return to sport was 85.1% (95% CI, 76.5-92.3%), including 72.3% (95% CI, 60.6-82.8%) returning to an equivalent or improved level of play, after 1-36 months. Patients undergoing anatomic total shoulder arthroplasty returned at a significantly higher rate (92.6%) compared to hemiarthroplasty (71.1%, p = 0.02) or reverse total shoulder arthroplasty (74.9%, p = 0.003).

**CONCLUSION:**

Most patients are able to return to one or more sports following shoulder arthroplasty, with anatomic total shoulder arthroplasty having the highest rate of return.

**LEVEL OF EVIDENCE: IV.**

**59. PAIN****Chronic pain in adolescents**

Pain. 2017 May;158(5):794-801. doi: 10.1097/j.pain.0000000000000817.

**Predictors of the transition from acute to persistent musculoskeletal pain in children and adolescents: a prospective study.**

Holley AL<sup>1</sup>, Wilson AC, Palermo TM.

**Abstract**

Strategies directed at the prevention of disabling pain have been suggested as a public health priority, making early identification of youth at risk for poor outcomes critical. At present, limited information is available to predict which youth presenting with acute pain are at risk for persistence. The aims of this prospective longitudinal study were to identify biopsychosocial factors in the acute period that predict the transition to persistent pain in youth with new-onset musculoskeletal (MSK) pain complaints. Participants were 88 children and adolescents (age 10-17 years) presenting to the emergency department (n = 47) or orthopedic clinic (n = 41) for evaluation of a new MSK pain complaint (<1 month duration). Youth presented for 2 study visits (T1  $\leq$  1 month post pain onset; T2 = 4-month follow-up) during which they completed questionnaires (assessing pain characteristics, psychological factors, sleep quality) and participated in a laboratory task assessing conditioned pain modulation. Regression analyses tested T1 predictors of longitudinal pain outcomes (pain persistence, pain-related disability, quality of life [QOL]). Results revealed approximately 35% of youth had persistent pain at 4-month follow-up, with persistent pain predicted by poorer conditioned pain modulation and female sex. Higher depressive symptoms at T1 were associated with higher pain-related disability and poorer QOL at T2. Findings highlight the roles of depressive symptoms and pain modulation in longitudinally predicting pain persistence in treatment-seeking youth with acute MSK pain and suggest potential mechanisms in the transition from acute to chronic MSK pain in children and adolescents.

**Dry eye and chronic pain condition**

*The Journal of Pain* April 2017 Volume 18, Issue 4, Supplement, Page S82

**Associations between symptoms and signs of dry eye and evoked pain sensitivity**

E. Felix, A. McClellan, A. Galor

Miami VAHS, Miami, FL

“Dry eye” is a heterogeneous condition with symptoms including visual disturbances and eye pain. Although many with dry eye symptoms have signs consistent with the disease (e.g., abnormal tear function, poor tear quality), others lack measurable signs of disease at the ocular surface.

The present study examined associations between the degree of discordance between dry eye symptoms and dry eye signs and measures of somatosensory function. Participants with and without dry eye symptoms were recruited from the Miami VA eye clinic ( $n = 152$ ), and completed questionnaires (demographic, pain, and dry eye symptom history), an ocular surface examination, and quantitative sensory testing (QST). A dry eye “discordance score” was calculated as the difference between the severity of dry eye symptoms and the severity of dry eye signs, so that high discordance scores were assigned to those with severe symptoms but minimal ocular signs of dry eye. Bivariate correlations showed that, although there was not a significant association between discordance score and pain thresholds on the cornea or forehead, discordance scores and pain thresholds on the forearm showed modest, but significant associations (cold pain threshold:  $r = -0.197$ ,  $p = 0.015$ ; hot pain threshold:  $r = -0.166$ ,  $p = 0.041$ ). Additionally, discordance scores were also related to intensity ratings of cold pain after-sensations on the forehead ( $r = 0.304$ ,  $p < .01$ ), and hot pain after-sensations on the forearm ( $r = 0.175$ ,  $p = 0.034$ ). These preliminary results suggest that evoked pain sensitivity at the site of clinical pain report (cornea) was independent of the degree of congruence between symptoms and signs of dry eye, but evoked pain sensitivity at a remote test site (forearm) was higher for those with greater dry eye symptom-to-sign discordance.

Thus, our findings are in support of recent evidence suggesting that the subgroup of patients with seemingly “idiopathic” dry eye may be more appropriately classified as having a centralized chronic pain condition.

**61. FIBROMYALGIA****Yoga***The Journal of Pain*

April 2017 Volume 18, Issue 4, Supplement, Page S54

**The impact of daily yoga-based exercise on pain, pain interference, sleep and stress in patients with fibromyalgia: a pilot study**

A. Lazaridou, A. Buliteanu, A. Vijjeswarapu, R. Edwards, K. Schreiber

Brigham and Women's Hospital, Harvard Medical School, Boston, MA

Chronic widespread pain experienced by patients with Fibromyalgia is notably resistant to treatment with conventional pharmacological therapies, and often is accompanied by higher reported stress and sleep disturbances.

