

## ABSTRACTS

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## LUMBAR SPINE

## Spondylolisthesis and MRI

Spine J. 2015 Feb 12. pii: S1529-9430(15)00114-X. doi: 10.1016/j.spinee.2015.02.016.

**Changes in lumbar spondylolisthesis on axial loaded MRI: Do they reproduce the positional changes in the degree of olisthesis observed on X-ray in the standing position?**

Kanno H<sup>1</sup>, Ozawa H<sup>2</sup>, Koizumi Y<sup>3</sup>, Morozumi N<sup>3</sup>, Aizawa T<sup>2</sup>, Ishii Y<sup>3</sup>, Itoi E<sup>2</sup>.

**BACKGROUND CONTEXT:** Axial loaded MRI, can partially simulate the lumbar spine in patients in a standing position, potentially provides additional imaging findings that cannot be obtained with conventional MRI in the clinical assessment of patients with degenerative lumbar disease. Previous studies have shown that axial loaded MRI demonstrates a significant reduction in the size of the dural sac compared with conventional MRI. However, there has been no study to compare the degree of olisthesis among conventional MRI, axial loaded MRI and upright X-ray in patients with degenerative spondylolisthesis (DS).

**PURPOSE:** To determine whether axial loaded MRI can demonstrate similar positional changes in lumbar olisthesis as those detected on upright lateral X-ray in patients with DS.

**STUDY DESIGN:** Imaging cohort study.

**PATIENT SAMPLE:** A total of 43 consecutive patients with DS exhibiting olisthesis of 3 mm or more on X-ray in the standing position were prospectively evaluated in this study.

**OUTCOME MEASUREMENTS:** The degree of olisthesis, intraclass correlation coefficient (ICC) and percentage of patients exhibiting olisthesis of 3 mm or more on MRI.

**METHODS:** The degree of olisthesis was measured on conventional MRI, axial loaded MRI and lateral X-ray performed in the upright position. The degree of olisthesis was compared among the three imaging techniques. The ICC values for the measurements of olisthesis between X-ray and conventional and axial loaded MRI were calculated and compared. The percentage of patients exhibiting olisthesis of 3 mm or more was compared between conventional MRI and axial loaded MRI. The authors declare no conflict of interest associated with this study.

**RESULTS:** The degree of olisthesis on axial loaded MRI ( $5.9 \pm 2.5$  mm) was significantly greater than that observed on conventional MRI ( $4.4 \pm 2.4$  mm) ( $p < 0.05$ ) although the degrees on conventional and axial loaded MRI were significantly smaller than that on upright x-ray ( $7.1 \pm 2.8$  mm) ( $p < 0.05$ ). The ICC between axial loaded MRI and X-ray (0.75, 95%CI: 0.58-0.85) was considerably greater than that observed between conventional MRI and X-ray (0.40, 95%CI: 0.11-0.62). The percentage of patients exhibiting olisthesis of 3 mm or more was significantly higher on axial loaded MRI (91%) than on conventional MRI (63%) ( $p < 0.01$ ).

**CONCLUSIONS:** Axial loaded MRI demonstrates a significantly larger degree of olisthesis than conventional MRI. In addition, the degree of olisthesis on axial loaded MRI was found to be more strongly correlated with that observed on X-ray in the upright position. Furthermore, the use of axial loaded MRI significantly reduced the misdiagnosis of olisthesis of 3 mm or more that was detected on X-ray. These results suggest that axial loaded MRI may be superior to identify the olisthesis of the lumbar spine and show the degrees of olisthesis correlated to those detected on upright X-ray. Further studies should be needed to clarify the actual value of these findings on axial loaded MRI and provide the evidence to support its clinical significance in the assessment of patients with DS.

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**KEYWORDS:** axial loading; degenerative spondylolisthesis; lumbar spine; magnetic resonance imaging; spinal canal stenosis

PMID: 25684062

## LBP

## LBP and sleep disturbance

Scand J Public Health. 2015 Feb 27. pii: 1403494814567755.

**Sleep disturbances predict future sickness absence among individuals with lower back or neck-shoulder pain: A 5-year prospective study.**

Aili K<sup>1</sup>, Nyman T<sup>2</sup>, Hillert L<sup>3</sup>, Svartengren M<sup>4</sup>.

[Author information](#)

**Abstract**

**Background:** Musculoskeletal pain is one of the most common causes of sickness absence. Sleep disturbances are often co-occurring with pain, but the relationship between sleep and pain is complex. Little is known about the importance of self-reported sleep, when predicting sickness absence among persons with musculoskeletal pain. This study aims to study the association between self-reported sleep quality and sickness absence 5 years later, among individuals stratified by presence of lower back pain (LBP) and neck and shoulder pain (NSP).

**Methods:** The cohort (n = 2286) in this 5-year prospective study (using data from the MUSIC-Norråtalje study) was stratified by self-reported pain into three groups: no LBP or NSP, solely LBP or NSP, and oncurrent LBP and NSP. Odds ratios (ORs) for the effect of self-reported sleep disturbances at baseline on sickness absence (> 14 consecutive days), 5 years later, were calculated.

**Results:** Within all three pain strata, individuals reporting the most sleep problems showed a significantly higher OR for all-cause sickness absence, 5 years later. The group with the most pronounced sleep problems within the concurrent LBP and NSP stratum had a significantly higher OR (OR 2.00; CI 1.09-3.67) also for long-term sickness absence (> 90days) 5 years later, compared to the group with the best sleep.

**Conclusions:** Sleep disturbances predict sickness absence among individuals regardless of co-existing features of LBP and/or NSP. The clinical evaluation of patients should take possible sleep disturbances into account in the planning of treatments.

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**KEYWORDS:** musculoskeletal pain; occupational health; pain; predictors; public health; risk factors; sleep; sleep quality; spinal pain; work ability

PMID: 25724467

**Psychological predictors of recovery from LBP****Psychological predictors of recovery from low back pain: a prospective study**

BMC Musculoskeletal Disorders, 03/13/2015 George SZ, et al.

The purposes of this study were to:

- 1) describe LBP recovery rates at 6 months following 4 weeks of physical therapy
- 2) identify psychological factors predictive of 6 month recovery status; and
- 3) identify psychological factors that co-occur with 6 month recovery status. The findings indicated that psychological risk status, depressive symptoms, and pain intensity were predictive of 6 month recovery status.

**Methods**

This study was a secondary analysis of a prospective cohort of patients (n=111) receiving outpatient physical therapy for LBP.

Patients were administered the STarT Back Screening Tool (SBT), individual psychological measures, a numerical pain rating scale (NPRS) and Roland Morris Disability Questionnaire (RMDQ) at intake, 4-week, and 6-month assessments.

LBP recovery was operationally defined based on meeting NPRS=0/10 and RMDQ $\geq$ 2 criterion at 6-month follow-up assessment.

Recovery groups were then compared for differences on all variables at intake and on individual psychological measures at 6-months.

Discriminant function analysis (DFA) identified which descriptive variables were predictive of recovery status.

**Results**

The 6-month recovery rate was 14/111 (12.6%) for the combined NPRS and RMDQ criterion. Non-recovered patients were associated with SBT risk status (p=0.004), higher intake pain intensity (p=.008) and higher depressive symptoms (p<.001) scores compared to recovered patients.

The overall accuracy for intake classification using DFA was 87.2% with SBT risk status, pain intensity, and depressive symptoms all making unique contributions.

At 6-months, non-recovered patients had higher fear-avoidance, kinesiophobia, and depressive symptoms (p's<.001) compared to recovered patients.

The overall accuracy for 6-month classification using DFA was 86.4% with fear-avoidance, kinesiophobia, and depressive symptoms all making unique contributions.

**Biopsychosocial rehab in LBP**

BMJ. 2015 Feb 18;350:h444. doi: 10.1136/bmj.h444.

**Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis.**

Kamper SJ<sup>1</sup>, Apeldoorn AT<sup>2</sup>, Chiarotto A<sup>2</sup>, Smeets RJ<sup>3</sup>, Ostelo RW<sup>4</sup>, Guzman J<sup>5</sup>, van Tulder MW<sup>6</sup>.

Author information

## Abstract

**OBJECTIVE:** To assess the long term effects of multidisciplinary biopsychosocial rehabilitation for patients with chronic low back pain.

**DESIGN:** Systematic review and random effects meta-analysis of randomised controlled trials.

**DATA SOURCES:** Electronic searches of Cochrane Back Review Group Trials Register, CENTRAL, Medline, Embase, PsycINFO, and CINAHL databases up to February 2014, supplemented by hand searching of reference lists and forward citation tracking of included trials.

**STUDY SELECTION CRITERIA:** Trials published in full; participants with low back pain for more than three months; multidisciplinary rehabilitation involved a physical component and one or both of a psychological component or a social or work targeted component; multidisciplinary rehabilitation was delivered by healthcare professionals from at least two different professional backgrounds; multidisciplinary rehabilitation was compared with a non- multidisciplinary intervention.

**RESULTS:** Forty one trials included a total of 6858 participants with a mean duration of pain of more than one year who often had failed previous treatment. Sixteen trials provided moderate quality evidence that multidisciplinary rehabilitation decreased pain (standardised mean difference 0.21, 95% confidence interval 0.04 to 0.37; equivalent to 0.5 points in a 10 point pain scale) and disability (0.23, 0.06 to 0.40; equivalent to 1.5 points in a 24 point Roland-Morris index) compared with usual care. Nineteen trials provided low quality evidence that multidisciplinary rehabilitation decreased pain (standardised mean difference 0.51, -0.01 to 1.04) and disability (0.68, 0.16 to 1.19) compared with physical treatments, but significant statistical heterogeneity across trials was present. Eight trials provided moderate quality evidence that multidisciplinary rehabilitation improves the odds of being at work one year after intervention (odds ratio 1.87, 95% confidence interval 1.39 to 2.53) compared with physical treatments. Seven trials provided moderate quality evidence that multidisciplinary rehabilitation does not improve the odds of being at work (odds ratio 1.04, 0.73 to 1.47) compared with usual care. Two trials that compared multidisciplinary rehabilitation with surgery found little difference in outcomes and an increased risk of adverse events with surgery.

**CONCLUSIONS:** Multidisciplinary biopsychosocial rehabilitation interventions were more effective than usual care (moderate quality evidence) and physical treatments (low quality evidence) in decreasing pain and disability in people with chronic low back pain. For work outcomes, multidisciplinary rehabilitation seems to be more effective than physical treatment but not more effective than usual care.

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PMID: 25694111

**Depression and genetics**

*Pain*. 2015 Mar;156(3):496-503. doi: 10.1097/01.j.pain.0000460330.56256.25.

**Genetics and the environment affect the relationship between depression and low back pain: a co-twin control study of Spanish twins.**

Pinheiro MB<sup>1</sup>, Ferreira ML, Refshauge K, Colodro-Conde L, Carrillo E, Hopper JL, Ordoñana JR, Ferreira PH.

Author information

**Abstract**

Although the co-occurrence of low back pain (LBP) and depression is common, the nature of this association remains unclear. We aimed to investigate whether symptoms of depression are associated with LBP after adjusting for various confounders, including genetics. We used cross-sectional data from 2148 twins from the Murcia Twin Registry, Spain. All twins answered questions about lifetime prevalence of LBP (outcome variable) and symptoms of depression, collected through two instruments, deriving 3 measures: (1) self-report feelings of depression and anxiety; (2) state depression, and (3) trait depression. First, associations were investigated using logistic regression analysis of the total sample. We performed subsequent matched within-pair twin case-control analyses with all complete twin pairs discordant for LBP regardless of zygosity, and separately for dizygotic and monozygotic pairs. This sequential analysis allows for more precise estimates of the relationship between variables, as in each step, the impact of early shared environment and genetics is further considered.

Symptoms of depression and anxiety were associated with higher prevalence of LBP in the total sample analysis (odds ratio [OR], 1.64; 95% confidence interval [CI], 1.31-2.05), and this relationship was stronger in the subsequent case-control analysis (OR, 1.74; 95% CI, 1.13-2.69) and dizygotic case-control analysis (OR, 2.39; 95% CI, 1.39-4.08) but disappeared when the analysis was conducted for monozygotic twins (OR, 0.92; 95% CI, 0.42-2.05). A similar pattern was found for state and trait depression. The depression-LBP relationship disappears when high levels of control for confounding factors are applied and seems to be driven by genetic or environmental factors that influence both conditions.

