

## ABSTRACTS

Table of Contents	
<b>PELVIC GIRDLE</b> .....	2
<b>PELVIC ORGANS</b> .....	5
<b>THORACIC SPINE</b> .....	12
<b>CRANIUM/TMJ</b> .....	14
<b>HEADACHES</b> .....	15
<b>CONCUSSIONS</b> .....	20
<b>HIP</b> .....	26
<b>MANUAL THERAPY/STRETCHING/MUSCLES STM</b> .....	38
<b>CFS/BET</b> .....	39
<b>ATHLETICS</b> .....	42
<b>RUNNING GAIT</b> .....	45
<b>PAIN</b> .....	48
<b>FIBROMYALGIA</b> .....	51
<b>NUTRITION/VITAMINS/MEDICATION/TOPICALS</b> .....	52

## 2. LBP

### Research and LBP

Spine J. 2016 Jan 27. pii: S1529-9430(16)00298-9. doi: 10.1016/j.spinee.2016.01.185.

#### **Quality assessment of systematic reviews for surgical treatment of low back pain: an overview.**

Martins DE<sup>1</sup>, Astur N<sup>2</sup>, Kanas M<sup>3</sup>, Ferretti M<sup>4</sup>, Lenza M<sup>5</sup>, Wajchenberg M<sup>6</sup>.

**BACKGROUND CONTEXT:** Low back pain is among the most frequent causes for medical appointments. Surgical treatment is widely controversial and new surgical techniques and treatment modalities have been developed within the last decade. Treatment for Low Back Pain should be evidence-based through Systematic Reviews and Meta Analysis. Thus, the quality of these reviews is sometimes put into question since methodological mistakes are frequently seen. **PURPOSE:** The aim of this study is to gather all Systematic Reviews for the surgical treatment of Low Back Pain and analyze their outcomes, quality and conclusion.

**STUDY DESIGN/SETTING:** An overview of Systematic Reviews **OUTCOME MEASURES:** AMSTAR score, PRISMA statement, conclusion supported by descriptive statistics.

**METHODS:** A literature search for Systematic Reviews containing Low Back Pain surgical treatment was conducted through different medical databases. Two investigators independently assessed all titles and abstracts for inclusion. Studies should have at least one surgical procedure as an intervention. Diagnoses were categorized as lumbar disc herniation, spondylolisthesis, stenosis, facet joint syndrome, and degenerative disc disease. Quality was assessed through the PRISMA and AMSTAR questionnaires. Study quality related to its PRISMA and/or AMSTAR score percentage was rated as: very poor (<30%), poor (30-50%), fair (50-70%), good (70-90%), and excellent (>90%). Articles were considered conclusive if they had a conclusion for their primary outcome supported by descriptive statistical evidence. This study was funded exclusively by the authors' own resources. None of the authors have any potential conflict of interest to declare.

**RESULTS:** Overall, there were 40 systematic reviews included. According to AMSTAR and PRISMA scores, 5-7.5% of the Systematic Reviews were rated as excellent and most of them were rated as a fair review. AMSTAR indicated that 22.5% of the reviews have very poor quality, while PRISMA stated 7.5% being of very poor quality. For both tools, performing a Meta Analysis made the reviews' quality significantly better. The best-rated diagnosis groups according to PRISMA were Spondylosis, Lumbar Disc Herniation and Degenerative Disc Disease. Considering the studies' conclusions, 25 (62.5%) out of the 40 Systematic Reviews had a conclusion to their primary outcome and only 11 (27.5%) were supported by descriptive statistical analysis. This means that 44% of the Systematic Reviews with a conclusion were evidence based. There were 15 (37.5%) SRs that did not reach a conclusion to their primary objectives.

#### **CONCLUSIONS:**

In conclusion, most SRs for LBP do not reach very good or excellent quality and only 27.5% of them have evidence-based conclusions. Including a meta-analysis is a significant factor to improve quality and evidence for SRs.

**KEYWORDS:** degenerative disc disease; low back pain; lumbar spine; outcome assessment; surgical procedures; systematic review

PMID: 26826347

**MRI and impact on LBP**

Eur Spine J. 2016 Feb 8.

**The added prognostic value of MRI findings for recovery in patients with low back pain in primary care: a 1-year follow-up cohort study.**

de Schepper EI<sup>1</sup>, Koes BW<sup>2</sup>, Oei EH<sup>3</sup>, Bierma-Zeinstra SM<sup>2,4</sup>, Luijsterburg PA<sup>2</sup>.

Abstract

**PURPOSE:**

Information on the prognostic value of MRI findings in low back pain patients in primary care is lacking. The objective of this study is to investigate the added prognostic value of baseline MRI findings over known prognostic factors for recovery at 12-month follow-up in patients with low back pain referred to MRI by their general practitioner.

**METHODS:**

Patients referred by their general practitioner for MRI of the lumbar spine were recruited at the MRI Center. The questionnaires at baseline and at 3 and 12-months follow-up included potential clinical predictors from history taking and the outcome recovery. The MRI radiology reports were scored. Analysis was performed in 3 steps: derivation of a predictive model including characteristics of the patients and back pain only (history taking), including reported MRI findings only, and the addition of reported MRI findings to the characteristics of the patients and back pain.

**RESULTS:**

At 12-months follow-up 53 % of the patients reported recovery (n = 683). Lower age, better attitude/beliefs regarding back pain, acute back pain, presence of neurological symptoms of the leg(s), and presence of non-continuous back pain were significantly associated with recovery at 12-months follow-up: area under the curve (AUC) 0.77. Addition of the MRI findings resulted in an AUC of 0.78.

**CONCLUSIONS:**

At 12-months follow-up, only 53 % of these patients with low back pain referred for MRI in general practice reported recovery. Five clinic baseline characteristics were associated with recovery at 12-months follow-up; adding the MRI findings did not result in a stronger prediction of recovery.

**KEYWORDS:**

Area under curve; Logistic models; Low back pain; Low back pain/diagnosis; Magnetic resonance imaging; Outcome; Predictive value of tests; Primary health care

PMID: 26858135

**Radicular symptoms increase with coughing etc.**

Eur Spine J. 2016 Feb 2.

**A diagnostic study in patients with sciatica establishing the importance of localization of worsening of pain during coughing, sneezing and straining to assess nerve root compression on MRI.**

Verwoerd AJ<sup>1</sup>, Mens J<sup>2</sup>, Barzouhi AE<sup>3</sup>, Peul WC<sup>4,5</sup>, Koes BW<sup>6</sup>, Verhagen AP<sup>7</sup>.

Abstract

**PURPOSE:**

To test whether the localization of worsening of pain during coughing, sneezing and straining matters in the assessment of lumbosacral nerve root compression or disc herniation on MRI.

**METHODS:**

Recently the diagnostic accuracy of history items to assess disc herniation or nerve root compression on magnetic resonance imaging (MRI) was investigated. A total of 395 adult patients with severe sciatica of 6-12 weeks duration were included in this study. The question regarding the influence of coughing, sneezing and straining on the intensity of pain could be answered on a 4 point scale: no worsening of pain, worsening of back pain, worsening of leg pain, worsening of back and leg pain. Diagnostic odds ratio's (DORs) were calculated for the various dichotomization options.