Previous studies have noted a benefit of regular exercise to patients with a variety of chronic pain conditions. However, patients with fibromyalgia are often resistant to intense exercise, which may worsen pain in the short term. Yoga is a relatively gentle and individually adaptable form of exercise, which may modulate stress and improve sleep. Also, wide variations in patient characteristics can make randomized controlled studies difficult to perform in this population. In this longitudinal study, we recruited women with fibromyalgia (Wolfe 2011 criteria) and at least a moderate degree of sleep disturbance (Pittsburgh Sleep Quality Index >5). Subjects attended weekly yoga sessions and practiced 30 min of daily yoga with videos sent electronically, and simultaneously recorded twice-daily diaries during a baseline week, week 2 and week 6 of yoga, including measures of pain, stress, and sleep quality. Paired sample t-test revealed significant decrease on average and worst pain ratings during the 2<sup>nd</sup> and 6<sup>th</sup> week of daily gentle yoga, compared to baseline as well as a decrease in reported fatigue at 6 weeks after starting the program ( $p < 0.5$ ). Although there were no adverse events or side effects reported by participants, there was some heterogeneity of treatment response.

Those practicing more frequently reported greater improvements in pain scores at 2 weeks. Fatigue, stress, and pain ratings were highly inter-correlated amongst participants. Future studies might be able to determine the interdependence of these symptoms on the impact of yoga-based exercise in fibromyalgia patients.

## Cold and FM

Int J Rheum Dis. 2017 Apr 17.

**The effects of local cold application on fibromyalgia pain.**

Yilmaz N<sup>1</sup>, Kiyak E<sup>2</sup>.

Abstract

**AIM:**

This study was conducted to evaluate the effects of local cold application on pain when applied to the trapezius muscles of patients with fibromyalgia.

**METHOD:**

A one-group, pre-test/post-test, pre-experimental model was applied in this study, which was conducted with 55 fibromyalgia patients who presented to a rheumatology outpatient clinic. A 10-min cold application was administered to one trapezius muscle of each patient. The participants' pain was evaluated, in total, four times (before the cold application and 10 min, 1.5 h and 24 h after the cold application). The visual analogue scale (VAS) for pain was used to collect data for the study, and Friedman and Wilcoxon tests were used to assess the data.

**RESULTS:**

The patients' pain mean score before (6.45, SD:1.27) the cold applications was found to be significantly higher than the scores noted 10 min (2.75, SD:1.73), 1.5 h (2.45, SD:1.29), and 24 h (3.36, SD:1.30) after the application ( $P < 0.001$ ).

**CONCLUSION:**

The study found that local cold applications performed on the trapezius muscles of patients with fibromyalgia significantly decreased their pain. With its discovery of a new method of pain control in fibromyalgia patients, this study will significantly contribute to science and will serve as a guide for pain management, especially in nursing practice. Further studies to evaluate the maximum effect duration and effect mechanisms of local cold applications to the trapezius muscles of FM patients are indicated.

**KEYWORDS:** *cold application; fibromyalgia; pain; trapezius muscle*

**62 A. NUTRITION/VITAMINS****Calcium and BMD****Calcium intake, bone mineral density, and fragility fractures: evidence from an Italian outpatient population.**

Vannucci L1, Masi L2, Gronchi G3, Fossi C1, Carossino AM1, Brandi ML4.

**Abstract**

This study was performed in 1000 adult Italian subjects to focus on the effects of dietary calcium intake on bone health. A higher fracture risk appears to be associated with a reduced calcium intake. An adequate daily calcium intake is recommended to counteract osteoporotic fractures.

**PURPOSE:**

The principal aim of the present study was to focus on the effects of dietary calcium intake on bone mineral density (BMD) and fragility fractures in a representative sample of an adult Italian outpatient population.

**METHODS:**

The study group consisted of 1000 consecutive adult Italian subjects [838 women (F) and 162 men (M)] referred to the Bone Metabolic Diseases Unit for the evaluation of their bone metabolism. Daily dietary calcium intake was assessed using a specific food frequency questionnaire (FFQ). Other evaluations included fracture risk, lumbar and femoral BMD, heel ultrasound, fragility fractures, plasma concentration of parathyroid hormone ([PTH]) and 25-hydroxy-vitamin D ([25(OH)D]), and urinary calcium.

**RESULTS:**

Only 10.4% of the subjects (n = 104; 71 F and 33 M) had a daily calcium intake adequate for adults ( $\geq 1000$  mg/day). No correlation was found between calcium intake and BMD. The transition from a daily dietary calcium intake  $< 400$  mg/day to a daily dietary calcium intake  $\geq 400$  mg/day was associated with a reduced fracture probability ratio at any site [from 42 to 21% ( $p < 0.05$ )]. Subjects with one or more vertebral fractures had a significantly lower dietary calcium intake ( $< 400$  mg/day) than did subjects without vertebral fractures, and they practiced physical activity only occasionally ( $p = 0.030$ ).

**CONCLUSIONS:**

Daily dietary calcium intake is lower than the recommended daily intake in an Italian ambulatory population, and a higher fracture risk appears to be associated with a reduced calcium intake. An age-adequate daily calcium intake, combined with regular physical activity, is strongly recommended in order to counteract fragility fractures.

**KEYWORDS:**

Bone mineral density; Calcium intake; Fragility fractures; Physical activity

**High protein and BMD****Dietary protein and bone health: a systematic review and meta-analysis from the National Osteoporosis Foundation.**

Shams-White MM1,2, Chung M1, Du M1,2, Fu Z1, Insogna KL3, Karlsen MC2, LeBoff MS4,5, Shapses SA6, Sackey J1,2, Wallace TC7,8, Weaver CM9.

**Abstract**

**Background:** Considerable attention has recently focused on dietary protein's role in the mature skeleton, prompted partly by an interest in nonpharmacologic approaches to maintain skeletal health in adult life.

**Objective:** The aim was to conduct a systematic review and meta-analysis evaluating the effects of dietary protein intake alone and with calcium with or without vitamin D (Ca±D) on bone health measures in adults.