PMID: 25679471

**Pain protocol****Pro-nociceptive and anti-nociceptive effects of a conditioned pain modulation protocol in participants with chronic low back pain and healthy control subjects**

Manual Therapy, 03/10/2015 Rabey M, et al.

The aim of this study is to investigate pro/anti-nociceptive effects of a CPM protocol in age/sex-matched healthy controls (HCs) and people with CLBP. In HCs and participants with CLBP this CPM protocol elicited responses consistent with varying pro/anti-nociceptive effects. The higher proportion of participants with CLBP demonstrating a facilitatory response suggests a pro-nociceptive phenotype may characterise this cohort.

**Methods**

Case-controlled trial (64 participants/group).

The CPM protocol involved: test stimulus (TS) (noxious pressure applied by algometer to lumbar region); conditioning stimulus (CS) (noxious heat applied by thermode to dorsal hand).

CPM recruitment was measured by the change in pain intensity (rated on a numeric rating scale (NRS)) of the TS in the presence and absence of the CS.

**Results**

Responses to this CPM protocol were variable for both groups with measures consistent with either inhibitory or facilitatory effects.

A significantly greater proportion of facilitatory responses were seen in the CLBP cohort compared to HCs (73% versus 31%).

In response to the CS, participants with CLBP demonstrated a mean increase in NRS scores (mean 1.3 points;  $p < 0.001$ ), while HCs did not (mean -0.2 points;  $p = 0.35$ ) and the between-group difference in change scores was significant (mean 1.4 points;  $p < 0.001$ ; effect size (Hedges'  $g$ ): 1.03)

## Elderly and LBP

**The clinical course of pain and function in older adults with a new primary care visit for back pain**

Journal of the American Geriatrics Society, 03/09/2015

Rundell SD, et al. – The study aim to report the clinical course of older adults presenting for a new primary care visit for back pain, no healthcare visit for back pain within the prior 6 months, by describing pain intensity, disability, pain interference, and resolution of back pain over 12 months. The majority of older adults in primary care practice settings presenting with a new visit for back pain have persistent symptoms, disability, and interference over 12 months of follow-up. Future research is needed to identify risk factors for persistent symptoms and effective interventions.

## Methods

Prospective inception cohort study.

Primary care settings of three integrated healthcare systems in the United States that participated in the Back pain Outcomes using Longitudinal Data (BOLD) registry.

Five thousand two hundred eleven (99.5%) of the 5,239 adults aged 65 and older who had reached their 12-month follow-up date.

Baseline demographic characteristics, EQ-5D score, duration of back pain, expectation for recovery, depression, and anxiety.

Participant-reported outcomes of back-related disability (Roland Morris Disability Questionnaire), numerical pain rating scale, pain interference, and resolution of back pain were collected at baseline and 3, 6, and 12 months.

## Results

Most improvement occurred within the first 3 months.

The number and proportion with 30% improvement in back pain increased from 1,950 (42.3%) at 3 months to 1,994 (44.8%) by 12 months, and 1,331 (28.8%) and 1,576 (35.4%) had 30% improvement in disability at 3 and 12 months. Only 23.0% reported that their back pain had resolved at 12 months.

Improvements in disability and interference with activity over 12 months differed according to age, duration of back pain, symptoms of depression and anxiety, and expectation for recovery.

**DISC  
INJECTIONS  
SURGERY****Lumbar discectomy and subsequent cervical discectomy**

QJM. 2015 Feb 5. pii: hcv035.

**Association between lumbar discectomy and subsequent cervical discectomy.**

Chiu CD<sup>1</sup>, Cho DY<sup>1</sup>, Lin CL<sup>2</sup>, Yang TY<sup>1</sup>, Kao CH<sup>3</sup>.

Author information

Abstract

**BACKGROUND:**

Lumbar discectomy (LD) is one of the most common spinal surgical procedures. However, the remote effect of the cervical spine has seldom been discussed. The comparative incidence of cervical discectomy with or without a previous LD is an essential feature in predicting this effect.

**METHODS:**

A cohort comparative study was conducted from the National Health Research Institute, Taiwan, over the period from 1996 to 2010. Patients who received LDs and patients who did not receive LDs in the same period were randomly selected to serve as samples for comparison. A total of 14 480 patients who did not undergo LD surgery and 3620 patients who received LDs were enrolled in this study. The incidence rates of discectomy-cervical in both groups were calculated from the follow-up period until the end of 2010. The baseline comorbidity history was determined for each patient. Comorbidities included fracture and osteoporosis.

**RESULTS:**

During the follow-up period, the overall incidence rate of CD was significantly higher in patients who were treated with LD than in those who were not (24.7 vs. 2.73 per 10 000 person years). The risk of CD in the LD-treated cohort was ~9-fold greater than that of the non-LD-treated cohort (HRs = 8.58, 95% CI = 5.38-13.7).

**CONCLUSION:**

Patients who have undergone LDs are at a greater risk of subsequent CDs, an increased risk that is evident in all patients regardless of demographics or the presence of fracture or osteoporosis.

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PMID: 25660599

**Disc surgery in young and old**

Spine J. 2015 Feb 17. pii: S1529-9430(15)00136-9. doi: 10.1016/j.spinee.2015.02.024.

**An observational study on the outcome after surgery for lumbar disc herniation in adolescents compared to adults based on the Swedish Spine Register.**

Lagerbäck T<sup>1</sup>, Elkan P<sup>2</sup>, Möller H<sup>3</sup>, Grauers A<sup>4</sup>, Diarbakerli E<sup>3</sup>, Gerdhem P<sup>5</sup>.  
Author information

**Abstract****BACKGROUND CONTEXT:**

Disc-related sciatica has a prevalence of about 2% in adults, but is rare in adolescents. If conservative treatment is unsuccessful, surgery is an option.

**PURPOSE:**

The aim of this study was to compare the outcomes of surgery for lumbar disc herniation in adolescents with adults in the SweSpine Register.

**STUDY DESIGN/SETTING:**

Prospective observational study. National Quality Register.

**PATIENT SAMPLE:**

This study included 151 patients, aged 18 years or younger, 4,386 patients aged 19-39 years and 6,078 patients aged 40 years or older, followed for 1-2 years after surgery.

**OUTCOME MEASURES:**

The primary outcomes were patient satisfaction and global assessment of back and leg pain. Secondary outcomes were visual analog scale (VAS) back pain, VAS leg pain, Oswestry Disability Index (ODI), and EuroQol 5-Dimensions (EQ-5D).

**METHODS:**

Financial support has been received from the Swedish Society of Spine Surgeons. Statistical analyses were performed with the Welch F-test, the Chi-square test, and the Wilcoxon test.

**RESULTS:**

At follow-up, 86% of the adolescents were satisfied compared to 78% in the younger adults and 76% in the older adults group ( $p < 0.001$ ). According to the global assessment, significantly decreased leg pain was experienced by 87% of the adolescents, 78% of the younger adults and 71% of the older adults ( $p < 0.001$ ). Corresponding figures for back pain were 88%, 73% and 70%, respectively ( $p < 0.001$ ). All groups experienced significant post-operative improvement of VAS leg pain, VAS back pain, ODI and EQ-5D (all  $p < 0.001$ ).

**CONCLUSIONS:**

The adolescent age group was more satisfied with the treatment than the adult groups. There was a significant improvement in all age groups after surgery.

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**KEYWORDS:**

Adolescents; discectomy; lumbar disc hernia; outcome; surgery

PMID:25701544

**PELVIC GIRDLE  
PELVIC ORGANS****Vestibulodynia**

Clin J Pain. 2015 Apr;31(4):333-41. doi: 10.1097/AJP.000000000000128.

**A prospective 2-year examination of cognitive and behavioral correlates of provoked vestibulodynia outcomes.**

Davis SN<sup>1</sup>, Bergeron S, Bois K, Sadikaj G, Binik YM, Steben M.  
Author information

## Abstract

**BACKGROUND:** Provoked vestibulodynia (PVD) is a common genital pain disorder in women that is associated with sexual dysfunction and lowered sexual satisfaction. A potentially applicable cognitive-behavioral model of chronic pain and disability is the fear-avoidance model (FAM) of pain. The FAM posits that cognitive variables, such as pain catastrophizing, fear, and anxiety lead to avoidance of pain-provoking behaviors (eg, intercourse), resulting in continued pain and disability. Although some of the FAM variables have been shown to be associated with PVD pain and sexuality outcomes, the model as a whole has never been tested in this population. An additional protective factor, pain self-efficacy (SE), is also associated with PVD, but has not been tested within the FAM model.

**AIMS:** Using a 2-year longitudinal design, we examine (1) whether initial levels (T1) of the independent FAM variables and pain SE were associated with changes in pain, sexual function, and sexual satisfaction over the 2-year time period; (2) the prospective contribution of changes in cognitive-affective (FAM) variables to changes in pain, and sexuality outcomes; and (3) whether these were mediated by behavioral change (avoidance of intercourse).

**METHODS:** A sample of 222 women with PVD completed self-report measures of FAM variables, SE, pain, sexual function, and sexual satisfaction at time 1 and at a 2-year follow-up. Structural equation modeling with Latent Difference Scores was used to examine changes and to examine mediation between variables.

**MAIN OUTCOMES:** Questionnaires included the Pain Catastrophizing Scale, McGill Pain Questionnaire, Trait Anxiety Inventory, Pain Self-Efficacy Scale, and Global Measure of Sexual Satisfaction, Female Sexual Function Index.

**RESULTS:** Participants who reported higher SE at T1 reported greater declines in pain, greater increases in sexual satisfaction, and greater declines in sexual function over the 2 time points. The overall change model did not support the FAM using negative cognitive-affective variables. Only increases in pain SE were associated with reductions in pain intensity. The relationship between changes in SE and changes in pain was partially mediated through changes in avoidance (more intercourse attempts). The same pattern of results was found for changes in sexual satisfaction as the outcome, and a partial mediation effect was found. There were no significant predictors of changes in sexual function other than T1 SE.

**DISCUSSION:** Changes in both cognitive and behavioral variables were significantly associated with improved pain and sexual satisfaction outcomes. However, it was the positive changes in SE that better predicted changes in avoidance behavior, pain, and sexual satisfaction. Cognitive-behavior therapy is often focused on changing negative pain-related cognitions to reduce avoidance and pain, but the present results demonstrate the potential importance of bolstering positive self-beliefs as well. Indeed, before engaging in exposure therapies, SE beliefs should be assessed and potentially targeted to improve adherence to exposure strategies.

PMID:24977392

**Vulvodynia**

**Pain.** 2015 Mar;156(3):386-96. doi: 10.1097/01.j.pain.0000460320.95267.5d.

**Site-specific mesenchymal control of inflammatory pain to yeast challenge in vulvodynia-afflicted and pain-free women.**

Foster DC<sup>1</sup>, Falsetta ML, Woeller CF, Pollock SJ, Song K, Bonham A, Haidaris CG, Stodgell CJ, Messing SP, Iadarola M, Phipps RP.

[Author information](#)

**Abstract**

Fibroblast strains were derived from 2 regions of the lower genital tract of localized provoked vulvodynia (LPV) cases and pain-free controls. Sixteen strains were derived from 4 cases and 4 controls, age and race matched, after presampling mechanical pain threshold assessments. Strains were challenged with 6 separate stimuli: live yeast species (*Candida albicans*, *Candida glabrata*, *Candida tropicalis*, and *Saccharomyces cerevisiae*), yeast extract (zymosan), or inactive vehicle. Production of prostaglandin E2 (PGE2) and interleukin 6 (IL-6) were proinflammatory response measures. Highest IL-6 and PGE2 occurred with vestibular strains after *C albicans*, *C glabrata*, and zymosan challenges, resulting in the ability to significantly predict IL-6 and PGE2 production by genital tract location. After *C albicans* and *C glabrata* challenge of all 16 fibroblast strains, adjusting for dual sampling of subjects, PGE2 and IL-6 production significantly predicted the presampling pain threshold from the genital tract site of sampling. At the same location of pain assessment and fibroblast sampling, in situ immunohistochemical (IHC)(+) fibroblasts for IL-6 and Cox-2 were quantified microscopically. The correlation between IL-6 production and IL-6 IHC(+) was statistically significant; however, biological significance is unknown because of the small number of IHC(+) IL-6 fibroblasts identified.