**RESULTS:**

The DOR changed into significant values when the answer option was more narrowed to worsening of leg pain. The highest DOR was observed for the answer option 'worsening of leg pain' with a DOR of 2.28 (95 % CI 1.28-4.04) for the presence of nerve root compression and a DOR of 2.50 (95 % CI 1.27-4.90) for the presence of a herniated disc on MRI.

**CONCLUSIONS:**

Worsening of leg pain during coughing, sneezing or straining has a significant diagnostic value for the presence of nerve root compression and disc herniation on MRI in patients with sciatica. This study also highlights the importance of the formulation of answer options in history taking.

**KEYWORDS:**

Diagnosis; Intervertebral disc displacement; Medical history taking; Pain; Sciatica; Specificity

PMID: 26842881

### 3. DISC

#### Disc degeneration

Spine (Phila Pa 1976). 2016 Feb;41(3):E116-E123.

#### **Downregulation of miR-27b is Involved in Loss of Type II Collagen by Directly Targeting Matrix Metalloproteinase 13 (MMP13) in Human Intervertebral Disc Degeneration.**

Li HR<sup>1</sup>, Cui Q, Dong ZY, Zhang JH, Li HQ, Zhao L.

Abstract

#### **STUDY DESIGN:**

A microRNA (miRNA) study.

#### **OBJECTIVE:**

The purpose of this study was to identify intervertebral disc degeneration (IDD)-specific miRNAs, followed by functional validation of results.

#### **SUMMARY OF BACKGROUND DATA:**

IDD is the major contributor to back radicular pain, and the molecular mechanisms underlying this disease are not completely understood. Accumulating evidence suggests that miRNAs play an important role in IDD, but the role of specific miRNAs involved in this disease remains elusive.

#### **METHODS:**

An initial screening of nucleus pulposus (NP) tissues, miRNA expression by miRNA microarray, was performed using samples from 10 patients with degenerative disc disease and 10 patients with lumbar fracture (as controls). Subsequently, differential expression was validated using quantitative reverse transcriptase PCR (qRT-PCR). The level of differentially expressed miRNAs in degenerative NP tissues was investigated, and then functional analysis of the miRNAs in regulating collagen II expression was carried out. Western blotting and luciferase reporter assays were also used to detect the target gene.

#### **RESULTS:**

We identified 23 miRNAs that were differentially expressed (16 upregulated and 7 downregulated) in patients compared with controls. After qRT-PCR confirmation, miR-27b was significantly downregulated in degenerative NP tissues when compared with controls. Moreover, its level was correlated with grade of disc degeneration. Overexpression of miR-27b promoted type II collagen expression in NP cells. Bioinformatics target prediction identified matrix metalloproteinase 13 (MMP13) as a putative target of miR-27b. Furthermore, luciferase reporter assays demonstrated that miR-27b directly targets MMP13 and affects the protein expression of MMP13 in NP cells. Expression of MMP13 negatively correlated with miR-27b expression in degenerative NP tissues.

#### **CONCLUSION:**

The downregulation of miR-27b induces type II collagen loss by directly targeting MMP13, leading to the development of IDD. Our study also underscores the potential of miR-27b as a novel therapeutic target in human IDD.

#### **LEVEL OF EVIDENCE: 3.**

PMID: 26583473

## 5. SURGERY

### Denervation of multifidus improves

BMC Musculoskelet Disord. 2016 Feb 6;17(1):63. doi: 10.1186/s12891-016-0927-9.

#### **Pedicle screw fixation and posterior fusion for lumbar degenerative diseases: effects on individual paraspinal muscles and lower back pain; a single-center, prospective study.**

Cha JR<sup>1</sup>, Kim YC<sup>2</sup>, Jang C<sup>3</sup>, Yoo WK<sup>4</sup>, Cui JH<sup>5</sup>.

Abstract

#### **BACKGROUND:**

To the best of our knowledge, there have been no reports on the points at which the denervated multifidus and erector spinae muscles become reinnervated after pedicle screw fixation and posterior fusion in patients with lumbar degenerative diseases. Our study was designed to confirm reinnervation of denervated paraspinal muscles following pedicle screw fixation and posterior fusion and to confirm alleviation of the patients' lower back pain (LBP).

#### **METHODS:**

In this prospective study, we enrolled 67 patients who had undergone pedicle screw fixation and posterior fusion. The surgery had alleviated their leg pain, but the patients complained of LBP at the L3-5 level 3 months after the surgery. The patients were divided into two groups (I and II) according to the level at which pain was experienced. Paraspinal mapping scores were recorded preoperatively and 3, 6, 12, and 18 months postoperatively. Oswestry Disability Index and visual analogue scale scores were determined. Regression analyses using a general linear model and a mixed model were performed.

#### **RESULTS:**

Pedicle screw fixation and posterior fusion significantly denervated the multifidus and erector spinae not only in the surgical segment, but also in adjacent segments. Group I patients displayed reinnervation in the denervated erector spinae and multifidus muscles at 12 and 18 months, respectively. In contrast, group II showed reinnervation only in of the denervated erector spinae of the upper segment at 18 months, with no other areas of reinnervation. Postoperative LBP was significantly diminished at 12 months in group I and at 18 months in group II. There was also significantly less LBP at 6 months (prior to reinnervation of the paraspinal muscles).

#### **CONCLUSIONS:**

The denervated multifidus and erector spinae muscles at L4-5, which had been denervated using pedicle screw fixation and posterior fusion, were significantly reinnervated at 18 months postoperatively, whereas patients with denervation at L3-5 had only a tendency to be reinnervated at follow-up. Postoperative LBP in these patients was significantly diminished at the follow-up visits.

PMID: 26850001

## Quality of research

Spine J. 2016 Jan 27. pii: S1529-9430(16)00298-9. doi: 10.1016/j.spinee.2016.01.185.

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**BACKGROUND CONTEXT:**

Low back pain is among the most frequent causes for medical appointments. Surgical treatment is widely controversial and new surgical techniques and treatment modalities have been developed within the last decade. Treatment for Low Back Pain should be evidence-based through Systematic Reviews and Meta Analysis. Thus, the quality of these reviews is sometimes put into question since methodological mistakes are frequently seen.

**PURPOSE:** *The aim of this study is to gather all Systematic Reviews for the surgical treatment of Low Back Pain and analyze their outcomes, quality and conclusion.*

**STUDY DESIGN/SETTING:**

An overview of Systematic Reviews OUTCOME MEASURES: AMSTAR score, PRISMA statement, conclusion supported by descriptive statistics.

**METHODS:**

A literature search for Systematic Reviews containing Low Back Pain surgical treatment was conducted through different medical databases. Two investigators independently assessed all titles and abstracts for inclusion. Studies should have at least one surgical procedure as an intervention. Diagnoses were categorized as lumbar disc herniation, spondylolisthesis, stenosis, facet joint syndrome, and degenerative disc disease. Quality was assessed through the PRISMA and AMSTAR questionnaires. Study quality related to its PRISMA and/or AMSTAR score percentage was rated as: very poor (<30%), poor (30-50%), fair (50-70%), good (70-90%), and excellent (>90%). Articles were considered conclusive if they had a conclusion for their primary outcome supported by descriptive statistical evidence. This study was funded exclusively by the authors' own resources. None of the authors have any potential conflict of interest to declare.