**Design:** Searches across 5 databases were conducted through October 2016 including randomized controlled trials (RCTs) and prospective cohort studies examining 1) the effects of "high versus low" protein intake or 2) dietary protein's synergistic effect with Ca±D intake on bone health outcomes. Two investigators independently conducted abstract and full-text screenings, data extractions, and risk of bias (ROB) assessments. Strength of evidence was rated by group consensus. Random-effects meta-analyses for outcomes with  $\geq 4$  RCTs were performed.

**Results:** Sixteen RCTs and 20 prospective cohort studies were included in the systematic review. Overall ROB was medium. Moderate evidence suggested that higher protein intake may have a protective effect on lumbar spine (LS) bone mineral density (BMD) compared with lower protein intake (net percentage change: 0.87%; 95% CI: 0.18%, 1.56%; *I*<sup>2</sup>: 0%; *n* = 4) but no effect on total hip (TH), femoral neck (FN), or total body BMD or bone biomarkers. Limited evidence did not support an effect of protein with Ca±D on LS BMD, TH BMD, or forearm fractures; there was insufficient evidence for FN BMD and overall fractures.

**Conclusions:** Current evidence shows no adverse effects of higher protein intakes. Although there were positive trends on BMD at most bone sites, only the LS showed moderate evidence to support benefits of higher protein intake. Studies were heterogeneous, and confounding could not be excluded. High-quality, long-term studies are needed to clarify dietary protein's role in bone health.

**Vit D in hyperparathyroidism****Skeletal effects of vitamin D deficiency among patients with primary hyperparathyroidism.**

Lee JH1, Kim JH1, Hong AR1, Kim SW1, Shin CS2.

**Abstract**

Little is known about the association between vitamin D deficiency and the skeletal phenotypes in primary hyperparathyroidism (PHPT) patients. A low 25-hydroxyvitamin D level was associated with a low bone mineral density and deteriorated hip geometry in women with PHPT in an Asian population where vitamin D deficiency is prevalent.

**INTRODUCTION**

Few studies have examined the effect of vitamin D deficiency on the bone health of primary hyperparathyroidism (PHPT) patients.

**METHODS**

We investigated the skeletal effects of vitamin D deficiency in 79 PHPT patients by assessing bone mineral density (BMD), the trabecular bone score (TBS), and hip geometry, which were measured using dual-energy X-ray absorptiometry (27 men with median age 60 years [53;69]; 52 postmenopausal women with median age of 57 years [53;67]). Cross-sectional data were collected from subjects enrolled in an ongoing PHPT cohort study at Seoul National University Hospital from March 2008 to December 2015.

**RESULTS**

We classified PHPT patients according to 25-hydroxyvitamin D (25(OH)D) levels (<20 vs.  $\geq 20$  ng/ml). After adjusting for age and body mass index, women with vitamin D deficiency had lower BMDs at the lumbar spine (LS) and femur neck (FN) than women who had sufficient levels of vitamin D (LS,  $0.903 \pm 0.138$  vs.  $0.998 \pm 0.184$  g/cm<sup>2</sup>; FN,  $0.715 \pm 0.084$  vs.  $0.791 \pm 0.113$  g/cm<sup>2</sup>;  $P < 0.05$ ). However, the total hip BMD and the TBS were not significantly different between the two groups. In the hip geometry analysis, the cross-sectional area, cross-sectional moment of inertia, and section modulus were also significantly lower in women with vitamin D deficiency than in those without. No significant difference was found in the BMD, TBS, or hip geometry according to 25(OH)D levels in men.

**CONCLUSION**

Vitamin D deficiency may be associated with a low BMD and deteriorated hip geometry in postmenopausal women with PHPT.

**Vit D and CA****Effect of Vitamin D and Calcium Supplementation on Cancer Incidence in Older Women: A Randomized Clinical Trial.**

Lappe J1, Watson P1, Travers-Gustafson D1, Recker R1, Garland C2, Gorham E2, Baggerly K3, McDonnell SL4.

**Abstract****IMPORTANCE:**

Evidence suggests that low vitamin D status may increase the risk of cancer.

**OBJECTIVE:**

To determine if dietary supplementation with vitamin D3 and calcium reduces the risk of cancer among older women.

**DESIGN, SETTING, AND PARTICIPANTS:**

A 4-year, double-blind, placebo-controlled, population-based randomized clinical trial in 31 rural counties (June 24, 2009, to August 26, 2015-the final date of follow-up). A total of 2303 healthy postmenopausal women 55 years or older were randomized, 1156 to the treatment group and 1147 to the placebo group. Duration of treatment was 4 years.

**INTERVENTIONS:**

The treatment group (vitamin D3 + calcium group) received 2000 IU/d of vitamin D3 and 1500 mg/d of calcium; the placebo group received identical placebos.

**MAIN OUTCOMES AND MEASURES:**

The primary outcome was the incidence of all-type cancer (excluding nonmelanoma skin cancers), which was evaluated using Kaplan-Meier survival analysis and proportional hazards modeling.

**RESULTS:**

Among 2303 randomized women (mean age, 65.2 years [SD, 7.0]; mean baseline serum 25-hydroxyvitamin D level, 32.8 ng/mL [SD, 10.5]), 2064 (90%) completed the study. At year 1, serum 25-hydroxyvitamin D levels were 43.9 ng/mL in the vitamin D3 + calcium group and 31.6 ng/mL in the placebo group. A new diagnosis of cancer was confirmed in 109 participants, 45 (3.89%) in the vitamin D3 + calcium group and 64 (5.58%) in the placebo group (difference, 1.69% [95% CI, -0.06% to 3.46%];  $P = .06$ ). Kaplan-Meier incidence over 4 years was 0.042 (95% CI, 0.032 to 0.056) in the vitamin D3 + calcium group and 0.060 (95% CI, 0.048 to 0.076) in the placebo group;  $P = .06$ . In unadjusted Cox proportional hazards regression, the hazard ratio was 0.70 (95% CI, 0.47 to 1.02). Adverse events potentially related to the study included renal calculi (16 participants in the vitamin D3 + calcium group and 10 in the placebo group), and elevated serum calcium levels (6 in the vitamin D3 + calcium group and 2 in the placebo group).