A low fibroblast IL-6 IHC(+) count may result from most IL-6 produced by fibroblasts existing in a secreted extracellular state. Enhanced, site-specific, innate immune responsiveness to yeast pathogens by fibroblasts may be an early step in LPV pathogenesis. Fibroblast strain testing may offer an attractive and objective marker of LPV pathology in women with vulvodynia of inflammatory origin.

PMID: 25679469

## VISCERA

## Vit. D and inflammatory disease

Dig Dis Sci. 2015 Mar 11.

**Vitamin D Status Is Associated with Intestinal Inflammation as Measured by Fecal Calprotectin in Crohn's Disease in Clinical Remission.**

Raftery T<sup>1</sup>, Merrick M, Healy M, Mahmud N, O'Morain C, Smith S, McNamara D, O'Sullivan M.  
Author information

Abstract

**BACKGROUND:**

Vitamin D, as potential immune modulator, has been implicated as an environmental risk factor for Crohn's disease (CD). Vitamin D status may be associated with disease risk, severity, activity, and progression. While associations between circulating 25OHD and markers of disease activity and inflammation in CD have been reported, the results are inconsistent.

**AIM:**

To determine the association between vitamin D status and markers of disease activity and inflammation in CD.

**METHODS:**

One hundred and nineteen CD patients' active and inactive diseases were enrolled in the cross-sectional study. Subject demographics and clinical data were collected. A serum sample was collected for 25OHD and CRP analysis, and a stool sample was collected for fecal calprotectin (FC) measurement.

**RESULTS:**

The mean serum 25OHD concentration of the group was 59.8 (24.9) nmol/L. After controlling for confounding variables, serum 25OHD inversely correlated with FC ( $r = -0.207$ ,  $P = 0.030$ ), particularly among those in clinical remission ( $r = -0.242$ ,  $P = 0.022$ ). The association between FC and 25OHD was further confirmed by linear regression ( $r = 31.3\%$ ,  $P < 0.001$ ). FC was lower in patients with 25OHD levels  $\geq 75$  nmol/L compared with levels  $< 25$  nmol/L [FC: 32.2 (16.3-98.2) vs 100.0 (34.4-213.5)  $\mu\text{g/g}$ ,  $P = 0.004$ ]. In the current study, however, 25OHD was not significantly associated with either CRP or CDAI.

**CONCLUSION:**

Circulating 25OHD was significantly inversely associated with intestinal inflammation as determined by FC in CD. Subgroup analysis confirmed the association among those in clinical remission, but not in those with active disease. 25OHD was not associated with disease activity score (CDAI) or systemic inflammation (CRP). Vitamin D intervention studies are warranted to determine whether raising serum 25OHD levels in patients with CD may reduce intestinal inflammation as measured by FC.

PMID: 25757449

THORACIC SPINE  
CERVICAL SPINE  
UPPER C SPINE  
WHIPLASH  
CRANIUM/TMJ  
HEADACHES

Migraine menopausal

Cephalalgia. 2015 Mar 9. pii: 0333102415575723.

**Menstrual versus non-menstrual attacks of migraine without aura in women with and without menstrual migraine.**

Vetvik KG<sup>1</sup>, Benth JŠ<sup>2</sup>, MacGregor EA<sup>3</sup>, Lundqvist C<sup>4</sup>, Russell MB<sup>5</sup>.  
Author information

Abstract

**OBJECTIVE:**

The objective of this article is to compare clinical characteristics of menstrual and non-menstrual attacks of migraine without aura (MO), prospectively recorded in a headache diary, by women with and without a diagnosis of menstrual migraine without aura (MM) according to the International Classification of Headache Disorders (ICHD).

**MATERIAL AND METHODS:**

A total of 237 women from the general population with self-reported migraine in  $\geq 50\%$  of their menstrual periods were interviewed and classified by a physician according to the criteria of the ICHD II. Subsequently, all participants were instructed to complete a prospective headache diary for at least three menstrual cycles. Clinical characteristics of menstrual and non-menstrual attacks of MO were compared by a regression model for repeated measurements.

**RESULTS:**

In total, 123 (52%) women completed the diary. In the 56 women who were prospectively diagnosed with MM by diary, the menstrual MO-attacks were longer (on average 10.65 hours, 99% CI 3.17-18.12) and more frequently accompanied by severe nausea (OR 2.14, 99% CI 1.20-3.84) than non-menstrual MO-attacks. No significant differences between menstrual and non-menstrual MO-attacks were found among women with MO, but no MM.

**CONCLUSION:**

In women from the general population, menstrual MO-attacks differ from non-menstrual attacks only in women who fulfil the ICHD criteria for MM.

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**KEYWORDS:** Menstrual migraine; characteristics; classification; headache diary; menstruation; migraine

PMID: 25754177

**Environmental factors for HA**

Cephalalgia. 2015 Feb 27. pii: 0333102415574845.

**Sensitization of the trigeminovascular system following environmental irritant exposure.**

Kunkler PE<sup>1</sup>, Zhang L<sup>1</sup>, Pellman JJ<sup>2</sup>, Oxford GS<sup>2</sup>, Hurley JH<sup>3</sup>.  
Author information

Abstract

**BACKGROUND:**

Air pollution is linked to increased emergency room visits for headache, and migraine patients frequently cite chemicals or odors as headache triggers, but the association between air pollutants and headache is not well understood. We previously reported that nasal administration of environmental irritants acutely increases meningeal blood flow via a TRPA1-dependent mechanism involving the trigeminovascular system. Here, we examine whether chronic environmental irritant exposure sensitizes the trigeminovascular system.

**METHODS:**

Male rats were exposed to acrolein, a TRPA1 agonist, or room air by inhalation for four days prior to meningeal blood flow measurements. Some animals were injected daily with a TRPA1 antagonist, AP-18, or vehicle prior to inhalation exposure. Trigeminal ganglia were isolated following blood flow measurements for immunocytochemistry and/or qPCR determination of TRPV1, TRPA1 and CGRP levels.

**RESULTS:**

Acrolein inhalation exposure potentiated blood flow responses both to TRPA1 and TRPV1 agonists compared to room air. Acrolein exposure did not alter TRPV1 or TRPA1 mRNA levels or TRPV1 or CGRP immunoreactive cell counts in the trigeminal ganglion. Acrolein sensitization of trigeminovascular responses to a TRPA1 agonist was attenuated by pre-treatment with AP-18.

**INTERPRETATION:**

These results suggest trigeminovascular sensitization as a mechanism for enhanced headache susceptibility after chemical exposure.

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**KEYWORDS:**

Headache; TRPA1; TRPV1; acrolein; trigeminal ganglion

PMID: 25724913

## VESTIBULAR CONCUSSIONS

### Concussion and sleep

Am J Sports Med. 2015 Mar;43(3):633-40. doi: 10.1177/0363546514560727. Epub 2014 Dec 17.

#### **Sleep disturbance and neurocognitive function during the recovery from a sport-related concussion in adolescents.**

Kostyun RO<sup>1</sup>, Milewski MD<sup>2</sup>, Hafeez I<sup>2</sup>.

Author information

#### Abstract

**BACKGROUND:** Sleep disturbances are a hallmark sign after a sport-related concussion (SRC). Poor sleep has been shown to adversely affect baseline neurocognitive test scores, but it is not comprehensively understood how neurocognitive function is affected by disrupted sleep during recovery from a concussion.

**PURPOSE:** To identify the correlation between adolescent athletes' neurocognitive function and their self-reported sleep quantity and sleep disturbance symptoms during recovery from SRC.

**STUDY DESIGN:** Cross-sectional study; Level of evidence, 3.

**METHODS:** Immediate Post-Concussion Assessment and Cognition Testing (ImPACT) data were retrospectively collected for 545 adolescent athletes treated for SRC at a sports medicine concussion clinic. Patients were stratified into groups based on 2 criteria: self-reported sleep duration and self-reported sleep disturbance symptoms during postinjury ImPACT testing. Sleep duration was classified as short (<7 hours), intermediate (7-9 hours), and long (>9 hours). Sleep disturbance symptoms were self-reported as part of the Post-Concussion Symptom Scale (PCSS) as either sleeping less than normal, sleeping more than normal, or having trouble falling asleep. One-way analyses of variance were conducted to examine the effects that sleep duration as well as self-reported sleep disturbance symptoms had on composite scores. A total of 1067 ImPACT tests were analyzed: test 1, 545; test 2, 380; and test 3, 142.

**RESULTS:** Sleeping fewer than 7 hours the night before testing correlated with higher PCSS scores ( $P < .001$ ), whereas sleeping longer than 9 hours correlated with worse visual memory ( $P = .01$ ), visual motor speed ( $P < .001$ ), and reaction time ( $P = .04$ ) composite scores. With regard to self-reported sleep disturbance symptoms, patients demonstrated worse composite scores during ImPACT testing when they self-reported sleeping more than normal (ImPACT test 1: verbal memory,  $P < .001$ ; visual motor speed,  $P = .05$ ; reaction time,  $P = .01$ ; ImPACT test 2: verbal memory,  $P < .001$ ; visual memory,  $P < .001$ ; visual motor speed,  $P < .001$ ; reaction time,  $P = .01$ ). Adolescent patients recovering from SRC demonstrated higher (worse) PCSS scores ( $P < .001$ ) when they sensed that their sleep had been disrupted.

**CONCLUSION:** Adolescent patients who perceive that their sleep is somehow disrupted after SRC may report a greater number of concussion symptoms during their recovery. In addition, the study results suggest that sleeping more than normal may identify an individual who continues to be actively recovering from concussion, given the correlation between lower neurocognitive function and this self-reported symptom.

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KEYWORDS: *ImPACT; athletes; concussion; sleep* PMID: 25520301

## SHOULDER GIRDLE CLAVICLE

**GLENOHUMERAL/SHOULDER  
ROTATOR CUFF  
ADHESIVE CAPSULITIS  
IMPINGMENT  
SURGERY  
ELBOW  
WRIST AND HAND**

**Interosseous membrane**

J Hand Surg Am. 2015 Feb 20. pii: S0363-5023(14)01754-7. doi: 10.1016/j.jhsa.2014.12.025.

**Anatomy and Biomechanics of the Forearm Interosseous Membrane.**

Farr LD<sup>1</sup>, Werner FW<sup>2</sup>, McGrattan ML<sup>1</sup>, Zwerling SR<sup>1</sup>, Harley BJ<sup>1</sup>.

Author information

Abstract

**PURPOSE:**

To examine the anatomy and function of the forearm interosseous membrane by exploring the anatomical insertions of the central band (CB) on the radius and the ulna and by quantifying the length of the intact ligament and replacement grafts located at the original CB attachment sites and alternative locations.

**METHODS:**

Eight fresh cadaver forearms were supinated and pronated and the wrist was extended and flexed while the motion between the distal radius and ulna were recorded. The length of the CB was computed for the intact CB as well for several alternative graft orientations and positions.

**RESULTS:**

The maximum length of the CB did not significantly change among different wrist motions. However, with the wrist in a static neutral position, the CB length was significantly shorter in forearm supination than in neutral. During active forearm rotation when CB replacement grafts were positioned distal or proximal to the original CB site, yet still parallel to it, each had a similar trend to be longer in neutral than in supination. If a graft was more transversely oriented, the computed CB length would be 1.6 mm shorter in supination than in neutral.

**CONCLUSIONS:**

These results support tensioning a CB graft with the forearm in supination if the goal is to maximize graft tension and to maintain the native 22° angle for a CB graft between the radius and ulna. The results also suggest that the CB graft can probably be located slightly distal or slightly proximal to its original attachment sites.