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Overall, there were 40 systematic reviews included. According to AMSTAR and PRISMA scores, 5-7.5% of the Systematic Reviews were rated as excellent and most of them were rated as a fair review. AMSTAR indicated that 22.5% of the reviews have very poor quality, while PRISMA stated 7.5% being of very poor quality. For both tools, performing a Meta Analysis made the reviews' quality significantly better. The best-rated diagnosis groups according to PRISMA were Spondylosis, Lumbar Disc Herniation and Degenerative Disc Disease. Considering the studies' conclusions, 25 (62.5%) out of the 40 Systematic Reviews had a conclusion to their primary outcome and only 11 (27.5%) were supported by descriptive statistical analysis. This means that 44% of the Systematic Reviews with a conclusion were evidence based. There were 15 (37.5%) SRs that did not reach a conclusion to their primary objectives.

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In conclusion, most SRs for LBP do not reach very good or excellent quality and only 27.5% of them have evidence-based conclusions. Including a meta-analysis is a significant factor to improve quality and evidence for SRs.

**KEYWORDS:** degenerative disc disease; low back pain; lumbar spine; outcome assessment; surgical procedures; systematic review PMID:26826347

**Impact of previous surgeries**

Eur Spine J. 2016 Jan 22.

**Influence of previous surgery on patient-rated outcome after surgery for degenerative disorders of the lumbar spine.**

Zehnder P<sup>1</sup>, Aghayev E<sup>2</sup>, Fekete TF<sup>3</sup>, Haschtmann D<sup>3</sup>, Pigott T<sup>4</sup>, Mannion AF<sup>5</sup>.

Abstract

**PURPOSE:**

Few studies have used multivariate models to quantify the effect of multiple previous spine surgeries on patient-oriented outcome after spine surgery. This study sought to quantify the effect of prior spine surgery on 12-month postoperative outcomes in patients undergoing surgery for different degenerative disorders of the lumbar spine.

**METHODS:**

The study included 4940 patients with lumbar degenerative disease documented in the Spine Tango Registry of EUROSPINE, the Spine Society of Europe, from 2004 to 2015. Preoperatively and 12 months postoperatively, patients completed the multidimensional Core Outcome Measures Index (COMI; 0-10 scale). Patients' medical history and surgical details were recorded using the Spine Tango Surgery 2006 and 2011 forms. Multiple linear regression models were used to investigate the relationship between the number of previous surgeries and the 12-month postoperative COMI score, controlling for the baseline COMI score and other potential confounders.

**RESULTS:**

In the adjusted model including all cases, the 12-month COMI score showed a 0.37-point worse value [95 % confidence intervals (95 % CI) 0.29-0.45;  $p < 0.001$ ] for each additional prior spine surgery. In the subgroup of patients with lumbar disc herniation, the corresponding effect was 0.52 points (95 % CI 0.27-0.77;  $p < 0.001$ ) and in lumbar degenerative spondylolisthesis, 0.40 points (95 % CI 0.17-0.64;  $p = 0.001$ ).

**CONCLUSIONS:**

We were able to demonstrate a clear "dose-response" effect for previous surgery: the greater the number of prior spine surgeries, the systematically worse the outcome at 12 months' follow-up. The results of this study can be used when considering or consenting a patient for further surgery, to better inform the patient of the likely outcome and to set realistic expectations.

**KEYWORDS:**

COMI; Degenerative disorders of the lumbar spine; Patient-rated outcome; Previous surgery; Spine Tango

PMID: 26801193

## 8. VISCERA

### Gluten free diet

Am J Gastroenterol. 2016 Feb 2. doi: 10.1038/ajg.2015.434.

#### **Neurological Dysfunction in Coeliac Disease and Non-Coeliac Gluten Sensitivity.**

Hadjivassiliou M<sup>1</sup>, Rao DG<sup>1</sup>, Grinewald RA<sup>1</sup>, Aeschlimann DP<sup>2</sup>, Sarrigiannis PG<sup>1</sup>, Hoggard N<sup>3</sup>, Aeschlimann P<sup>3</sup>, Mooney PD<sup>4</sup>, Sanders DS<sup>4</sup>.

Abstract

#### **OBJECTIVES:**

Non-coeliac gluten sensitivity (NCGS) refers to patients with primarily gastrointestinal symptoms without enteropathy that symptomatically benefit from gluten-free diet (GFD). Little is known about its pathophysiology, propensity to neurological manifestations, and if these differ from patients with coeliac disease (CD). We investigated the clinical and immunological characteristics of patients presenting with neurological manifestations with CD and those with NCGS.

#### **METHODS:**

We compared clinical, neurophysiological, and imaging data of patients with CD and NCGS presenting with neurological dysfunction assessed and followed up regularly over a period of 20 years.

#### **RESULTS:**

Out of 700 patients, 562 were included. Exclusion criteria included no bowel biopsy to confirm CD, no HLA type available, and failure to adhere to GFD. All patients presented with neurological dysfunction and had circulating anti-gliadin antibodies. Out of 562 patients, 228 (41%) had evidence of enteropathy (Group 1, CD) and 334 (59%) did not (Group 2, NCGS). The most common neurological manifestations were cerebellar ataxia, peripheral neuropathy, and encephalopathy. There was a greater proportion of patients with encephalopathy in Group 1 and with a greater proportion of neuropathy in Group 2. The severity of ataxia did not differ between the two groups. Patients in Group 1 had more severe neuropathy. All patients from both groups responded to gluten-free diet. Anti-tissue transglutaminase (TG2) antibodies were found in 91% of patients in Group 1 and in 29% of patients in Group 2. Comparison between those patients in Group 2 with HLA-DQ2/DQ8 and those without as well as those with positive TG2 compared with those with negative TG2 antibodies identified no differences within these subgroups. Serological positivity for TG6 antibodies was similar in the two groups (67 and 60%).

#### **CONCLUSIONS:**

The neurological manifestations of CD and NCGS are similar and equally responsive to a GFD suggestive of common pathophysiological mechanisms. Am J Gastroenterol advance online publication, 2 February 2016; doi:10.1038/ajg.2015.434.

PMID: 26832652

## Crohn's disease and smoking

Am J Gastroenterol. 2016 Feb 9. doi: 10.1038/ajg.2015.401.

**Impact of Smoking Cessation on the Clinical Course of Crohn's Disease Under Current Therapeutic Algorithms: A Multicenter Prospective Study.**

Nunes T<sup>1</sup>, Etchevers MJ<sup>1</sup>, García-Sánchez V<sup>2</sup>, Ginard D<sup>3</sup>, Martí E<sup>3</sup>, Barreiro-de Acosta M<sup>4</sup>, Gomollón F<sup>5</sup>, Arroyo M<sup>5</sup>, Bastida G<sup>6</sup>, Gonzalez B<sup>7</sup>, Monfort D<sup>8</sup>, García-Planella E<sup>9</sup>, Figueroa C<sup>1</sup>, Panés J<sup>1</sup>, Sans M<sup>1,10</sup>.