**CONCLUSIONS AND RELEVANCE:**

Among healthy postmenopausal older women with a mean baseline serum 25-hydroxyvitamin D level of 32.8 ng/mL, supplementation with vitamin D3 and calcium compared with placebo did not result in a significantly lower risk of all-type cancer at 4 years. Further research is necessary to assess the possible role of vitamin D in cancer prevention.

**Impact of a healthy diet and cognition****Association of Adherence to a Healthy Diet with Cognitive Decline in European and American Older Adults: A Meta-Analysis within the CHANCES Consortium.**

Berendsen AA1, Kang JH, van de Rest O, Jankovic N, Kampman E, Kiefte-de Jong JC, Franco OH, Ikram MA, Pikhart H, Nilsson LM, Brenner H, Boffetta P, Rafnsson SB, Gustafson D, Kyrozi A, Trichopoulou A, Feskens EJ, Grodstein F, de Groot LC.

**Abstract****AIM:**

To examine the association between a healthy diet, assessed by the Healthy Diet Indicator (HDI), and cognitive decline in older adults.

**METHODS:**

Data from 21,837 participants aged  $\geq 55$  years from 3 cohorts (Survey in Europe on Nutrition and the Elderly, a Concerted Action [SENECA], Rotterdam Study [RS], Nurses' Health Study [NHS]) were analyzed. HDI scores were based on intakes of saturated fatty acids, polyunsaturated fatty acids, mono- and disaccharides, protein, cholesterol, fruits and vegetables, and fiber. The Telephone Interview for Cognitive Status in NHS and Mini-Mental State Examination in RS and SENECA were used to assess cognitive function from multiple repeated measures. Using multivariable-adjusted, mixed linear regression, mean differences in annual rates of cognitive decline by HDI quintiles were estimated.

**RESULTS:**

Multivariable-adjusted differences in rates in the highest versus the lowest HDI quintile were 0.01 (95% CI -0.01, 0.02) in NHS, 0.00 (95% CI -0.02, 0.01) in RS, and 0.00 (95% CI -0.05, 0.05) in SENECA with a pooled estimate of 0.00 (95% CI -0.01, 0.01),  $I^2 = 0\%$ .

**CONCLUSIONS:**

A higher HDI score was not related to reduced rates of cognitive decline in European and American older adults.

### Depression and diet

#### **Dietary patterns and depression risk: A meta-analysis**

Ye Li, Mei-Rong Lv, Yan-Jin Wei, Ling Sun, Ji-Xiang Zhang, Huai-Guo Zhang, Bin Li

#### **ABSTRACT**

Although some studies have reported potential associations of dietary patterns with depression risk, a consistent perspective hasn't been estimated to date. Therefore, we conducted this meta-analysis to evaluate the relation between dietary patterns and the risk of depression.

#### **METHODS**

A literature research was conducted searching MEDLINE and EMBASE databases up to September 2016. In total, 21 studies from ten countries met the inclusion criteria and were included in the present meta-analysis.

#### **RESULTS**

A dietary pattern characterized by a high intakes of fruit, vegetables, whole grain, fish, olive oil, low-fat dairy and antioxidants and low intakes of animal foods was apparently associated with a decreased risk of depression. A dietary pattern characterized by a high consumption of red and/or processed meat, refined grains, sweets, high-fat dairy products, butter, potatoes and high-fat gravy, and low intakes of fruits and vegetables is associated with an increased risk of depression.

#### **CONCLUSION**

The results of this meta-analysis suggest that healthy pattern may decrease the risk of depression, whereas western-style may increase the risk of depression. However, more randomized controlled trails and cohort studies are urgently required to confirm these findings.

**Zinc and diabetic foot ulcer****The effects of zinc supplementation on wound healing and metabolic status in patients with diabetic foot ulcer: A randomized, double-blind, placebo-controlled trial.**

Momen-Heravi M1,2, Barahimi E1, Razzaghi R1, Bahmani F3, Gilasi H4, Asemi Z3.

**Abstract**

This study was performed to determine the effects of zinc supplementation on wound healing and metabolic status in patients with diabetic foot ulcer.

**METHOD**

The current randomized, double-blind, placebo-controlled trial was conducted among 60 patients (aged 40-85 years old) with grade 3 diabetic foot ulcer. Participants were randomly divided into two groups (30 participants in each group) to take either 220 mg zinc sulfate supplements containing 50 mg elemental zinc or placebo daily for 12 weeks.