**CLINICAL RELEVANCE:**

Reconstruction of the interosseous membrane has been hampered by a lack of understanding of its length changes with forearm or wrist motion. These results provide a starting point in helping clinicians understand how to more precisely reconstruct this ligament in an anatomical manner.

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**KEYWORDS:** Interosseous membrane; central band  
PMID: 25703865

**Treatment of wrist ganglion**

J Hand Surg Am. 2015 Mar;40(3):546-553.e8. doi: 10.1016/j.jhsa.2014.12.014.

**Wrist ganglion treatment: systematic review and meta-analysis.**

Head L<sup>1</sup>, Gencarelli JR<sup>1</sup>, Allen M<sup>1</sup>, Boyd KU<sup>2</sup>.

Author information

Abstract

**PURPOSE:**

To review the clinical outcomes of treatment for adult wrist ganglions and to conduct a meta-analysis comparing the 2 most common options: open surgical excision and aspiration.

**METHODS:**

The review methodology was registered with PROSPERO. We performed a systematic search of MEDLINE and EMBASE for articles published between 1990 and 2013. Included studies reported treatment outcomes of adult wrist ganglions. Two independent reviewers performed screening and data extraction. We evaluated the methodological quality of randomized controlled trials (RCT) and cohort studies using the Cochrane Handbook for Systematic Reviews and the Newcastle-Ottawa Scale, respectively; Grading of Recommendations, Assessment, Development, and Evaluation was used to evaluate the quality of evidence.

**RESULTS:**

A total of 753 abstracts were identified and screened; 112 full-text articles were reviewed and 35 studies (including 2,239 ganglions) met inclusion criteria for data extraction and qualitative synthesis. Six studies met criteria for meta-analysis, including 2 RCTs and 4 cohort studies. In RCTs surgical excision was associated with a 76% reduction in recurrence compared with aspiration. Randomized controlled trial quality was moderate. In cohort studies surgical excision was associated with a 58% reduction in recurrence compared with aspiration. Cohort study quality was very low. In cohort studies aspiration was not associated with a significant reduction in recurrence compared with reassurance. Across all studies mean recurrence for arthroscopic surgical excision (studies, 11; ganglions, 512), open surgical excision (studies, 14; ganglions, 809), and aspiration (studies, 12; ganglions, 489) was 6%, 21%, and 59%, respectively. Mean complication rate for arthroscopic surgical excision (studies, 6; ganglions, 221), open surgical excision (studies, 6; ganglions, 341), and aspiration (studies, 3; ganglions, 134) was 4%, 14%, and 3%, respectively.

**CONCLUSIONS:**

Open surgical excision offers significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions. Arthroscopic excision has yielded promising outcomes but data from comparative trials are limited and have not demonstrated its superiority. Further RCTs are needed to increase confidence in the estimate of effect and to compare complications and recovery.

**TYPE OF STUDY/LEVEL OF EVIDENCE:** Therapeutic I.

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**KEYWORDS:** Ganglion; meta-analysis; review; treatment; wrist  
PMID:25708437

**CARPAL TUNNEL SYNDROME**  
**HIP**  
**REPLACEMENTS**  
**OA**  
**IMPINGEMENT**

**Cam in young football players**

Br J Sports Med. 2015 Jan 7. pii: bjsports-2014-094130. doi: 10.1136/bjsports-2014-094130.

**The relationship between the frequency of football practice during skeletal growth and the presence of a cam deformity in adult elite football players.**

Tak I1, Weir A2, Langhout R3, Waarsing JH4, Stubbe J5, Kerkhoffs G6, Agricola R4.

**Abstract**

**BACKGROUND/AIM:**

Cam deformity (CD) is likely a bony adaptation in response to high-impact sports practice during skeletal growth. We ascertained whether a dose-response relationship exists between the frequency of football practice during skeletal growth and the presence of a CD in adulthood, and if the age at which a football player starts playing football is associated with the presence of a CD in adulthood.

**METHODS:**

Prevalence of a CD ( $\alpha$  angle  $>60^\circ$ ) and a pathological CD ( $\alpha$  angle  $>78^\circ$ ) was studied using standardised anteroposterior (AP) and frog-leg lateral (FLL) radiographs that were obtained during seasonal screening. The age of starting to play football with a low frequency (LF;  $\leq 3$  times/week) and high frequency (HF;  $\geq 4$  times/week) was retrospectively assessed. The differences in prevalence of a CD per hip, in either view, between groups were calculated by logistic regression with generalised estimating equations.

**RESULTS:**

63 players (mean( $\pm$ SD) age 23.1( $\pm$ 4.2) years) participated, yielding 126 hips for analysis. The prevalence of a CD in the FLL was 40% (n=82) in players who started playing HF football from the age of 12 years or above, and 64% (n=44) in those playing HF football before the age of 12 years (p=0.042). This was also true for a pathological CD (12% vs 30%, p=0.038). The AP views revealed no difference.

**CONCLUSIONS:**

Our results indicate a probable dose-response relationship between the frequency of football practice during skeletal growth and the development of a CD, which should be confirmed in future prospective studies.

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**KEYWORDS:** Bone; Growth; Hip; Radiology; Risk factor

**KNEE****Anterior Lateral Ligament**

Arthroscopy. 2015 Mar;31(3):569-582.e3. doi: 10.1016/j.arthro.2014.12.015.

**The Structure and Function of the Anterolateral Ligament of the Knee: A Systematic Review.**

Van der Watt L<sup>1</sup>, Khan M<sup>1</sup>, Rothrauff BB<sup>2</sup>, Ayeni OR<sup>3</sup>, Musahl V<sup>2</sup>, Getgood A<sup>4</sup>, Peterson D<sup>1</sup>.  
Author information

## Abstract

**PURPOSE:**

The purpose of this systematic review was to evaluate the anatomic structure and function of the anterolateral ligament (ALL) of the knee.

**METHODS:**

The Medline, Embase, and Cochrane databases were screened for all studies related to the ALL of the knee. Two reviewers independently reviewed all eligible articles and the references of these articles. Inclusion and exclusion criteria were applied to all searched studies. Quality assessment was completed for the included studies.

**RESULTS:**

Nineteen studies were identified for final analysis. Pooled analysis identified the ALL in 430 of 449 knees (96%) examined. The ligament was found to originate from the region of the lateral femoral epicondyle and insert on the proximal tibia midway between the Gerdy tubercle and the fibular head. The ALL was found to be 34.1 to 41.5 mm in length, 5.1 to 8.3 mm in width above the lateral meniscus, and 8.9 to 11.2 mm in width below the lateral meniscus. By use of magnetic resonance imaging, the ALL was identified in 93% of knees examined (clinical, 64 of 70; cadaveric, 16 of 16). In one case study the ligament was clearly visualized by ultrasound examination. Histologic analysis across 3 studies showed characteristics consistent with ligamentous tissue. Though not shown in biomechanical studies, it is hypothesized that the ALL provides anterolateral stability to the knee, preventing anterolateral subluxation of the proximal tibia on the femur. One study identified a network of peripheral nerves, suggesting a proprioceptive function of the ALL.

**CONCLUSIONS:**

This systematic review shows the ALL to be a distinct structure with a consistent origin and insertion sites. The ALL is an extra-articular structure with a clear course from the lateral femoral epicondyle region, running anteroinferiorly, to the proximal tibia at a site midway between the Gerdy tubercle and the head of the fibula. The function of this ligament is theorized to provide anterolateral knee stability.

**LEVEL OF EVIDENCE:** Level IV, systematic review of cadaveric and imaging studies.  
PMID: 25744324

**Overweight**

Ann Rheum Dis. 2015 Apr;74(4):711-7. doi: 10.1136/annrheumdis-2013-204161. Epub 2013 Dec 17.

**Association between childhood overweight measures and adulthood knee pain, stiffness and dysfunction: a 25-year cohort study.**

Antony B<sup>1</sup>, Jones G<sup>1</sup>, Venn A<sup>1</sup>, Cicuttini F<sup>1</sup>, March L<sup>2</sup>, Blizzard L<sup>3</sup>, Dwyer T<sup>1</sup>, Cross M<sup>4</sup>, Ding C<sup>5</sup>.

Author information

Abstract

**OBJECTIVE:**

To describe the associations between overweight measures in childhood and knee pain, stiffness and dysfunction among adults 25 years later.

**METHODS:**

Subjects broadly representative of the Australian population (n=449, aged 31-41 years, female 48%) were selected from the Australian Schools Health and Fitness Survey of 1985. Height, weight and knee injury were recorded and knee pain was assessed using the Western Ontario and McMaster Universities osteoarthritis index (WOMAC). Childhood height, weight and knee injury had been measured according to standard protocols 25 years earlier and body mass index (BMI) and percentage overweight were calculated.

**RESULTS:**

The prevalence of knee pain was 34% and overweight in childhood and adulthood was 7% and 48%, respectively. Overall, there were no significant associations between childhood overweight measures and total WOMAC knee pain, stiffness and dysfunction scores in adulthood. However, in men, overweight in childhood was associated with adulthood WOMAC pain (relative risk (RR) 1.72, 95% CI 1.11 to 2.69) and childhood weight and BMI were associated with WOMAC stiffness and dysfunction. Childhood weight, BMI and overweight were all associated with the presence of adulthood walking knee pain in men and the whole sample. Most of these associations were independent of adult overweight measures. Subjects who were overweight in both childhood and adult life had a significant increase in the risk and prevalence of adulthood walking pain (RR=2.42, 95% CI 1.06 to 5.53).

**CONCLUSIONS:**

Childhood overweight measures were significantly associated with adulthood knee mechanical joint pain, stiffness and dysfunction among men, independent of adult overweight, suggesting that childhood overweight may lead to later knee symptoms in men.

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**KEYWORDS:** Arthritis; Epidemiology; Knee Osteoarthritis

PMID: 24347570

**KNEE/ACL****ACL and meniscus**

Int Orthop. 2015 Feb 19.

**Postoperative change in the length and extrusion of the medial meniscus after anterior cruciate ligament reconstruction.**

Narazaki S<sup>1</sup>, Furumatsu T, Tanaka T, Fujii M, Miyazawa S, Inoue H, Shimamura Y, Saiga K, Ozaki T.

Author information

Abstract

**PURPOSE:**

The medial meniscus is a secondary stabilizer of anterior tibial translation in anterior cruciate ligament (ACL)-deficient knees. ACL reconstruction effectively restores an increased anterior tibial translation in the ACL-deficient knee. However, knee osteoarthritis sometimes develops in ACL-reconstructed patients during a long-term follow-up period. We hypothesized that the medial meniscal position would be different between the ACL-deficient and reconstructed knees. The aim of this study was to investigate pre-operative and postoperative location of the medial meniscus in patients who underwent ACL reconstruction.

**METHODS:**

ACL-reconstructed knees (28 knees) and normal knees (27 knees) were investigated. Medial tibial plateau length (MTPL) and medial tibial plateau width (MTPW) were determined using radiographic images. Magnetic resonance imaging (MRI)-based medial meniscal length (MML), medial meniscal width (MMW), and medial meniscal extrusion (MME) were measured. Postoperative change in the MML, MMW, and MME were evaluated and compared with those in normal knees.

**RESULTS:**

No significant differences between the ACL-deficient (pre-operative) and normal groups were noted. The ACL-reconstructed (postoperative) group showed an increase in the MML, in the percentage of the MML ( $\%MML = 100 \text{ MML}/\text{MTPL}$ ), and in the MME. Significant differences between postoperative and normal groups were observed in the MML,  $\%MML$ , and MME. MMW and MMW percentage ( $100 \text{ MMW}/\text{MTPW}$ ) were similar in all groups.

**CONCLUSIONS:**

The anteroposterior length and radial extrusion of the medial meniscus increased after ACL reconstruction. Transposition of the medial meniscus may be a possible cause of developing further degenerative knee joint disorders after ACL reconstruction.

PMID: 25693884

## MENISCUS

## PATELLA

### PRP and Patella tendinopathy

Am J Sports Med. 2014 Dec 18. pii: 0363546514560726.