Abstract

**OBJECTIVES:**

Given the importance of tobacco smoking (TS) as the only environmental factor repeatedly linked to the development of the Crohn's disease (CD), it is surprising that very few prospective studies have assessed whether TS is associated with an increased frequency of clinical relapse. Our aim was to evaluate the current impact of TS on disease relapse and the clinical benefit of quitting smoking in the present era of widespread use of anti-TNF drugs and immunosuppressants.

**METHODS:**

This was a multicenter prospective cohort study, which included 573 CD patients in clinical remission with various smoking habits. All smokers were advised to quit. Patients not exposed to tobacco before inclusion (non- and former smokers), continuing smokers, and quitters were compared regarding differences in disease outcomes during a follow-up of 4 years.

**RESULTS:**

A total of 148 continuing smokers, 190 nonsmokers, 160 former smokers, and 75 quitters were included. In comparison with nonsmokers, continuing smokers relapsed more frequently with an incidence rate ratio of 1.53 (95% confidence interval (CI): 1.10-2.17). Former smokers and quitters had similar relapse incidences compared with nonsmokers. Smoking was an independent predictor for disease relapse in the multivariate analysis (hazard ratio: 1.58 (95% CI 1.20-2.09). In the time-dependent analysis, continuing smokers had earlier relapse, regardless of anti-TNF or immunosuppressant use.

**CONCLUSIONS:**

Continuing smokers have more disease relapses, and patients who quit smoking have a similar relapse incidence compared with nonsmokers. Am J Gastroenterol advance online publication, 9 February 2016; doi:10.1038/ajg.2015.401.

PMID: 26856753

## Diaphragmatic breathing

Med Sci Sports Exerc. 2016 Jan 19.

**Diaphragm Recruitment Increases during a Bout of Targeted Inspiratory Muscle Training.**

Ramsook AH<sup>1</sup>, Koo R, Molgat-Seon Y, Dominelli PB, Syed N, Ryerson CJ, Sheel AW, Guenette JA.

Abstract

**PURPOSE:**

The extent to which the diaphragm is targeted during a bout of inspiratory muscle training (IMT) is unknown. The purpose of this study was to characterize the relative activation patterns of the diaphragm and extra-diaphragmatic inspiratory muscles during a bout of IMT and to determine if diaphragmatic recruitment can be increased by giving subjects specific diaphragmatic breathing instructions (IMTdi).

**METHODS:**

Ten healthy men were instrumented with surface electromyography (EMG) electrodes on the sternocleidomastoid (EMGscm), scalenes (EMGsca), parasternal intercostals (EMGpic), and 7th intercostal space (EMG7ic). A multi-pair esophageal electrode catheter measured crural diaphragm EMG (EMGdi) and transdiaphragmatic pressure (Pdi). Trial 1 of IMT involved 25 dynamic inspiratory maneuvers at 40% of maximal inspiratory mouth pressure using a variable flow resistive loading device where subjects were free to choose their own inspiratory muscle recruitment strategy. Trial 2 involved the same procedures, but subjects were given specific instructions to actively recruit their diaphragm. Cervical magnetic stimulation of the phrenic nerves verified the absence of diaphragmatic fatigue before commencing the second trial.

**RESULTS:**

Compared to IMT, IMTdi resulted in a significant increase in EMGdi ( $56 \pm 12$  vs.  $73 \pm 10\%$ max,  $p=0.002$ ) and Pdi swings ( $39 \pm 14$  vs.  $64 \pm 17$ cmH<sub>2</sub>O,  $p<0.0001$ ) and decrease in EMGsca ( $52 \pm 21$  vs.  $36 \pm 22\%$ max,  $p=0.04$ ). There was no difference in EMG7ic ( $26 \pm 19$  vs.  $33 \pm 21\%$ max,  $p=0.36$ ), EMGpic ( $31 \pm 24$  vs.  $25 \pm 15\%$ max,  $p=0.22$ ), and EMGscm ( $58 \pm 21$  vs.  $45 \pm 24\%$ max,  $p=0.08$ ) when comparing IMT vs. IMTdi, respectively.

**CONCLUSIONS:**

Simple diaphragmatic breathing instructions can significantly increase the recruitment of the diaphragm during IMT compared to a bout of IMT where individuals are free to choose their own inspiratory muscle recruitment strategy.

PMID: 26795460

## 9. THORACIC SPINE

### Disc herniation

Eur Spine J. 2016 Jan 22.

#### **Giant central thoracic disc herniations: surgical outcome in 17 consecutive patients treated by mini-thoracotomy.**

Roelz R<sup>1</sup>, Scholz C<sup>2</sup>, Klingler JH<sup>2</sup>, Scheiwe C<sup>2</sup>, Sircar R<sup>2</sup>, Hubbe U<sup>2</sup>.

Abstract

#### **PURPOSE:**

Safe treatment of giant central thoracic disc herniations (cTDHs) remains a surgical challenge due to frequent calcifications, intradural extension and, importantly, the rare exposure of spine surgeons to these lesions. We report our 10-year experience in the management of giant cTDH by mini-thoracotomy and offer a detailed description of the technique.

#### **METHODS:**

17 patients harboring 17 giant cTDH operated on via a mini-thoracotomy at the authors' institution between 2004 and 2014 were reviewed. All patients presented with myelopathy of varying magnitude. Mean patient age was 47 years. The mean follow-up period was 5.5 years. Median canal compromise of the cTDH was 66 %. cTDH were densely calcified in 7 (41 %), partially calcified in 6 (35 %) and soft in 4 (24 %) patients. Intradural extension of cTDH was noted in six patients (35 %). Benzels' modified myelopathy score of the Japanese Orthopedic Association was adjusted for the evaluation of thoracic myelopathy (mJOA) to assess functional outcomes.

#### **RESULTS:**

Successful removal of the offending cTDH was achieved in all patients. The overall mJOA Score improved from 7.9/13 to 11.1/13. Two patients with giant and densely calcified cTDH experienced a transient post-operative neurological decline. There was a statistically significant correlation between size of cTDH and intradural extension.

#### **CONCLUSION:**

Patients with myelopathy due to giant cTDH can be safely treated by the mini-thoracotomy approach. Postoperative neurological worsening and severe complications or incisional pain are rare. In contrast to complex posterior or thoracoscopic approaches, the mini-thoracotomy is technically straightforward and thus easy to learn for experienced spine surgeons.