**RESULTS**

After the 12-week intervention, compared with the placebo, zinc supplementation was associated with significant reductions in ulcer length ( $-1.5 \pm 0.7$  vs.  $-0.9 \pm 1.2$  cm,  $P=0.02$ ) and width ( $-1.4 \pm 0.8$  vs.  $-0.8 \pm 1.0$  cm,  $P=0.02$ ). In addition, changes in fasting plasma glucose ( $-40.5 \pm 71.0$  vs.  $-3.9 \pm 48.5$  mg/dL,  $P=0.02$ ), serum insulin concentration ( $-8.0 \pm 15.4$  vs.  $+1.1 \pm 10.3$   $\mu$ IU/mL,  $P=0.009$ ), homeostasis model of assessment-estimated insulin resistance ( $-3.9 \pm 7.1$  vs.  $+0.8 \pm 5.9$ ,  $P=0.007$ ), the quantitative insulin sensitivity check index ( $+0.01 \pm 0.03$  vs.  $-0.002 \pm 0.02$ ,  $P=0.04$ ) and HbA1c ( $-0.5 \pm 0.8$  vs.  $-0.1 \pm 0.5\%$ ,  $P=0.01$ ) in the supplemented group were significantly different from the changes in these indicators in the placebo group. Additionally, significant increases in serum HDL-cholesterol ( $+4.1 \pm 4.3$  vs.  $+1.1 \pm 5.1$  mg/dL,  $P=0.01$ ), plasma total antioxidant capacity ( $+91.7 \pm 213.9$  vs.  $-111.9 \pm 188.7$  mmol/L,  $P<0.01$ ) and total glutathione ( $+68.1 \pm 140.8$  vs.  $-35.0 \pm 136.1$   $\mu$ mol/L,  $P=0.006$ ), and significant decreases in high sensitivity C-reactive protein ( $-20.4 \pm 24.6$  vs.  $-6.8 \pm 21.3$   $\mu$ g/mL,  $P=0.02$ ) and plasma malondialdehyde concentrations ( $-0.6 \pm 0.9$  vs.  $-0.2 \pm 0.7$   $\mu$ mol/L,  $P=0.03$ ) were seen following supplementation with zinc compared with the placebo.

**CONCLUSION**

Zinc supplementation for 12 weeks among diabetic foot ulcer patients had beneficial effects on parameters of ulcer size and metabolic profiles.

## Prostrate CA and diet

Int J Cancer. 2017 Apr 17.

**Fruit and vegetable intake and prostate cancer risk in the European Prospective Investigation into Cancer and Nutrition (EPIC).**

Perez-Cornago A<sup>1</sup>, Travis RC<sup>1</sup>, Appleby PN<sup>1</sup>, Tsilidis KK<sup>2,3</sup>, Tjønneland A<sup>4</sup>, Olsen A<sup>4</sup>, Overvad K<sup>5</sup>, Katzke V<sup>6</sup>, Kühn T<sup>6</sup>, Trichopoulou A<sup>7,8</sup>, Peppas E<sup>7</sup>, Kritikou M<sup>7</sup>, Sieri S<sup>9</sup>, Palli D<sup>10</sup>, Sacerdote C<sup>11</sup>, Tumino R<sup>12</sup>, Bueno-de-Mesquita HB<sup>3,13,14</sup>, Agudo A<sup>15</sup>, Larrañaga N<sup>16,17</sup>, Molina-Portillo E<sup>17,18</sup>, Ardanaz E<sup>17,19,20</sup>, Chirlaque MD<sup>17,21,22</sup>, Lasheras C<sup>23</sup>, Stattin P<sup>24,25</sup>, Wennberg M<sup>26</sup>, Drake I<sup>27</sup>, Malm J<sup>28</sup>, Schmidt JA<sup>1</sup>, Khaw KT<sup>29</sup>, Gunter M, Freisling H, Huybrechts I, Aune D<sup>3</sup>, Cross AJ<sup>3</sup>, Riboli E<sup>3</sup>, Key TJ<sup>1</sup>.

**Abstract**

Several dietary factors have been studied in relation to prostate cancer; however, most studies have not reported on subtypes of fruit and vegetables or tumor characteristics, and results obtained so far are inconclusive. This study aimed to examine the prospective association of total and subtypes of fruit and vegetable intake with the incidence of prostate cancer overall, by grade and stage of disease, and prostate cancer death. Lifestyle information for 142,239 men participating in the European Prospective Investigation into Cancer and Nutrition from 8 European countries was collected at baseline. Multivariable Cox regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). After an average follow-up time of 13.9 years, 7,036 prostate cancer cases were identified. Compared with the lowest fifth, those in the highest fifth of total fruit intake had a significantly reduced prostate cancer risk (HR=0.91; 95% CI=0.83-0.99; P-trend=0.01). No associations between fruit subtypes and prostate cancer risk were observed, except for citrus fruits, where a significant trend was found (HR=0.94; 95% CI=0.86-1.02; P-trend=0.01). No associations between total and subtypes of vegetables and prostate cancer risk were observed. We found no evidence of heterogeneity in these associations by tumor grade and stage, with the exception of significant heterogeneity by tumor grade ( $P_{\text{heterogeneity}} < 0.001$ ) for leafy vegetables.

No significant associations with prostate cancer death were observed. The main finding of this prospective study was that a higher fruit intake was associated with a small reduction in prostate cancer risk. Whether this association is causal remains unclear. This article is protected by copyright. All rights reserved.

## Vitamin use

(OB/GYN)

Am J Obstet Gynecol. 2017 Apr 1.

**Multivitamin use and adverse birth outcomes in high-income countries: a systematic review and meta-analysis.**

Wolf HT1, Hegaard HK2, Huusom LD3, Pinborg AB3.

**Abstract**

**BACKGROUND:**

In high-income countries (HIC), a healthy diet is widely accessible. However, a change towards a poor quality diet with a low nutritional value in HIC has led to an inadequate vitamin intake during pregnancy.

**OBJECTIVE:**

We conducted a systematic review and meta-analysis to evaluate the association between multivitamin use among women in HIC and the risk of adverse birth outcomes (preterm birth (PTB) (primary outcome), low birth weight, small-for-gestational age (SGA), stillbirth, neonatal death, perinatal mortality and congenital anomalies without further specification).