#### **Platelet-Rich Plasma in the Treatment of Patellar Tendinopathy: A Systematic Review.**

Liddle AD1, Rodríguez-Merchán EC2.

#### **Author information**

#### **Abstract**

**BACKGROUND:** Patellar tendinopathy (PT) is a major cause of morbidity in both high-level and recreational athletes. While there is good evidence for the effectiveness of eccentric exercise regimens in its treatment, a large proportion of patients have disease that is refractory to such treatments. This has led to the development of novel techniques, including platelet-rich plasma (PRP) injection, which aims to stimulate a normal healing response within the abnormal patellar tendon. However, little evidence exists at present to support its use.

**PURPOSE:** To determine the safety and effectiveness of PRP in the treatment of PT and to quantify its effectiveness relative to other therapies for PT.

**STUDY DESIGN:** Systematic review.

**METHODS:** A systematic review was conducted in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. A literature review was conducted of the Medline, EMBASE, and Cochrane databases as well as trial registries. Both single-arm and comparative studies were included. The outcomes of interest were pain (as measured by visual analog or other, comparable scoring systems), functional scores, and return to sport. Study quality and risk of bias were assessed using the methodological index for nonrandomized studies (MINORS) score and the Cochrane risk of bias tool.

**RESULTS:** Eleven studies fit the inclusion criteria. Of these, 2 were randomized, controlled trials (RCTs), and 1 was a prospective, nonrandomized cohort study. The remainder were single-arm case series. All noncomparative studies demonstrated a significant improvement in pain and function after PRP injection. Complications and adverse outcomes were rare. The results of the comparative studies were inconsistent, and superiority of PRP over control treatments could not be conclusively demonstrated.

**CONCLUSION:** Platelet-rich plasma is a safe and promising therapy in the treatment of recalcitrant PT. However, its superiority over other treatments such as physical therapy remains unproven. Further RCTs are required to determine the relative effectiveness of the many available treatments for PT and to determine the subgroups of patients who stand to gain the most from the use of these therapies.

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**KEYWORDS:** patellar tendon; platelet-rich plasma; tendinopathy; treatment

**KNEE/TOTAL  
KNEE/EXERCISE  
OSTEOARTHRITIS/KNEE**

**Fat deposits in thigh of Knee OA**

Invest Radiol. 2015 Apr;50(4):268-74. doi: 10.1097/RLI.0000000000000113.

**Quantitative relationship of thigh adipose tissue with pain, radiographic status, and progression of knee osteoarthritis: longitudinal findings from the osteoarthritis initiative.**

Dannhauer T<sup>1</sup>, Ruhdorfer A, Wirth W, Eckstein F.  
Author information

Abstract

**OBJECTIVE:**

The aim of this study was to explore the relationship of thigh subcutaneous fat (SCF) and intermuscular fat (IMF) content with knee osteoarthritis (KOA) cross-sectionally and longitudinally, using quantitative magnetic resonance imaging. Specifically, we examined relationships with frequent knee pain, various radiographic strata, and structural progression status of KOA.

**MATERIALS AND METHODS:**

Subjects who showed between-knee discordance of frequent versus no pain (n = 48), osteophyte versus no radiographic KOA (n = 55), and radiographic joint space narrowing versus no joint space narrowing (n = 44) were selected from the Osteoarthritis Initiative. Knees with structural progression of KOA (n = 23) were compared with knees without progression. Axial thigh magnetic resonance images were used to determine IMF and SCF. Differences between knees and between baseline and 2-year follow-up were examined using paired t tests.

**RESULTS:**

Women displayed similar amounts of IMF, but twice the SCF of men. Limbs of women with frequently painful knees had statistically significant greater IMF areas (+4.2%; P = 0.05) than contralateral pain-free limbs did. No significant cross-sectional differences were observed between other strata. Men with structural progression appeared to have a greater longitudinal increase in SCF (+13.2%; P < 0.05) than did men without progression (-1.9%), and women with progression appeared to have a greater increase in IMF (+11.6%) than did those without progression (+1.5%).

**CONCLUSION:**

In women, painful knees display greater IMF content than do contralateral pain-free knees. Other between-knee comparisons did not reveal a regional association between radiographic KOA and thigh adipose tissue status. Structural progression of KOA may be associated with greater longitudinal increases in SCF in men and greater increases of IMF in women, compared with nonprogressive controls.

PMID:25419827

**Sleep disruption**

J Pain. 2015 Feb 25. pii: S1526-5900(15)00541-6. doi: 10.1016/j.jpain.2015.02.004.

**Disrupted Sleep is Associated with Altered Pain Processing by Sex and Ethnicity in Knee Osteoarthritis.**

Petrov ME<sup>1</sup>, Goodin BR<sup>2</sup>, Cruz-Almeida Y<sup>3</sup>, King C<sup>4</sup>, Glover TL<sup>5</sup>, Bulls HW<sup>2</sup>, Herbert M<sup>2</sup>, Sibille KT<sup>6</sup>, Bartley EJ<sup>7</sup>, Fessler BJ<sup>8</sup>, Sotolongo A<sup>8</sup>, Staud R<sup>9</sup>, Redden D<sup>10</sup>, Fillingim RB<sup>11</sup>, Bradley LA<sup>8</sup>.

Author information

**Abstract**

Studies indicate that improving sleep decreases reported pain in patients with knee osteoarthritis (OA), but it is unclear if this association extends to experimentally-induced pain responses. A community-based sample of 88 African-American and 52 non-Hispanic white adults (45-76y) with knee OA completed the Insomnia Severity Index and the arousal subscale of the Sleep Hygiene and Practices Scale. Participants underwent quantitative sensory testing including measures of pain sensitivity and facilitation at the knee, and pain inhibition. Outcomes were analyzed with multiple Tobit, hierarchical regression models, with adjustment for relevant covariates. Ethnicity and sex by sleep interactions were also entered into the models. After covariate adjustment, main associations were not observed. However, sex interacted with insomnia severity to predict greater temporal summation of heat and punctate pressure pain among women and lower heat temporal summation among men. Men and women who engaged in frequent arousal-associated sleep behaviors demonstrated higher and lower heat temporal summation, respectively. Non-Hispanic whites with greater insomnia severity displayed lower pressure pain thresholds and pain inhibition.

Our findings are the first to demonstrate that disrupted sleep is associated with altered pain processing differentially by sex and ethnicity/race among people with knee OA.

***PERSPECTIVE:***

This article presents the association between insomnia severity, maladaptive sleep behaviors, and experimentally-induced pain responses among people with knee osteoarthritis. Disrupted sleep was associated with altered pain processing by sex and ethnicity/race. Offering sleep interventions may help ameliorate pain, but treatment may need to be tailored by sex and ethnicity/race.

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***KEYWORDS:***

ethnicity; insomnia; knee osteoarthritis; quantitative sensory testing; sleep

PMID: 25725172

**Kinesio taping and function**

Am J Phys Med Rehabil. 2015 Mar;94(3):192-200. doi: 10.1097/PHM.0000000000000148.

**Kinesio taping improves pain, range of motion, and proprioception in older patients with knee osteoarthritis: a randomized controlled trial.**

Cho HY<sup>1</sup>, Kim EH, Kim J, Yoon YW.

Author information

Abstract

**OBJECTIVE:**

This study investigated the short-term effects of Kinesio taping (KT) on various types of pain, active range of motion (AROM), and proprioception in patients with knee osteoarthritis.

**DESIGN:**

Forty-six older participants (mean [SD], 57.9 [4.4] yrs) with osteoarthritis were randomly allocated to two groups: the KT group or the placebo-KT group. Taping with tension (KT application) or without tension (placebo-KT application) was applied to the quadriceps of the participants in both groups. Before and after intervention, pain intensity was measured using a visual analog scale at rest and during walking, and pressure pain thresholds (PPTs) were assessed using an algometer in the quadriceps and the tibialis anterior. In addition, pain-free AROM and proprioception were measured.

**RESULTS:**

The KT group showed attenuation of pain during walking (effect size [ES], 1.97), PPT in the quadriceps (ES, 2.58), and PPT in the tibialis anterior (ES, 2.45). This group also showed significantly improved AROM (ES, 2.01) and proprioception (ES, 1.73-1.89;  $P < 0.05$ ). However, the placebo-KT group did not show significant changes in pain, AROM, or proprioception. There were significant differences between the two groups in pain during walking and PPT. In addition, pain during walking showed a significant correlation with AROM and proprioception, and a significant correlation was found between PPT and AROM.

**CONCLUSIONS:**

These results demonstrated that KT application with proper tension to the quadriceps effectively attenuates various types of pain and improves AROM and proprioception in osteoarthritis patients. Thus, KT may be a suitable intervention to improve pain, AROM, and proprioception in patients with osteoarthritis in clinics.

PMID: 25706053

FOOT AND ANKLE  
 ORTHOTICS  
 ANKLE/INSTABILITY  
 ACHILLES TENDON  
 PLANTAR SURFACE  
 HALLUX VALGUS  
 RHUMATOID ARTHRITIS  
 MANUAL THERAPY

HA and manual therapy

Cephalalgia. 2015 Mar 6. pii: 0333102415576226.

**Multimodal manual therapy vs. pharmacological care for management of tension type headache: A meta-analysis of randomized trials.**

Mesa-Jiménez JA<sup>1</sup>, Lozano-López C<sup>2</sup>, Angulo-Díaz-Parreño S<sup>3</sup>, Rodríguez-Fernández ÁL<sup>3</sup>, De-la-Hoz-Aizpurua JL<sup>2</sup>, Fernández-de-Las-Peñas C<sup>4</sup>.

Author information

Abstract

**BACKGROUND:** Manual therapies are generally requested by patients with tension type headache.

**OBJECTIVE:** To compare the efficacy of multimodal manual therapy vs. pharmacological care for the management of tension type headache pain by conducting a meta-analysis of randomized controlled trials.

**METHODS:** PubMed, MEDLINE, EMBASE, AMED, CINAHL, EBSCO, Cochrane Database of Systematic Reviews, Cochrane Collaboration Trials Register, PEDro and SCOPUS were searched from their inception until June 2014. All randomized controlled trials comparing any manual therapy vs. medication care for treating tension type headache adults were included. Data were extracted and methodological quality assessed independently by two reviewers. We pooled headache frequency as the main outcome and also intensity and duration. The weighted mean difference between manual therapy and pharmacological care was used to determine effect sizes.

**RESULTS:** Five randomized controlled trials met our inclusion criteria and were included in the meta-analysis. Pooled analyses found that manual therapies were more effective than pharmacological care in reducing frequency (weighted mean difference -0.8036, 95% confidence interval -1.66 to -0.44; three trials), intensity (weighted mean difference -0.5974, 95% confidence interval -0.8875 to -0.3073; five trials) and duration (weighted mean difference -0.5558, 95% confidence interval -0.9124 to -0.1992; three trials) of the headache immediately after treatment. No differences were found at longer follow-up for headache intensity (weighted mean difference -0.3498, 95% confidence interval -1.106 to 0.407; three trials).

**CONCLUSION:** Manual therapies were associated with moderate effectiveness at short term, but similar effectiveness at longer follow-up for reducing headache frequency, intensity and duration in tension type headache than pharmacological medical drug care. However, due to the heterogeneity of the interventions, these results should be considered with caution at this stage.

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**KEYWORDS:** Tension type headache; effectiveness; manual therapy; medication

PMID: 25748428

**NEUROMOBILIZATION  
STRETCHING/MUSCLES  
STM  
MUSCLES****Coactivation of hamstrings and quads****The association between antagonist hamstring coactivation and episodes of knee joint shifting and buckling**

Osteoarthritis and Cartilage , 03/13/2015 Segal NA, et al.

**Summary****Objective**

Hamstring coactivation during quadriceps activation is necessary to counteract the quadriceps pull on the tibia, but coactivation can be elevated with symptomatic knee osteoarthritis (OA). To guide rehabilitation to attenuate risk for mobility limitations and falls, this study evaluated whether higher antagonistic open-chain hamstring coactivation is associated with knee joint buckling (sudden loss of support) and shifting (a sensation that the knee might give way).