#### **KEYWORDS:**

Myelopathy; Thoracic disc herniation; Thoracic spine; Transthoracic approach

PMID: 26801194

**10 B. CERVICAL EXERCISES****Neck muscle strength and reduced injuries and concussions**

Sports Medicine

pp 1-14

First online: 09 February 2016

**Neck Muscular Strength, Training, Performance and Sport Injury Risk: A Review**

- Con Hrysomallis

**Abstract**

The neck musculature has an essential role in positioning and stabilising the head and may influence sport performance and injury risk. The objectives of this review are to (1) compare the neck strength of different athletes; (2) report on the outcomes of training programmes; (3) explore the association between neck strength and head stabilisation; (4) examine the relationship between neck strength and sport injury risk; and (5) identify areas for future research. There was a difference in strength between different player positions in football codes, gender and age. Detected differences were partly attributed to variation in neck muscle mass. Neck strength training programmes were generally shown to be effective for untrained and trained participants using dynamic or isometric actions and various types of resistance devices. There was a wide range of reported increases in neck strength; the smallest gains were usually for programmes that utilised lower intensity or frequency. There was limited evidence that greater isometric strength or dynamic training was associated with better head stabilisation during low-level force application, while there is direct evidence of an association between neck isometric training or strength and injury risk.

A retrospective analysis of professional rugby union players revealed that isometric training reduced match-related cervical spine injuries and a prospective study found that greater overall isometric neck strength reduced concussion risk in high school athletes. Recommendations for future research include substantiating the link between neck strength and sport injury risk and assessing the effectiveness of neck plyometric and perturbation training on stabilisation and injury risk.

**13. CRANIUM/TMJ****Oral fascial pain**

J Oral Rehabil. 2016 Jan 30. doi: 10.1111/joor.12383.

**Reports of perceptual distortion of the face are common in patients with different types of chronic oro-facial pain.**

Dagsdóttir LK<sup>1,2</sup>, Skyt I<sup>1,3</sup>, Vase L<sup>3</sup>, Baad-Hansen L<sup>1,2</sup>, Castrillon E<sup>1,2</sup>, Svensson P<sup>1,2,4</sup>.

**Abstract**

Anecdotally, chronic oro-facial pain patients may perceive the painful face area as 'swollen'. Because there are no clinical signs, these self-reported 'illusions' may represent perceptual distortions and can be speculated to contribute to the maintenance of oro-facial pain. This descriptive study investigated whether chronic oro-facial pain patients experience perceptual distortions - a kind of body image disruption. Sixty patients were consecutively recruited to fill in questionnaires regarding i) pain experience, ii) self-reports of perceptual distortion and iii) psychological condition. Perceptual distortions were examined in the total group and in three diagnostic subgroups: i) painful post-traumatic trigeminal neuropathy (PPTN), ii) painful temporomandibular disorder (TMD) or iii) persistent idiopathic facial pain (PIFP). A large proportion of oro-facial pain patients reported perceptual distortions of the face (55.0%). In the diagnostic subgroups, perceptual distortions were most pronounced in PPTN patients (81.5%) but with no significant group differences. In the total group of chronic oro-facial pain patients, the present pain intensity explained 16.9% of the variance in magnitude of the perceptual distortions ( $R^2 = 16.9$ ,  $F(31) = 6.3$ ,  $P = 0.017$ ).

This study demonstrates that many chronic oro-facial pain patients may experience perceptual distortions. Future studies may clarify the mechanisms underlying perceptual distortions, which may point towards new complementary strategies for the management of chronic oro-facial pain.

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**KEYWORDS:**

body image; chronic oro-facial pain; oral physiology; perceptual distortions; psychological condition; quality of life

PMID: 26826628

**14. HEADACHES****Gray matter changes**

Cephalalgia. 2016 Feb 6. pii: 0333102416630593.

**Gray matter changes related to medication overuse in patients with chronic migraine.**

Lai TH<sup>1</sup>, Chou KH<sup>2</sup>, Fuh JL<sup>3</sup>, Lee PL<sup>4</sup>, Kung YC<sup>4</sup>, Lin CP<sup>5</sup>, Wang SJ<sup>6</sup>.

Abstract

**OBJECTIVE:**

The objective of this article is to investigate the neurological substrates associated with medication overuse (MO) in patients with chronic migraine (CM).

**METHODS:**

We recruited age- and sex-matched CM patients with MO (CMwMO), CM patients without MO (CMwoMO), and healthy controls (HCs). Magnetic resonance T1-weighted images were processed by voxel-based morphometry, and the findings were correlated with clinical variables and treatment responses.

**RESULTS:**

A total of 66 patients with CM (half with MO) and 33 HCs completed the study. Patients with CMwMO compared to the patients with CMwoMO showed gray matter volume (GMV) decrease in the orbitofrontal cortex and left middle occipital gyrus as well as GMV increase in the left temporal pole/parahippocampus. The GMV changes explained 31.1% variance of the analgesics use frequency. The patients who responded to treatment had greater GMV in the orbitofrontal cortex ( $p = 0.028$ ). Patients with CM (with and without MO), compared with HCs, had decreased GMV at multiple brain areas including the frontal, temporal and occipital lobes, precuneus and cerebellum.

**CONCLUSIONS:**

Our study showed GMV changes in CMwMO patients compared to the CMwoMO patients. These three cerebral regions accounted for significant variance in analgesics use frequency. Moreover, the GMV of the orbitofrontal cortex was predictive of the response to MO treatments.

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**KEYWORDS:**

Magnetic resonance imaging; medication overuse; migraine; orbitofrontal cortex; voxel-based morphometry

PMID: 26853805

**Migraines and Parkinson's disease**

Cephalalgia. 2016 Feb 6. pii: 0333102416630577.

**Migraine is related to an increased risk of Parkinson's disease: A population-based, propensity score-matched, longitudinal follow-up study.**

Wang HI<sup>1</sup>, Ho YC<sup>2</sup>, Huang YP<sup>3</sup>, Pan SL<sup>4</sup>.

Abstract

**BACKGROUND:**

The association between migraine and Parkinson's disease (PD) remains controversial. The purpose of the present population-based, propensity score-matched follow-up study was to investigate whether migraineurs are at a higher risk of developing PD.

**METHODS:**

A total of 41,019 subjects aged between 40 and 90 years with at least two ambulatory visits with a diagnosis of migraine in 2001 were enrolled in the migraine group. A logistic regression model that included age, sex, pre-existing comorbidities and socioeconomic status as covariates was used to compute the propensity score. The non-migraine group consisted of 41,019 propensity score-matched, randomly sampled subjects without migraine. The PD-free survival rate were estimated using the Kaplan-Meier method. Stratified Cox proportional hazard regression was used to estimate the effect of migraine on the risk of developing PD.

**RESULTS:**

During follow-up, 148 subjects in the migraine group and 101 in the non-migraine group developed PD. Compared to the non-migraine group, the hazard ratio of PD for the migraine group was 1.64 (95% confidence interval: 1.25-2.14,  $p = 0.0004$ ). The PD-free survival rate for the migraine group was significantly lower than that for the non-migraine group ( $p = 0.0041$ ).

**CONCLUSIONS:**

This study showed an increased risk of developing PD in patients with migraine.

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**KEYWORDS:**

Migraine; Parkinson's disease; propensity score; risk factors

PMID: 26853806

## Arterial stiffness

Obesity (Silver Spring). 2016 Feb 5. doi: 10.1002/oby.21414.