**STUDY DESIGN:**

We searched electronic databases (MEDLINE, Embase, Cochrane, Scopus and CINAHL) from inception to 17 June 2016 using synonyms of "pregnancy", "study/trial type" and "multivitamins". Eligible studies were all studies in HIC investigating the association between multivitamin use (three or more vitamins or minerals in tablets or capsules) and adverse birth outcomes. We evaluated randomized, controlled trials using the Cochrane Collaboration tool. Observational studies were evaluated using the Newcastle-Ottawa Scale. Meta-analyses were applied on raw data for outcomes with data for at least two studies and were conducted using RevMan (version 5.3). Outcomes were pooled using the random-effect model. The quality of evidence was assessed using the GRADE approach.

**RESULTS:**

We identified 35 eligible studies including 98,926 women. None of the studies compared the use of folic acid and iron versus use of multivitamins. Use of multivitamin did not change the risk of the primary outcome PTB RR 0.84 (95% CI 0.69-1.03). However, the risk of SGA RR 0.77 (95% CI 0.63-0.93), neural tube defects (NTD) RR 0.67 (95% CI 0.52-0.87), cardiovascular defects RR 0.83 (95% CI 0.70-0.98), urine tract defects RR 0.60 (95% CI 0.46-0.78), and limb deficiencies RR 0.68 (95% CI 0.52-0.89) was decreased. Of the 35 identified studies, only four were RCTs. The degree of clinical evidence according to the GRADE system was low or very low for all outcomes except for recurrence of NTD where a moderate degree of clinical evidence was found.

**CONCLUSION:**

Routine multivitamin use in HIC can be recommended, but with caution due to the low quality of evidence. RCTs or well-performed, large prospective cohort studies are needed.

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**KEYWORDS:**

Multivitamin; adverse birth outcome; congenital birth defects; meta-analysis; pregnancy; systematic review

## Vit D and CA

JAMA. 2017 Mar 28;317(12):1234-1243.

**Effect of Vitamin D and Calcium Supplementation on Cancer Incidence in Older Women: A Randomized Clinical Trial.**

Lappe J1, Watson P1, Travers-Gustafson D1, Recker R1, Garland C2, Gorham E2, Baggerly K3, McDonnell SL4.

**Abstract****IMPORTANCE:**

Evidence suggests that low vitamin D status may increase the risk of cancer.

**OBJECTIVE:**

To determine if dietary supplementation with vitamin D3 and calcium reduces the risk of cancer among older women.

**DESIGN, SETTING, AND PARTICIPANTS:**

A 4-year, double-blind, placebo-controlled, population-based randomized clinical trial in 31 rural counties (June 24, 2009, to August 26, 2015—the final date of follow-up). A total of 2303 healthy postmenopausal women 55 years or older were randomized, 1156 to the treatment group and 1147 to the placebo group. Duration of treatment was 4 years.

**INTERVENTIONS:**

The treatment group (vitamin D3 + calcium group) received 2000 IU/d of vitamin D3 and 1500 mg/d of calcium; the placebo group received identical placebos.

**MAIN OUTCOMES AND MEASURES:**

The primary outcome was the incidence of all-type cancer (excluding nonmelanoma skin cancers), which was evaluated using Kaplan-Meier survival analysis and proportional hazards modeling.

**RESULTS:**

Among 2303 randomized women (mean age, 65.2 years [SD, 7.0]; mean baseline serum 25-hydroxyvitamin D level, 32.8 ng/mL [SD, 10.5]), 2064 (90%) completed the study. At year 1, serum 25-hydroxyvitamin D levels were 43.9 ng/mL in the vitamin D3 + calcium group and 31.6 ng/mL in the placebo group. A new diagnosis of cancer was confirmed in 109 participants, 45 (3.89%) in the vitamin D3 + calcium group and 64 (5.58%) in the placebo group (difference, 1.69% [95% CI, -0.06% to 3.46%];  $P = .06$ ). Kaplan-Meier incidence over 4 years was 0.042 (95% CI, 0.032 to 0.056) in the vitamin D3 + calcium group and 0.060 (95% CI, 0.048 to 0.076) in the placebo group;  $P = .06$ . In unadjusted Cox proportional hazards regression, the hazard ratio was 0.70 (95% CI, 0.47 to 1.02). Adverse events potentially related to the study included renal calculi (16 participants in the vitamin D3 + calcium group and 10 in the placebo group), and elevated serum calcium levels (6 in the vitamin D3 + calcium group and 2 in the placebo group).

**CONCLUSIONS AND RELEVANCE:**

Among healthy postmenopausal older women with a mean baseline serum 25-hydroxyvitamin D level of 32.8 ng/mL, supplementation with vitamin D3 and calcium compared with placebo did not result in a significantly lower risk of all-type cancer at 4 years. Further research is necessary to assess the possible role of vitamin D in cancer prevention.

**62 B. CRYOTHERAPY****Cold helps fibromyalgia**

Int J Rheum Dis. 2017 Apr 17.

**The effects of local cold application on fibromyalgia pain.**

Yilmaz N<sup>1</sup>, Kiyak E<sup>2</sup>.

Abstract

**AIM:**

This study was conducted to evaluate the effects of local cold application on pain when applied to the trapezius muscles of patients with fibromyalgia.

**METHOD:**

A one-group, pre-test/post-test, pre-experimental model was applied in this study, which was conducted with 55 fibromyalgia patients who presented to a rheumatology outpatient clinic. A 10-min cold application was administered to one trapezius muscle of each patient. The participants' pain was evaluated, in total, four times (before the cold application and 10 min, 1.5 h and 24 h after the cold application). The visual analogue scale (VAS) for pain was used to collect data for the study, and Friedman and Wilcoxon tests were used to assess the data.