**Design**

At baseline, median hamstring coactivation was assessed during maximal isokinetic knee extensor strength testing and at baseline and 24-month follow-up, knee buckling and shifting was self-reported. Associations between tertiles of co-activation and knee (1) buckling, (2) shifting and (3) either buckling or shifting were assessed using logistic regression, adjusted for age, sex, knee OA and pain.

**Results**

1826 participants (1089 women) were included. Mean±SD age was 61.7±7.7 years, BMI was 30.3±5.5 kg/m<sup>2</sup> and 38.2% of knees had OA. There were no consistent statistically significant associations between hamstring coactivation and ipsilateral prevalent or incident buckling or the combination of buckling and shifting. The odds ratios for incident shifting in the highest in comparison with the lowest tertile of coactivation had similar magnitudes in the combined and medial hamstrings, but only reached statistical significance for lateral hamstring coactivation, OR(95%CI) 1.53 (0.99, 2.36).

**Conclusions**

Hamstring coactivation during an open kinetic chain quadriceps exercise was not consistently associated with prevalent or incident self-reported knee buckling or shifting in older adults with or at risk for knee OA.

**Keywords:** Muscle Activation, Knee, Osteoarthritis, Epidemiology

**STRETCHING**  
**MOTOR CONTROL**  
**CFS/BET**  
**EXERCISE**

**Aerobic capacity black, white, Hispanic**

Sports Med. 2015 Mar 5.

**Black and White Race Differences in Aerobic Capacity, Muscle Fiber Type, and Their Influence on Metabolic Processes.**

Ceaser T<sup>1</sup>, Hunter G.  
Author information

Abstract

Obesity is a known risk factor for cardiometabolic disease. Increasing aerobic capacity ( $VO_{2max}$ ) reduces adiposity, maintains weight, and reduces the risk of developing obesity and cardiometabolic disease. Two major determinants of aerobic capacity are the metabolic properties specific to a particular muscle fiber type and the capacity of the cardiorespiratory system to deliver nutrient-rich content to the muscle. Recent research suggests that some race/ethnic groups, particularly non-Hispanic Black subjects, are predisposed to a reduced  $VO_{2max}$  by way of muscle fiber type. Combined with insufficient physical activity, these characteristics place non-Hispanic Black subjects at an increased risk for obesity and other adverse health outcomes when compared with other race/ethnic groups. The purpose of this review was to suggest a model for explaining how skeletal muscle fiber type may contribute to reduced aerobic capacity and obesity among non-Hispanic Black subjects.

Our review indicates that metabolic properties of type II skeletal muscle (e.g. reduced oxidative capacity, capillary density) are related to various cardiometabolic diseases. Based on the review, non-Hispanic Black subjects appear to have a lower maximal aerobic capacity and a greater percentage of type II skeletal muscle fibers. Combined with reduced energy expenditure and reduced hemoglobin concentration, non-Hispanic Black subjects may be inherently predisposed to a reduced maximal aerobic capacity compared with non-Hispanic White subjects, thereby increasing the risk for obesity and related metabolic diseases.

PMID: 25739558

### Resistance training and muscle protein

Sports Med. 2015 Mar 6.

#### **A Review of Resistance Training-Induced Changes in Skeletal Muscle Protein Synthesis and Their Contribution to Hypertrophy.**

Damas F<sup>1</sup>, Phillips S, Vechin FC, Ugrinowitsch C.  
Author information

##### Abstract

Muscle protein synthesis (MPS) is stimulated by resistance exercise (RE) and is further stimulated by protein ingestion. The summation of periods of RE-induced increases in MPS can induce hypertrophy chronically. As such, studying the response of MPS with resistance training (RT) is informative, as adaptations in this process can modulate muscle mass gain. Previous studies have shown that the amplitude and duration of increases in MPS after an acute bout of RE are modulated by an individual's training status. Nevertheless, it has been shown that the initial responses of MPS to RE and nutrition are not correlated with subsequent hypertrophy. Thus, early acute responses of MPS in the hours after RE, in an untrained state, do not capture how MPS can affect RE-induced muscle hypertrophy. The purpose of this review is provide an in-depth understanding of the dynamic process of muscle hypertrophy throughout RT by examining all of the available data on MPS after RE and in different phases of an RT programme. Analysis of the time course and the overall response of MPS is critical to determine the potential protein accretion after an RE bout.

Exercise-induced increases in MPS are shorter lived and peak earlier in the trained state than in the untrained state, resulting in a smaller overall muscle protein synthetic response in the trained state. Thus, RT induces a dampening of the MPS response, potentially limiting protein accretion, but when this occurs remains unknown.

PMID: 25739559

### CORE

#### Motor control vs. exercise in LBP

##### **A tailored exercise program versus general exercise for a subgroup of patients with low back pain and movement control impairment: a randomised controlled trial with one-year follow-up**

Manual Therapy , 03/10/2015 Saner J, et al.

The effectiveness of a specific exercise treatment to improve movement control was tested in this study. This study found no additional benefit of specific exercises targeting MCI.

#### **Methods**

Using a multicentre randomised controlled trial (RCT), the authors compared exercises that targeted MCI (MC) with a general exercise (GE) treatment.

After randomisation, patients in both groups (n(MC)=52; n(GE)=54) were treated in eight private physiotherapy practices and five hospital outpatient physiotherapy centres.

Follow-up measurements were taken at post-treatment, six months and 12 months.

The primary outcome measurement was the Patient Specific Function Scale (PSFS).

#### **Results**

PSFS showed no difference between groups after treatment, or at six months and 12 months.

Secondary outcome analysis for pain and disability, measured with the Graded Chronic Pain scale and the Roland Morris Disability Questionnaire respectively, showed that a small improvement post-treatment levelled off over the long term.

Both groups improved significantly ( $p < 0.001$ ) over the course of one year.

**Exercise for LBP**

Clin Rehabil. 2015 Feb 13. pii: 0269215515570379.

**Exercise interventions for the treatment of chronic low back pain: A systematic review and meta-analysis of randomised controlled trials.**

Searle A<sup>1</sup>, Spink M<sup>2</sup>, Ho A<sup>3</sup>, Chuter V<sup>4</sup>.

Author information

Abstract

**OBJECTIVE:**

To determine, for adults with chronic low back pain, which exercise interventions are the most effective at reducing pain compared to other treatments.

**DATA SOURCES:**

A search of MEDLINE, CINAHL, EMBASE, SPORTDiscus, PsycINFO and The Cochrane Library was conducted up to October 2014.

**REVIEW METHODS:**

Databases were searched for published reports of randomised trials that investigated the treatment of chronic low back pain of non-specific origin with an exercise intervention. Two authors independently reviewed and selected relevant trials. Methodological quality was evaluated using the Downs and Black tool.

**RESULTS:**

Forty-five trials met the inclusion criteria and thirty-nine were included in the meta-analysis. Combined meta-analysis revealed significantly lower chronic low back pain with intervention groups using exercise compared to a control group or other treatment group (Standard Mean Deviation (SMD) = -0.32, CI 95% -0.44 to -0.19, P < 0.01). Separate exploratory subgroup analysis showed a significant effect for strength/resistance and coordination/stabilisation programs.

**CONCLUSIONS:**

Our results found a beneficial effect for strength/resistance and coordination/stabilisation exercise programs over other interventions in the treatment of chronic low back pain and that cardiorespiratory and combined exercise programs are ineffective.

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**KEYWORDS:** Chronic low back pain; exercise; meta-analysis; systematic review  
PMID: 25681408

**Hip abductors and core**

Am J Phys Med Rehabil. 2015 Mar;94(3):201-10. doi: 10.1097/PHM.000000000000155.

**Effect of hip abduction exercise with manual pelvic fixation on recruitment of deep trunk muscles.**

Kim EH<sup>1</sup>, Lim TH, Park SH, Kim CS, Jang SH, Cho YW, Kim KJ, Choi HS, Ahn SH.  
Author information

## Abstract

**OBJECTIVE:**

The aim of this study was to determine whether side-lying hip abduction exercise while applying manual pelvic fixation is more effective than hip abduction without manual pelvic fixation for promoting deep trunk muscle activity.

**DESIGN:**

This is a cross-sectional study comparing deep trunk muscle activation between hip abduction exercise without and with manual pelvic fixation in ten participants. Muscle activation was measured using fine-wire and surface electromyography.

**RESULTS:**

Hip abduction with manual pelvic fixation was found to result in significantly more recruitment of all studied deep trunk muscles except the ipsilateral obliquus externus compared with hip abduction without manual pelvic fixation ( $P < 0.05$ ). The greatest increased activation was seen in the ipsilateral deep and superficial multifidus. The increase in deep multifidus percentage of maximal voluntary contraction was greater than that of the rectus abdominis, the obliquus externus, the transversus abdominis/obliquus internus, the lumbar erector spinae, the superficial multifidus, and the gluteus medius ( $P < 0.05$ ). The superficial multifidus percentage of maximal voluntary contraction was significantly increased over that of the rectus abdominis and the obliquus externus ( $P < 0.05$ ). Moderate correlation between deep and superficial multifidus activation was found (Pearson correlation coefficient, 0.537).

**CONCLUSIONS:**

Hip abduction training in the side-lying position while applying manual pelvic fixation seems to be more effective for recruiting deep trunk muscles for dynamic lumbar spinal stabilization.

PMID: 25122096

**POSTURE  
SCOLIOSIS  
ATHLETICS****Older athletes performance**

Age Ageing. 2015 Mar 8. pii: afv023.

**Greater progression of athletic performance in older Masters athletes.**

Akkari A<sup>1</sup>, Machin D<sup>1</sup>, Tanaka H<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

The number of new world records has decreased substantially in most athletic events in recent years. There has been enormous growth in participation at Masters events, and older athletes have been competing at the highest levels with much younger athletes. However, the progression of athletic performance over time has not been well investigated in Masters athletes.

**OBJECTIVE AND METHODS:**

To determine whether older Masters athletes improved athletic performance over time, running and swimming times from 1975 to 2013 were collected biennially. The running event of 100 m was chosen specifically, as it is one of the most popular track and field events that would have attracted a large number of competitors. The middle distance of 400 m as well as 100 m freestyle swimming were also examined to determine whether the results in 100 m sprint event can be confirmed in other events.

**RESULTS:**

The improvements in fastest 100 m running times over time were not significant. However, all the Masters age-group records improved significantly over time. The slopes of improvements over the years were progressively greater at older age groups with the greatest progression observed at oldest age groups of 75-79 years examined. The general trends were similar for 400 m middle-distance running and 100 m freestyle swimming.

**CONCLUSIONS:**

While younger athletes' performance has stagnated, Masters athletes improved their athletic performance significantly and progressively over the years. The magnitude of improvements was greater in older age groups gradually closing the gap in athletic performance between younger and older participants.

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**KEYWORDS:** aging athletes; functional capacity; masters athletes; older people; sports; successful aging

PMID: 25753790

## GAIT RUNNING

### Foot strike patterns

J Sports Sci Med. 2015 Mar 1;14(1):225-32. eCollection 2015.

#### Effect of Acute Alterations in Foot Strike Patterns during Running on Sagittal Plane Lower Limb Kinematics and Kinetics.

Valenzuela KA1, Lynn SK1, Mikelson LR1, Noffal GJ1, Judelson DA1.

Author information

#### Abstract

The purpose of this study was to determine the effect of foot strike patterns and converted foot strike patterns on lower limb kinematics and kinetics at the hip, knee, and ankle during a shod condition.