**Higher augmentation index is associated with tension-type headache and migraine in middle-aged/older humans with obesity.**

Kalil GZ<sup>1,2</sup>, Recober A<sup>3</sup>, Hoang-Tienor A<sup>3</sup>, Bridget Zimmerman M<sup>4,5</sup>, Haynes WG<sup>2,6</sup>, Pierce GL<sup>1,6,7,8</sup>.

Abstract

**OBJECTIVE:**

Obesity is a major risk factor for chronic daily headaches, including migraine and tension-type headache (TTH). Although migraine is associated with increased risk of cardiovascular diseases (CVD), a relation between TTH and CVD risk has not been established. It was hypothesized that higher carotid-femoral pulse wave velocity (CFPWV) and augmentation index (AI), measures of aortic stiffness and pressure wave reflection, respectively, and biomarkers of CVD risk, would be higher among adults with obesity and migraine or TTH compared with those with no headache.

**METHODS:**

Adults with obesity (n = 93; body mass index  $\geq 30$  kg/m<sup>2</sup>) who were between 40 and 75 years old with at least one additional CVD risk factor were enrolled. Subjects had CFPWV and AI assessed and a complete neurological exam for diagnosis of headache in the past 12 months.

**RESULTS:**

Adults with obesity and TTH (P = 0.018), but not migraine (P = 0.29), had significantly higher AI compared with those with no headache. When both CFPWV and AI were considered in a logistic regression model with migraine or TTH, only AI was associated with TTH (P = 0.008) and migraine (P = 0.032) but could not distinguish between the two headache phenotypes.

**CONCLUSIONS:**

Increased aortic AI but not stiffness is associated with TTH and migraine among middle-aged/older adults with obesity and high CVD risk.

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PMID: 26847595

## Trigeminal nerve

Cephalalgia. 2016 Feb 8. pii: 0333102416630579.

**The phenotype of migraine with unilateral cranial autonomic symptoms documents increased peripheral and central trigeminal sensitization. A case series of 757 patients.**

Barbanti P<sup>1</sup>, Aurilia C<sup>2</sup>, Dall'Armi V<sup>3</sup>, Egeo G<sup>2</sup>, Fofi L<sup>2</sup>, Bonassi S<sup>3</sup>.

Abstract

**BACKGROUND:**

Migraine with unilateral cranial autonomic symptoms (UAS) is a putative migraine endophenotype with convincing response to trigeminal-targeted treatments that still needs a thorough characterization.

**OBJECTIVE:**

The objective of this article is to carefully investigate the clinical phenotype of migraine with UAS in a large group of patients for more accurate migraine diagnoses, improved clinical management, and better outcome prediction.

**METHODS:**

We studied 757 consecutive episodic and chronic migraineurs in a tertiary headache clinic with face-to-face interviews, detailing in depth their lifestyle, sociodemographic and headache characteristics.

**RESULTS:**

Migraineurs with UAS (37.4%) differed from the general migraine population with respect to longer attack duration (OR = 2.47,  $p < 0.02$ , having >72-hour long attacks), more strictly unilateral (OR = 3.18,  $p < 0.001$ ) and severe headache (OR = 1.72,  $p = 0.011$ ), more frequent allodynia (OR = 3.03,  $p < 0.001$ ) and photophobia (OR = 1.87,  $p = 0.019$ ).

**CONCLUSIONS:**

Migraine patients with UAS are characterized not only by symptoms due to intense peripheral trigeminal activation but also to central sensitization. Our study broadens the knowledge on the clinical and phenotypic characteristics of migraine with UAS, suggests pathophysiological implications, and supports the need for future prospective clinical studies.

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**KEYWORDS:**

Migraine; cranial autonomic symptoms; disability; pathophysiology; trigemino-autonomic reflex

PMID: 26858260

## Changes in cortex

J Headache Pain. 2015 Dec;17(1):4. doi: 10.1186/s10194-016-0593-1. Epub 2016 Feb 1.

**Right fronto-insular white matter tracts link cognitive reserve and pain in migraine patients.**

Gomez-Beldarrain M<sup>1</sup>, Oroz I<sup>2</sup>, Zapiain BG<sup>3</sup>, Ruanova BF<sup>4</sup>, Fernandez YG<sup>3</sup>, Cabrera A<sup>4</sup>, Anton-Ladislao A<sup>5</sup>, Aguirre-Larracochea U<sup>5</sup>, Garcia-Monco JC<sup>2</sup>.

Abstract

**BACKGROUND:**

Structural white matter abnormalities in pain-modulating regions are present in migraine. Whether they are associated with pain chronification and with cognitive reserve is unclear.

**METHODS:**

Prospective, cohort, six-month study of adult patients with episodic or chronic migraine, and controls. Cognitive reserve, quality of life, impact of pain on daily living, depression and anxiety were assessed. Participants underwent a diffusion-tensor MRI to establish the integrity of white matter tracts of three regions of interest (ROIs) implicated in pain modulation, emotion, cognition and resilience (anterior insula, anterior cingulate gyrus, and uncinate fasciculus).

**RESULTS:**

Fifty-two individuals were enrolled: 19 episodic migraine patients, 18 chronic migraine patients, and 15 controls. The analysis of the fractional anisotropy in the ROIs showed that those patients with the poorest prognosis (i.e., those with chronic migraine despite therapy at six months -long-term chronic migraineurs) had a significantly lower fractional anisotropy in the right ROIs. Participants with higher cognitive reserve also had greater fractional anisotropy in the right anterior insula and both cingulate gyri. Multivariate analysis showed a significant association between cognitive reserve, migraine frequency, and fractional anisotropy in the right-sided regions of interest.

**CONCLUSIONS:**

Long-term chronic migraine patients show abnormalities in anterior white matter tracts, particularly of the right hemisphere, involved in pain modulation emotion, cognition and resilience. Robustness in these areas is associated with a higher cognitive reserve, which in turn might result in a lower tendency to migraine chronification.

**KEYWORDS:**

Chronic migraine; Cingulate gyri; Cognitive reserve; Fractional anisotropy; Insula; Migraine; Uncinate fasciculus

PMID: 26830863

## 16. CONCUSSIONS

### Concussion facts

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#### An inside look at concussions

Wednesday February 3, 2016 **By Chris Armes, Communications Officer**  
*Queen's researchers examining the structural, functional changes to the brain caused by traumatic brain injuries.*

With concussions in sport receiving increasing attention from athletes, sports fans and researchers alike, Queen's University post-doctoral researcher Clarisse Mark is at the leading edge in exploring the functional changes to the brain caused by injury.

Using Functional MRI scans of concussed athletes and Canadian Armed Forces members, Dr. Clarisse Mark is studying how concussions effect the brain.

A biomedical engineer by training, Dr. Mark saw the opportunity to expand her research focus from healthy young adults to study those with mild traumatic brain injuries or concussions. Using advanced Functional MRI – which examines brain activity overlaid onto structural features – Dr. Mark explores how patients are affected by concussions.