**RESULTS:**

The patients' pain mean score before (6.45, SD:1.27) the cold applications was found to be significantly higher than the scores noted 10 min (2.75, SD:1.73), 1.5 h (2.45, SD:1.29), and 24 h (3.36, SD:1.30) after the application ( $P < 0.001$ ).

**CONCLUSION:**

The study found that local cold applications performed on the trapezius muscles of patients with fibromyalgia significantly decreased their pain. With its discovery of a new method of pain control in fibromyalgia patients, this study will significantly contribute to science and will serve as a guide for pain management, especially in nursing practice. Further studies to evaluate the maximum effect duration and effect mechanisms of local cold applications to the trapezius muscles of FM patients are indicated.

**KEYWORDS:** *cold application; fibromyalgia; pain; trapezius muscle*

**63. PHARMACOLOGY****NSAID's****Nonsteroidal Anti-inflammatory Drugs for Sciatica: An Updated Cochrane Review.**

Rasmussen-Barr E1, Held U, Grooten WJ, Roelofs PD, Koes BW, van Tulder MW, Wertli MM.

**STUDY DESIGN:** Systematic review and meta-analysis.

**OBJECTIVE:** To determine the efficacy of nonsteroidal anti-inflammatory drugs (NSAIDs) on pain reduction, overall improvement, and reported adverse effects in people with sciatica.

**SUMMARY OF BACKGROUND DATA:** NSAIDs are one of the most frequently prescribed drugs for sciatica.

**METHODS:** We updated a 2008 Cochrane Review through June 2015. Randomized controlled trials that compared NSAIDs with placebo, with other NSAIDs, or with other medication were included. Outcomes included pain using mean difference (MD, 95% confidence intervals [95% CI]). For global improvement and adverse effects risk ratios (RR, 95% CI) were used. We assessed level of evidence using the Grades of Recommendation, Assessment, Development and Evaluation approach.

**RESULTS:** Ten trials were included (N=1651). Nine out of 10 trials were assessed at high risk of bias. For pain reduction (visual analog scale, 0 to 100) NSAIDs were no more effective than placebo (MD -4.56, 95% CI -11.11 to 1.99, quality of evidence: very low). For global improvement NSAIDs were more effective than placebo (RR 1.14 [95% CI 1.03 to 1.27], low quality of evidence). One trial reported the effect of NSAIDs on disability with very low-quality evidence that NSAIDs are no more effective than placebo. There was low-quality evidence that the risk for adverse effects is higher for NSAID than placebo (RR 1.40, 95% CI 1.02 to 1.93).

**CONCLUSION:** Our findings show very low-quality evidence that the efficacy of NSAIDs for pain reduction is comparable with that of placebo, low-quality evidence that NSAIDs is better than placebo for global improvement and low-quality evidence for higher risk of adverse effects using NSAIDs compared with placebo. The findings must be interpreted with caution, due to small study samples, inconsistent results, and a high risk of bias in the included trials.

**Opioid use****Patterns and predictors of persistent opioid use following hip or knee arthroplasty****OBJECTIVE**

The relationship between arthroplasty and long-term opioid use in patients with knee or hip osteoarthritis is not well studied. We examined the prevalence, patterns and predictors of persistent opioid use after hip or knee arthroplasty.

**METHOD**

Using claims data (2004-2013) from a U.S. commercial health plan, we identified adults who underwent hip or knee arthroplasty and filled  $\geq 1$  opioid prescription within 30 days after the surgery. We defined persistent opioid users as patients who filled  $\geq 1$  opioid prescription every month during the 1-year postoperative period based on group-based trajectory models. Multivariable logistic regression was used to determine preoperative predictors of persistent opioid use after surgery.

**RESULTS**

We identified 57,545 patients who underwent hip or knee arthroplasty. The mean $\pm$ SD age was 61.5 $\pm$ 7.8 years and 87.1% had any opioid use preoperatively. Overall, 7.6% persistently used opioids after the surgery. Among patients who used opioids in 80% of the time for  $\geq 4$  months preoperatively (n=3,023), 72.1% became persistent users. In multivariable analysis, knee arthroplasty vs. hip, a longer hospitalization stay, discharge to a rehabilitation facility, preoperative opioid use (e.g., a longer duration and greater dosage and frequency), a higher comorbidity score, back pain, rheumatoid arthritis, fibromyalgia, migraine and smoking, and benzodiazepine use at baseline were strong predictors for persistent opioid use (C-statistic=0.917).

**CONCLUSION**

Over 7% of patients persistently used opioids in the year after hip or knee arthroplasty. Given the adverse health effects of persistent opioid use, strategies need to be developed to prevent persistent opioid use after this common surgery.

**64. ELECTROTHERAPY**

*Evidence-Based Complementary and Alternative Medicine*

Volume 2017 (2017), Article ID 9502718, 9 pages

**A Randomized Clinical Trial Comparing the Effectiveness of Electroacupuncture versus Medium-Frequency Electrotherapy for Discogenic Sciatica**

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Academic Editor: Maruti Ram Gudavalli

**Abstract****Objective.**

To investigate the short- and long-term effects of electroacupuncture (EA) compared with medium-frequency electrotherapy (MFE) on chronic discogenic sciatica.

**Methods.**

One hundred participants were randomized into two groups to receive EA () or MFE () for 4 weeks. A 28-week follow-up of the two groups was performed. The primary outcome measure was the average leg pain intensity. The secondary outcome measures were the low back pain intensity, Oswestry Disability Index (ODI), patient global impression (PGI), drug use frequency, and EA acceptance.