Subjects were videotaped with a high speed camera while running a 5km at self-selected pace on a treadmill to determine natural foot strike pattern on day one. Preferred forefoot group (PFFG, n = 10) and preferred rear foot group (PRFG, n = 11) subjects were identified through slow motion video playback (n = 21, age = 22.8±2.2 years, mass = 73.1±14.5 kg, height 1.75 ± 0.10 m). On day two, subjects performed five overground run trials in both their natural and unnatural strike patterns while motion and force data were collected. Data were collected over two days so that foot strike videos could be analyzed for group placement purposes. Several 2 (Foot Strike Pattern -forefoot strike [FFS], rearfoot strike [RFS]) x 2 (Group - PFFG, PRFG) mixed model ANOVAs (p < 0.05) were run on speed, active peak vertical ground reaction force (VGRF), peak early stance and mid stance sagittal ankle moments, sagittal plane hip and knee moments, ankle dorsiflexion ROM, and sagittal plane hip and knee ROM. There were no significant interactions or between group differences for any of the measured variables. Within subject effects demonstrated that the RFS condition had significantly lower (VGRF) (RFS = 2.58 ± .21 BW, FFS = 2.71 ± 0.23 BW), dorsiflexion moment (RFS = -2.6 1± 0.61 Nm·kg(-1), FFS = -3.09 ± 0.32 Nm·kg(-1)), and dorsiflexion range of motion (RFS = 17.63 ± 3.76°, FFS = 22.10 ± 5.08°). There was also a significantly higher peak plantarflexion moment (RFS = 0.23 ± 0.11 Nm·kg(-1), FFS = 0.01 ± 0.01 Nm·kg(-1)), peak knee moment (RFS = 2.61 ± 0.54 Nm·kg(-1), FFS = 2.39 ± 0.61 Nm·kg(-1)), knee ROM (RFS = 31.72 ± 2.79°, FFS = 29.58 ± 2.97°), and hip ROM (RFS = 42.72 ± 4.03°, FFS = 41.38 ± 3.32°) as compared with the FFS condition.

This research suggests that acute changes in foot strike patterns during shod running can create alterations in certain lower limb kinematic and kinetic measures that are not dependent on the preferred foot strike pattern of the individual. This research also challenges the contention that the impact transient spike in the vertical ground reaction force curve is only present during a rear foot strike type of running gait.

Key points Footstrike pattern changes should be individually considered and implemented based on individual histories/abilities Forefoot strike patterns increase external dorsiflexion moments Rearfoot strike patterns increase external knee flexion moments Recreational shod runners are able to mimic habitual mechanics of different foot strike patterns.

**KEYWORDS:** Forefoot; joint moments; range of motion; rearfoot

**Footwear and economy**

Sports Med. 2015 Mar;45(3):411-22. doi: 10.1007/s40279-014-0283-6.

**The effect of footwear on running performance and running economy in distance runners.**

Fuller JT1, Bellenger CR, Thewlis D, Tsiros MD, Buckley JD.

**Author information****Abstract****BACKGROUND:**

The effect of footwear on running economy has been investigated in numerous studies. However, no systematic review and meta-analysis has synthesised the available literature and the effect of footwear on running performance is not known.

**OBJECTIVE:**

The aim of this systematic review and meta-analysis was to investigate the effect of footwear on running performance and running economy in distance runners, by reviewing controlled trials that compare different footwear conditions or compare footwear with barefoot.

**METHODS:**

The Web of Science, Scopus, MEDLINE, CENTRAL (Cochrane Central Register of Controlled Trials), EMBASE, AMED (Allied and Complementary Medicine), CINAHL and SPORTDiscus databases were searched from inception up until April 2014. Included articles reported on controlled trials that examined the effects of footwear or footwear characteristics (including shoe mass, cushioning, motion control, longitudinal bending stiffness, midsole viscoelasticity, drop height and comfort) on running performance or running economy and were published in a peer-reviewed journal.

**RESULTS:**

Of the 1,044 records retrieved, 19 studies were included in the systematic review and 14 studies were included in the meta-analysis. No studies were identified that reported effects on running performance. Individual studies reported significant, but trivial, beneficial effects on running economy for comfortable and stiff-soled shoes [standardised mean difference (SMD) <0.12;  $P < 0.05$ ], a significant small beneficial effect on running economy for cushioned shoes (SMD = 0.37;  $P < 0.05$ ) and a significant moderate beneficial effect on running economy for training in minimalist shoes (SMD = 0.79;  $P < 0.05$ ). Meta-analysis found significant small beneficial effects on running economy for light shoes and barefoot compared with heavy shoes (SMD < 0.34;  $P < 0.01$ ) and for minimalist shoes compared with conventional shoes (SMD = 0.29;  $P < 0.01$ ). A significant positive association between shoe mass and metabolic cost of running was identified ( $P < 0.01$ ). Footwear with a combined shoe mass less than 440 g per pair had no detrimental effect on running economy.

**CONCLUSIONS:**

Certain models of footwear and footwear characteristics can improve running economy. Future research in footwear performance should include measures of running performance.

**Age and running health**

Med Sci Sports Exerc. 2015 Feb 9.

**Running Mechanics and Variability with Aging.**

Silvernail JF1, Boyer K, Rohr E, Brüggemann GP, Hamill J.

**Author information****Abstract****INTRODUCTION:**

As the elderly population continues to grow in the US, issues related to the maintenance of health become increasingly important. Physical activity has positive benefits for healthy aging. Running, a popular form of exercise is associated with the risk of developing an injury, especially in older runners. Initial differences have been observed between older and younger runners, but these were observed without consideration for other differences between groups such as running mileage.

**PURPOSE:**

To compare running mechanics and lower extremity coordination variability in matched groups of healthy younger and healthy older runners.

**METHODS:**

Three-dimensional kinetics and kinematics were collected while 14 older adults (45-65 years) and younger adults (18-35 years) ran overground at 3.5 m/s. Knee, ankle and hip joint angles and moments were determined and discrete measures at foot-strike, maximum and minimum were determined and compared between groups. Segment angles during stance were utilized to calculate segment coordination variability between the pelvis and thigh, thigh and shank and shank and foot using a modified vector coding technique.

**RESULTS:**

Knee and ankle joint angles were similar between groups ( $p>0.05$ ). Older runners had a greater hip range of motion ( $p=0.01$ ) and peak hip flexion ( $p=0.001$ ) more extended hip position than younger runners. Older runners had a smaller ankle plantar-flexion moment ( $p=0.04$ ) and hip rotational moment ( $p=0.005$ ) than younger runners. There were no differences between groups observed in any of the variability measures ( $p>0.05$ ).

**CONCLUSION:**

Runners appear to maintain movement patterns and variability during running with increasing age indicating that the activity of running itself may be contributing to the maintenance of health of the older runners in the current study.

**PAIN****Pain and happiness**

Prim Health Care Res Dev. 2015 Apr;16(2):114-26. doi: 10.1017/S146342361300056X. Epub 2014 Jan 22.

**Happiness intervention decreases pain and depression, boosts happiness among primary care patients.**

Lambert D'raven LT<sup>1</sup>, Moliver N<sup>2</sup>, Thompson D<sup>1</sup>.

Author information

**Abstract**

**AIM:** The aim of the study was to determine whether positive psychological interventions (PPIs) in a primary health care setting would improve physical and mental health over time.

**BACKGROUND:** Most treatments for depression focus on reducing symptoms rather than on creating positive states of mental health. Empirical studies to verify the efficacy of PPIs in primary health care are needed.

**METHOD:** In a six-week pilot program, we invited patients in a primary health care setting with symptoms of depression to participate in groups designed to increase levels of happiness. The program involved interventions such as engaging in good deeds, writing gratitude letters, and introducing empirical research. Patients completed the SF12v2® at the beginning and end of the program and at three- and six-month follow-up. Measures included physical functioning, bodily pain, mental health, social functioning, and vitality. Patients also participated in focus groups to discuss their experiences.

**FINDINGS:** Of the 124 patients who enrolled in this pilot study, 75 completed the six-week program, and 35 participated in two follow-up assessments. Among the participants who remained for all follow-up assessments, scores improved from baseline to 6-month follow-up for health, vitality, mental health, and the effects of mental and physical health on daily activities. This subset of patients reported greater energy and more daily accomplishments, along with reductions in functional limitations. Improvements in mental and physical health and functioning were shown over a six-month period. The study provides a basis for the further investigation of PPIs in creating improvements for patients with depression in primary health care.

**KEYWORDS:** primary health care

PMID: 24451155

## Psychiatric testing

J Orthop Sci. 2015 Mar 3.

**Computational psychological study of the Brief Scale for Psychiatric Problems in Orthopaedic Patients (BS-POP) for patients with chronic low back pain: verification of responsiveness.**

Yoshida K<sup>1</sup>, Sekiguchi M, Otani K, Mashiko H, Shioda H, Wakita T, Niwa SI, Kikuchi SI, Konno SI.

Author information

Abstract

**BACKGROUND:**

We developed the Brief Scale for Psychiatric Problems in Orthopaedic Patients (BS-POP, physician and patient versions) and have previously shown that the BS-POP is reliable and has construct validity, criterion validity, and reproducibility. The present study aimed to proactively verify the responsiveness of the BS-POP with regard to chronic low back pain (LBP) patients.

**METHODS:**

The study subjects included 193 chronic LBP patients (81 males, 112 females; mean age 62 years) who had suffered from persistent LBP for  $\geq 3$  months. During the first test (before the treatment), the BS-POP, the Minnesota Multiphasic Personality Inventory (MMPI), the Profile of Mood States (POMS), the 36-item Short-form Health Survey version 2 (SF-36 v2), and the Roland-Morris Disability Questionnaire (RDQ) were conducted. The BS-POP, POMS, SF-36 v2, and RDQ for the third test were conducted (4-6 weeks after treatment) on all patients who had participated in the first test to determine the responsiveness of the BS-POP. The responsiveness of the BS-POP was investigated statistically.

**RESULTS:**

The total crude BS-POP scores were significantly lower for both physician and patient versions in the third test than in the first test. Moreover, the crude RDQ scores and SF-36 v2 items, physical functioning (PF), bodily pain (BP), MH, VT, and GH, and POMS items, tension-anxiety (T-A), D, F, and confusion (C) improved significantly, confirming responsiveness to treatment.

**DISCUSSION:**

The present findings indicate that the BS-POP possesses sufficient responsiveness from a computational psychology perspective. The BS-POP constitutes a tool enabling orthopaedists to easily identify psychiatric problems in orthopaedic patients.

PMID: 25727356

**Recovery of peripheral nerves**

J Hand Surg Am. 2015 Mar;40(3):433-7. doi: 10.1016/j.jhssa.2014.12.018.

**The value of the tender muscle sign in detecting motor recovery after peripheral nerve reconstruction.**

Lee EY<sup>1</sup>, Karjalainen TV<sup>1</sup>, Sebastin SJ<sup>2</sup>, Lim AY<sup>1</sup>.

Author information

Abstract

**PURPOSE:**

Squeezing a denervated muscle a few weeks after nerve repair produces a characteristic response in patients. This response is observed before any clinical evidence of motor recovery. We called this response the tender muscle sign (TMS) and wanted to determine whether this sign was related to the recovery of motor power.

**METHODS:**

We studied 31 adults with unilateral brachial plexus injuries who underwent 50 procedures for reinnervation of the supraspinatus, deltoid, and biceps. Follow-up was monthly for the first year and at 3-monthly intervals thereafter. Average duration of follow-up was 3.3 years. The TMS was sought at each visit. The presence of the TMS, when it was first observed, and time to Medical Research Council (MRC) grade 1 and 3 recoveries were recorded. The sensitivity, specificity, and predictive values of TMS for motor recovery were calculated.

**RESULTS:**

The TMS was always detected earlier than palpable muscle contraction. It was significantly associated with recovery of MRC grade 1 and 3 motor power. The sensitivity of TMS for MRC grade 1 recovery was 96% and specificity was 100%. For MRC grade 3 recovery, it had 97% sensitivity and 27% specificity. The positive predictive value was 100% for MRC grade 1 recovery and 83% for MRC grade 3. The negative predictive value was 50% for MRC grade 1 recovery and 75% for MRC grade 3.

**CONCLUSIONS:**

Previous studies have demonstrated the presence of nociceptive receptors in human skeletal muscle. The reinnervation of these receptors by the regenerating axons results in cramp-like tenderness when the muscle is squeezed. This response is specific to a reinnervated muscle and cannot be elicited in denervated or normally innervated muscle. The TMS is a simple, clear, and early indicator of muscle reinnervation that is useful in monitoring motor recovery after nerve regeneration.