“With Functional MRI, we can look at which regions of the brain activate during certain tasks, how the brain vessels feed those regions and how they are interconnected, in addition to examining the structural components of the brain,” says Dr. Mark

Along with her colleagues, Drs. Ingrid Johnsrude (Western), DJ Cook and Doug Munoz (Center for Neuroscience Studies), Dr. Mark developed a proposal for a nationwide collaboration to study concussion injuries in athletes and Canadian Armed Forces members.

Participants in the study take part in two activities, designed to examine how concussions affect skills such as memory, cognition, movement and balance. The first test, Dr. Mark's Functional MRI, consists of a memory test and a specialized breathing task – to measure blood flow in the brain -- while inside an MRI scanner. Participants are also scanned while watching a short video clip.

The second activity, held on a subsequent day, involves performing a series of tasks on a specially-built robot called KINARM -- the Kinesiological Instrument for Normal and Altered Reaching Movements. The tests measure the participant's speed, accuracy, reaction time, decision-making and balance. Non-concussed “control” participants perform each task once. Participants suffering from a concussion undergo each test four times – as soon as possible after the injury, one week later, a couple months later and one year after the injury – to track changes in performance as the brain heals. The program has recruited seven concussed athletes to date.

“I'm very excited about our research so far,” says Dr. Mark. “There is a lot of research into concussions taking place in the United States, but we are one of only a handful of researchers in Canada exploring the issue.” While Dr. Mark and her colleagues are currently recruiting subjects from the varsity teams at Queen's, RMC and St. Lawrence, they hope to expand their subject pool to include soldiers who have suffered traumatic brain injuries in combat. For more details and/or to participate, please contact Cheryl Hamilton at [qconclusion@gmail.com](mailto:qconclusion@gmail.com).

### Rest is important

#### FIRST-OF-ITS-KIND STUDY EXPLAINS WHY REST IS CRITICAL AFTER A CONCUSSION

Karen Teber

*km463@georgetown.edu*

**WASHINGTON** — Doctors who order several days of rest after a person suffers a concussion are giving sound advice, say researchers, and new data from animal models explains why.

Georgetown University Medical Center neuroscientists say rest — for more than a day — is critical for allowing the brain to reset neural networks and repair any short-term injury. The new study in mice also shows that repeated mild concussions with only a day to recover between injuries leads to mounting damage and brain inflammation that remains evident a year after injury.

“It is good news that the brain can recover from a hit if given enough time to rest and recover. But on the flip side, we find that the brain does not undertake this rebalancing when impacts come too close together,” says the study’s lead researcher, Mark P. Burns, PhD, assistant professor of neuroscience at GUMC and director of the Laboratory for Brain Injury and Dementia.

This first-of-its-kind study, published in the March 2016 issue of *American Journal of Pathology*, modeled repeated mild head trauma as a means to investigate brain damage that occurs after a sports, military or domestic abuse injury.

Investigators developed a mouse model of repetitive, extremely mild concussive impacts conducted while the mouse is anesthetized. They compared the brain’s response to a single concussion with an injury received daily for 30 days and one received weekly over 30 weeks.

Mice with a single insult temporarily lose 10-15 percent of the neuronal connections in their brains, but no inflammation or cell death resulted, Burns says. With three days rest, all neuronal connections were restored. This neuronal response is not seen in mice with daily concussions, but the pattern is restored when a week of rest is given between each insult, Burns says.

When a mild concussion occurred each day for a month, inflammation and damage to the brain’s white matter resulted. “This damage became progressively worse for two months and remained apparent one year after the last impact,” Burns says.

“The findings mirror what has been observed about such damage in humans years after a brain injury, especially among athletes,” Burns says. “Studies have shown that almost all people with single concussions spontaneously recover, but athletes who play contact sports are much more susceptible to lasting brain damage. These findings help fill in the picture of how and when concussions and mild head trauma can lead to sustained brain damage.”

## White matter

AJNR Am J Neuroradiol. 2015 Sep 24.

**Principal Component Analysis of Diffusion Tensor Images to Determine White Matter Injury Patterns Underlying Postconcussive Headache.**

Ghodadra A<sup>1</sup>, Alhilali L<sup>2</sup>, Fakhran S<sup>2</sup>.

Abstract

**BACKGROUND AND PURPOSE:**

Principal component analysis, a data-reduction algorithm, generates a set of principal components that are independent, linear combinations of the original dataset. Our study sought to use principal component analysis of fractional anisotropy maps to identify white matter injury patterns that correlate with posttraumatic headache after mild traumatic brain injury.

**MATERIALS AND METHODS:**

Diffusion tensor imaging and neurocognitive testing with the Immediate Post-Concussion Assessment and Cognitive Test were performed in 40 patients with mild traumatic brain injury and 24 without posttraumatic headache. Principal component analysis of coregistered fractional anisotropy maps was performed. Regression analysis of the major principal components was used to identify those correlated with posttraumatic headache. Finally, each principal component that correlated with posttraumatic headache was screened against other postconcussive symptoms and demographic factors.

**RESULTS:**

Principal component 4 (mean,  $7.1 \pm 10.3$ ) correlated with the presence of posttraumatic headache in mild traumatic brain injury (odds ratio per SD, 2.32; 95% CI, 1.29-4.67;  $P = .01$ ). Decreasing principal component 4 corresponded with decreased fractional anisotropy in the midsplenium and increased fractional anisotropy in the genu of the corpus callosum. Principal component 4 identified patients with posttraumatic headache with an area under the receiver operating characteristic curve of 0.73 and uniquely correlated with posttraumatic headache and no other postconcussive symptom or demographic factors.

**CONCLUSIONS:**

Principal component analysis can be an effective data-mining method to identify white matter injury patterns on DTI that correlate with clinically relevant symptoms in mild traumatic brain injury. A pattern of reduced fractional anisotropy in the splenium and increased fractional anisotropy in the genu of the corpus callosum identified by principal component analysis can help identify patients at risk for posttraumatic headache after mild traumatic brain injury.

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PMID: 26405087

**20 A. ROTATOR CUFF****Rotator interval**

BMC Musculoskelet Disord. 2016 Jan 28;17(1):46. doi: 10.1186/s12891-016-0898-x.

**The effect of the rotator interval on glenohumeral kinematics during abduction.**

Haghpanah B<sup>1,2</sup>, Walley KC<sup>3</sup>, Hingsammer A<sup>4</sup>, Harlow ER<sup>5</sup>, Oftadeh R<sup>6,7</sup>, Vaziri A<sup>8</sup>, Ramappa AJ<sup>9</sup>, DeAngelis JP<sup>10</sup>, Nazarian A<sup>11,12</sup>.

Abstract

**BACKGROUND:**

The rotator interval (RI) has been exploited as a potentially benign point of entry into the glenohumeral (GH) joint. Bounded by the supraspinatus, subscapularis and coracoid process of the scapula, the RI is believed to be important in the shoulder's soft tissue balancing and function. However, the role of the RI in shoulder kinematics is not fully understood. The purpose of this study is to describe the effect of the RI on GH motion during abduction of the arm.

**METHODS:**

Six shoulders from three cadaveric torsos were studied to assess the impact of changes in the RI during abduction under four conditions: Intact (Baseline), Opened, Repaired (repaired with side-to-side tissue approximation, no overlap) and Tightened (repaired with 1 cm overlap). For each group, the GH translation and area under the Curve (AUC) were measured during abduction using an intact cadaveric shoulder (intact torso).