**Results.**

The mean changes in the average leg pain numerical rating scale (NRS) scores were 2.30 (1.86–2.57) and 1.06 (0.62–1.51) in the EA and MFE groups at week 4, respectively. The difference was significant (). The long-term follow-up resulted in significant differences. The average leg pain NRS scores decreased by 2.12 (1.70–2.53) and 0.36 (–0.05–0.78) from baseline in the EA and MFE groups, respectively, at week 28. However, low back pain intensity and PGI did not differ significantly at week 4. No serious adverse events occurred.

**Conclusions.**

EA showed greater short-term and long-term benefits for chronic discogenic sciatica than MFE, and the effect of EA was superior to that of MFE. The study findings warrant verification. This trial was registered under identifier.

**67. PSYCHOSOCIAL****The role of Rajyoga meditation for modulation of anxiety and serum cortisol in patients undergoing coronary artery bypass surgery: A prospective randomized control study.**

Kiran U1, Ladha S1, Makhija N1, Kapoor PM1, Choudhury M1, Das S1, Gharde P1, Malik V1, Airan B1.

**Abstract****INTRODUCTION:**

Rajyoga meditation is a form of mind body intervention that is promoted by the Brahma Kumaris World Spiritual University. This form of meditation can be easily performed without rituals or mantras and can be practiced anywhere at any time. The practice of Rajyoga meditation can have beneficial effects on modulating anxiety and cortisol level in patients undergoing major cardiac surgery.

**MATERIALS AND METHODS:**

A prospective randomized control study was carried out in a single tertiary care center. One hundred and fifty patients undergoing elective coronary artery bypass surgery were enrolled in the study. The patients were randomized in two groups namely, Group 1 (Rajyoga group) and Group 2 (Control Group). Anxiety was measured on a visual analog scale 1-10 before the start of Rajyoga training or patient counseling (T1), on the morning of the day of surgery (T2), on the 2nd postoperative day (T3), and on the 5th postoperative day (T4). The serum cortisol level was measured in the morning of the day of surgery (T1), on the 2nd postoperative day (T2) and on the 5th postoperative day (T3), respectively.

**RESULTS:**

In the study, it was seen that the anxiety level of the patients before the surgery (T1) and on the day of surgery (T2) were comparable between the two groups. However on the 2nd postoperative day (T3), the patients who underwent Rajyoga training had lower anxiety level in comparison to the control group ( $3.12 \pm 1.45$  vs.  $6.12 \pm 0.14$ ,  $P < 0.05$ ) and on the 5th postoperative day (T4) it was seen that Rajyoga practice had resulted in significant decline in anxiety level ( $0.69 \pm 1.1$  vs.  $5.6 \pm 1.38$ ,  $P < 0.05$ ). The serum cortisol level was also favorably modulated by the practice of Rajyoga meditation.

**CONCLUSION:**

Mindbody intervention is found to effective in reducing the anxiety of the patients and modulating the cortisol level in patients undergoing wellknown stressful surgery like coronary artery bypass surgery.

**Integration of Yoga Therapy Into Traditional Residential Treatment for at Risk Adolescent Females: A Community-Based Approach**

Rachael L. Polis, DO, Liza M. Creel, MPH, PhD, Meredith B. Loveless, MD, Margaret M. Abraham, MD, S. Paige Hertweck, MD

**OBJECTIVE**

Yoga has been associated with improved mental health outcomes. To our knowledge there are no previous studies demonstrating if the same benefits will be found in a traditional medical treatment center for marginalized adolescent female population. A prospective pilot study was conducted at a residential treatment facility serving girls between the ages of 11 to 18 who have emotional disabilities and have been traumatized by abuse or neglect. The center offers a team-based treatment approach. We hypothesized the addition of a yoga program into the treatment program could decrease anxiety.

**METHODS**

Adolescent females living at the facility were recruited to voluntarily participate in a six-week yoga intervention. Informed consents and assents were obtained. Participants provided demographic and background information. Participants were randomly assigned to either a control or intervention group. Individuals in the intervention group participated in evening yoga twice weekly. A yoga instructor from a nonprofit yoga organization led each yoga session. Baseline assessments of anxiety were obtained from participants in both study groups using the State-Trait Anxiety Inventory (STAI). As each session the intervention group completed pre and post STAI. Both the intervention and control groups completed post assessments of anxiety. Pre and post intervention group means and the observed change in anxiety scores were calculated. Group means were compared using a two sample t-test to test for statistically significant differences.

**RESULTS**

A total of 27 individuals were recruited into the study, 15 in the yoga group and 12 in the control group. Only 12 individuals assigned to the yoga group participated in at least one yoga session. The study groups were similar in terms of age, race and ethnicity, self-reported depression, tobacco and alcohol use, and documented sexual and physical abuse. They differed on self-reported anxiety and history of drug use.

There was a reduction in anxiety scores at each yoga session, with a mean per-session reduction of 14.9 points (range: 2.9 point – 26 point reduction). Results of statistical analyses comparing mean anxiety scores are available in Table 1. The mean anxiety scores differed significantly between the groups at baseline and post-intervention. The mean change in anxiety scores over the study period was not statistically significant when comparing the groups, although it is nearing significance.

**CONCLUSION**

Although the reduction in anxiety scores observed in this pilot study was not statistically significant, these findings suggest that yoga may offer benefit in terms of anxiety reduction for adolescent females with complex health needs. Future studies should aim to recruit a larger sample size to improve statistical power.