**TYPE OF STUDY/LEVEL OF EVIDENCE:** Diagnostic IV.

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**KEYWORDS:**

Nerve injury; brachial plexus injury; clinical sign; motor recovery; nerve regeneration

PMID: 25708431

**Central sensitization form**

Clin J Pain. 2015 Apr;31(4):323-32. doi: 10.1097/AJP.0000000000000113.

**Ability of the central sensitization inventory to identify central sensitivity syndromes in an outpatient chronic pain sample.**

Neblett R<sup>1</sup>, Hartzell MM, Cohen H, Mayer TG, Williams M, Choi Y, Gatchel RJ.  
Author information

Abstract

**OBJECTIVES:**

The aim of this study was to determine the ability of the central sensitization inventory (CSI), a new screening instrument, to assist clinicians in identifying patients with central sensitivity syndromes (CSSs).

**METHODS:**

Patients from a psychiatric medical practice (N=161), which specialized in the assessment and treatment of complex pain and psychophysiological disorders, were assessed for the presence of a CSS. CSI scores, using a previously determined cutoff of "40" of "100," were compared between the CSS patient group (n=99) and the non-CSS patient group (n=62). Information on false positives, false negatives, true positives, and true negatives were analyzed, and sensitivity and specificity analyses were conducted. In addition, CSS-relevant variables such as depression, abuse, and substance abuse were examined.

**RESULTS:**

A large percentage of CSS patients had comorbid major depressive disorder (80%) and abuse history (43%), which was higher than rates for the patients without a CSS (55% and 24%, respectively). The CSI correctly identified 82.8% (n=82) of CSS patients as having a CSS (ie, sensitivity) and 54.8% (n=28) of non-CSS patients as not having a CSS (ie, specificity). False-positive patients (not diagnosed with a CSS, but scoring >40 on the CSI) reported more severe pain, interference in daily functioning, and abuse history, compared with the non-CSS patients who scored below 40 (ie, true negatives).

**CONCLUSIONS:**

The CSI is a useful and valid instrument for screening patients for the possibility of a CSS, although the chances of false positives are relatively high when evaluating patients with complex pain and psychophysiological disorders.

PMID: 24806467

### Factors for chronic pain in adolescents

#### **Bullying, abuse and family conflict as risk factors for chronic pain among Dutch adolescents**

European Journal of Pain, 03/09/2015 Voerman JS, et al.

The present study aims to examine if early adversities, e.g. bullying, abuse and family conflict are risk factors for chronic pain in adolescents. The secondary aim of the present study was to describe the pain characteristics of chronic pain in adolescents in a community sample of Dutch adolescents. The results of the present study suggest that bullying, abuse and family conflict may be risk factors for chronic pain in adolescents. Early signalling these stressors might prevent chronic pain

**Dorsal horn**

Pain. 2015 Mar;156(3):428-38. doi: 10.1097/01.j.pain.0000460318.65734.00.

**Inflammatory-induced changes in synaptic drive and postsynaptic AMPARs in lamina II dorsal horn neurons are cell-type specific.**

Kopach O<sup>1</sup>, Krotov V, Belan P, Voitenko N.  
Author information

## Abstract

Persistent peripheral inflammation alters trafficking of AMPA receptors (AMPARs) at the synapses between primary afferents and dorsal horn (DH) neurons that contribute to the maintenance of inflammatory pain. However, whether peripheral inflammation changes the synaptic activity within the DH circuitry and how it modulates synaptic AMPARs in different neuronal types still remain unknown. We find that complete Freund adjuvant (CFA)-induced peripheral inflammation prominently augments excitatory neurotransmission in rat lamina II neurons characterized by intrinsic adapting firing properties and apparently decreases it in the tonic firing lamina II neurons, suggesting different roles of these types of interneurons in pain processing. Peripheral inflammation also differentially changes inhibitory neurotransmission in these neuronal types, shifting the balance between neuronal excitation and inhibition toward excitation of the adapting firing, but toward inhibition of the tonic firing lamina II neurons.

Synaptic AMPARs were differentially changed in the adapting firing and the tonic firing neurons, implying different mechanisms of AMPAR adjustment at the synapses in these types of interneurons during persistent inflammation. The inflammatory-induced, neuron-type specific changes in synaptic drive within the DH circuitry and synaptic AMPAR functioning in lamina II neurons may contribute to the persistent pain maintenance.

PMID: 25599231

**Management of pain problems**

Prim Health Care Res Dev. 2015 Apr;16(2):157-66. doi: 10.1017/S1463423614000140. Epub 2014 Mar 27.

**A study of National Health Service management of chronic osteoarthritis and low back pain.**

Hart OR<sup>1</sup>, Uden RM<sup>2</sup>, McMullan JE<sup>3</sup>, Ritchie MS<sup>4</sup>, Williams TD<sup>5</sup>, Smith BH<sup>6</sup>.

Author information

**Abstract**

Aim To describe treatment and referral patterns and National Health Service resource use in patients with chronic pain associated with low back pain or osteoarthritis, from a Primary Care perspective.

**BACKGROUND:**

Osteoarthritis and low back pain are the two commonest debilitating causes of chronic pain, with high health and social costs, and particularly important in primary care. Understanding current practice and resource use in their management will inform health service and educational requirements and the design and optimisation of future care.

**METHOD:**

Multi-centre, retrospective, descriptive study of adults ( $\geq 18$  years) with chronic pain arising from low back pain or osteoarthritis, identified through primary care records. Five general practices in Scotland, England (two), Northern Ireland and Wales. All patients with a diagnosis of low back pain or osteoarthritis made on or before 01/09/2006 who had received three or more prescriptions for pain medication were identified and a sub-sample randomly selected then consented to an in-depth review of their medical records (n=264). Data on management of chronic pain were collected retrospectively from patients' records for three years from diagnosis ('newly diagnosed' patients) or for the most recent three years ('established' patients). Findings Patients received a wide variety of pain medications with no overall common prescribing pattern. GP visits represented the majority of the resource use and 'newly diagnosed' patients were significantly more likely to visit their GP for pain management than 'established' patients. Although 'newly diagnosed' patients had more referrals outside the GP practice, the number of visits to secondary care for pain management was similar for both groups.

**CONCLUSION:**

This retrospective study confirmed the complexity of managing these causes of chronic pain and the associated high resource use. It provides an in-depth picture of prescribing and referral patterns and of resource use.

**KEYWORDS:**

referral and consultations

PMID: 24674890

**Multiple sites of pain**

Int Arch Occup Environ Health. 2015 Mar 3.

**Combined musculoskeletal pain in the upper and lower body: associations with occupational mechanical and psychosocial exposures.**

Sommer TG<sup>1</sup>, Frost P, Svendsen SW.  
Author information

Abstract

**PURPOSE:**

Pain in more than one site is common in working populations. We aimed to characterise combined pain (pain in the upper and lower body) and to evaluate whether the prevalence of combined pain is positively related to combined occupational mechanical exposures to the upper and lower body and to high psychosocial job strain.

**METHODS:**

This cross-sectional study was based on questionnaire data from the Musculoskeletal Research Database at the Danish Ramazzini Centre. The study included 14,081 men and 20,173 women. Occupational exposures were assessed by job exposure matrices. We analysed the prevalence of pain limited to the upper body, pain limited to the lower body, and combined pain in relation to occupational exposures using Poisson regression.

**RESULTS:**

During the last year, 23.2 % of the men and 33.9 % of the women reported combined pain, which was characterised by somatisation, illness worrying, and low SF-36 scores. For men, the adjusted prevalence ratio for combined pain was 1.51 [95 % confidence interval (95 % CI) 1.40-1.64] in relation to exposures limited to the upper body and 2.24 (95 % CI 2.11-2.39) in relation to combined exposures. For women, the corresponding adjusted prevalence ratios were 1.56 (95 % CI 1.50-1.63) and 1.55 (95 % CI 1.50-1.61). High job strain was related to pain among men, only.

**CONCLUSION:**

Combined pain may in part be explained by local effects of occupational mechanical exposures acting at more than one site.

PMID: 25731853

**COMPLEX REGIONAL PAIN  
FIBROMYALGIA****Cognitive dysfunction**

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**Development and Initial Validation of a Brief Self-Report Measure of Cognitive Dysfunction in Fibromyalgia.**

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**Abstract**

Pain is often the focus of research and clinical care in fibromyalgia (FM); however, cognitive dysfunction is also a common, distressing, and disabling symptom in FM. Current efforts to address this problem are limited by lack of a comprehensive, valid measure of subjective cognitive dysfunction in FM that is easily interpretable, accessible, and brief. The purpose of this study was to leverage cognitive functioning item banks that were developed as part of the Patient Reported Outcomes Measurement Information System (PROMIS<sup>®</sup>) to devise a 10-item short form measure of cognitive functioning for use in FM. In Study 1, a nationwide (US) sample of 1035 adults with FM (age range: 18-82, 95.2% female) completed two cognitive item pools. Factor analyses and item response theory (IRT) analyses were used to identify dimensionality and optimally-performing items. A recommended 10-item measure, called the Multidimensional Inventory of Subjective Cognitive Impairment (MISCI) was created. In Study 2, 232 adults with FM completed the MISCI as well as a legacy measure of cognitive functioning that is used in FM clinical trials, the Multiple Ability Self-Report Questionnaire (MASQ). The MISCI showed excellent internal reliability, low ceiling/floor effects, and good convergent validity with the MASQ ( $r = -.82$ ).

**PERSPECTIVE:**

This paper presents the Multidimensional Inventory of Subjective Cognitive Impairment (MISCI), a 10-item measure of cognitive dysfunction in fibromyalgia, developed through classical test theory and item response theory. This brief but comprehensive measure shows evidence of excellent construct validity through large correlations with a lengthy legacy measure of cognitive functioning.

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**KEYWORDS:** MISCI; PROMIS; cognitive functioning; fibromyalgia; self-report  
PMID:25746197

## Diagnosis

**Variables associated with fibromyalgia diagnosis**

Journal of Pain Research, 03/11/2015Masters ET, et al.

**Background:** Diagnosis of fibromyalgia (FM) is often challenging. Identifying factors associated with an FM diagnosis may guide health care providers in implementing appropriate diagnostic and management strategies.

**Methods:** This retrospective study used the de-identified Humedica electronic medical record (EMR) database to identify variables associated with an FM diagnosis. Cases (n=4,296) were subjects  $\geq 18$  years old with  $\geq 2$  *International Classification of Diseases*, Ninth Revision (ICD-9) codes for FM (729.1)  $\geq 30$  days apart during 2012, associated with an integrated delivery network, with  $\geq 1$  encounter with a health care provider in 2011 and 2012. Controls without FM (no-FM; n=583,665) did not have the ICD-9 codes for FM. Demographic, clinical, and health care resource utilization variables were extracted from structured EMR data. Univariate analysis identified variables showing significant differences between the cohorts based on odds ratios (ORs).

**Results:** Consistent with FM epidemiology, FM subjects were predominantly female (78.7% vs 64.5%;  $P < 0.0001$ ) and slightly older (mean age 53.3 vs 52.7 years;  $P = 0.0318$ ). Relative to the no-FM cohort, the FM cohort was characterized by a higher prevalence of nearly all evaluated comorbidities; the ORs suggested a higher likelihood of an FM diagnosis ( $P < 0.0001$ ), especially for musculoskeletal and neuropathic pain conditions (OR 3.1 for each condition). Variables potentially associated with an FM diagnosis included higher levels of use of specific health care resources including emergency-room visits, outpatient visits, hospitalizations, and medications. Units used per subject for emergency-room visits, outpatient visits, hospitalizations, and medications were also significantly higher in the FM cohort ( $P < 0.0001$ ), confirming resource utilization as an important variable associated with an FM diagnosis.

**Conclusion:** Significant differences between the FM and no-FM cohorts were observed for nearly all the demographic, clinical, and health care resource variables, suggesting an association with FM diagnosis. These results also support use of EMR data for identifying variables associated with FM, which may help in the diagnosis and management of this condition.

**Keywords:** retrospective database analysis, predictors, musculoskeletal pain, observational study, real world data

**NUTRITION/VITAMINS**

**PHARMACOLOGY**

**ELECTROTHERAPY**

**NEUROLOGICAL CONDITIONS**