**RESULTS:**

GH kinematics varied in response to each intervention and throughout the entire abduction arc. Opening the RI caused a significant change in GH translation. The Repair and Tightened groups behaved similarly along all axes of GH motion.

**CONCLUSIONS:**

The RI is central to normal GH kinematics. Any insult to the tissue's integrity alters the shoulder's motion throughout abduction. In this model, closing the RI side-to-side has the same effect as tightening the RI. Since suture closure may offer the same benefit as tightening the RI, clinicians should consider this effect when treating patients with shoulder laxity. This investigation provides an improved perspective on the role of the RI on GH kinematics during abduction. When managing shoulder pathology, surgeons should consider how these different methods of RI closure affect the joint's motion. In different circumstances, the surgical approach to the RI can be tailored to address each patient's specific needs.

PMID: 2681861

**Return of scapula kinematics**

J Shoulder Elbow Surg. 2016 Jan 21. pii: S1058-2746(15)00592-3. doi:

10.1016/j.jse.2015.10.021

**Three-dimensional shoulder kinematics normalize after rotator cuff repair.**

Kolk A<sup>1</sup>, de Witte PB<sup>2</sup>, Henseler JF<sup>2</sup>, van Zwet EW<sup>3</sup>, van Arkel ER<sup>4</sup>, van der Zwaal P<sup>4</sup>, Nelissen RG<sup>5</sup>, de Groot JH<sup>6</sup>.

**BACKGROUND:**

Patients with a rotator cuff (RC) tear often exhibit scapular dyskinesia with increased scapular lateral rotation and decreased glenohumeral elevation with arm abduction. We hypothesized that in patients with an RC tear, scapular lateral rotation, and thus glenohumeral elevation, will be restored to normal after RC repair.

**METHODS:**

Shoulder kinematics were quantitatively analyzed in 26 patients with an electromagnetic tracking device (Flock of Birds) before and 1 year after RC repair in this observational case series. We focused on humeral range of motion and scapular kinematics during abduction. The asymptomatic contralateral shoulder was used as the control. Changes in scapular kinematics were associated with the gain in range of motion. Shoulder kinematics were analyzed using a linear mixed model.

**RESULTS:**

Mean arm abduction and forward flexion improved after surgery by 20° (95% confidence interval [CI], 2.7°-36.5°; P = .025) and 13° (95% CI, 1.2°-36.5°; P = .044), respectively. Kinematic analyses showed decreases in mean scapular protraction (ie, internal rotation) and lateral rotation (ie, upward rotation) during abduction by 3° (95% CI, 0.0°-5.2°; P = .046) and 4° (95% CI, 1.6°-8.4°; P = .042), respectively. Glenohumeral elevation increased by 5° (95% CI, 0.6°-9.7°; P = .028) at 80°. Humeral range of motion increased when scapular lateral rotation decreased and posterior tilt increased.

**CONCLUSIONS:**

Scapular kinematics normalize after RC repair toward a symmetrical scapular motion pattern as observed in the asymptomatic contralateral shoulder. The observed changes in scapular kinematics are associated with an increased overall range of motion and suggest restored function of shoulder muscles.

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**KEYWORDS:**

Rotator cuff; kinematics; kinesiology; movement; shoulder; surgery; tears

PMID: 2680393

### Degenerative changes

Phys Ther. 2016 Feb 4.

#### **Developmental Biology and Regenerative Medicine: Addressing the Vexing Problem of Persistent Muscle Atrophy in the Chronically Torn Human Rotator Cuff.**

Meyer GA<sup>1</sup>, Ward SR<sup>2</sup>.

Persistent muscle atrophy in the chronically torn rotator cuff is a significant obstacle for treatment and recovery. Large atrophic changes are predictive of poor surgical and non-surgical outcomes and frequently fail to resolve even following functional restoration of loading and rehabilitation. New insights into the processes of muscle atrophy and recovery gained through studies in Developmental Biology combined with the novel tools and strategies emerging in Regenerative Medicine provides new avenues to combat the vexing problem of muscle atrophy in the rotator cuff. Moving these treatment strategies forward is likely going to involve the combination of surgery, biologic/cellular agents and physical interventions, as increasing experimental evidence points to the beneficial interaction between biologic therapies and physiologic stresses. Thus, the physical therapy profession is poised to play a significant role in defining the success of these combinatorial therapies.

This perspective will provide an overview of the Developmental Biology and Regenerative Medicine strategies currently under investigation to combat muscle atrophy and how they may integrate into the current and future practice of physical therapy.

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PMID: 26847008

**27. HIP****Abdominal fat and increase risk of fx**

Osteoporos Int. 2016 Feb 5.

**Abdominal obesity and hip fracture: results from the Nurses' Health Study and the Health Professionals Follow-up Study.**

Meyer HE<sup>1,2,3</sup>, Willett WC<sup>4,5,6</sup>, Flint AJ<sup>4,5</sup>, Feskanich D<sup>6</sup>.

Abdominal obesity might increase fracture risk. We studied the prospective associations between waist circumference, waist-to-hip ratio, and hip fracture. The indicators of abdominal obesity were associated with increased hip fracture risk in women, but not in men. The increased risk was restricted to women with low physical activity.

**INTRODUCTION:**

Low weight is an established risk factor for osteoporosis and hip fracture. However, the association between fat tissue, muscle, and bone is complex, and abdominal obesity might increase fracture risk. We studied the prospective associations between indicators of abdominal obesity and hip fracture in two large US cohorts.

**METHODS:**

At baseline in 1986 and through biennial follow-up, information on hip fracture and potential risk factors was collected in 61,677 postmenopausal women and 35,488 men above age 50. Waist and hip circumferences were reported at baseline and updated twice.

**RESULTS:**

During follow-up, 1168 women and 483 men sustained a hip fracture. After controlling for known risk factors, there was a significant association in women between increasing waist circumference and hip fracture (RR per 10-cm increase 1.13 (95 % CI 1.04-1.23) and between increasing waist-to-hip ratio and hip fracture (RR per 0.1 unit increase 1.14 (95 % CI 1.04-1.23), but these associations were not seen in men. In women, both measures interacted with physical activity. Those in the highest ( $\geq 0.90$ ) versus lowest ( $< 0.75$ ) category of waist-to-hip ratio had increased risk of hip fracture if their activity was less than the population median (RR = 1.61, 95 % CI 1.18-2.19) but not if their activity was higher (RR = 1.00, 95 % CI 0.72-1.40). A similar pattern was found for waist circumference.

**CONCLUSION:**

Indicators of abdominal obesity were associated with increased hip fracture risk after controlling for BMI in women. The increased risk was restricted to women with low physical activity. In men, no significant associations were found.

**KEYWORDS:**

Aging; Bone-fat interactions; Hip fracture; Obesity; Physical activity; Prospective

PMID: 26849456

**IT band and the Ober test**

Am J Sports Med. 2016 Jan 11. pii: 0363546515621762.

**An Anatomic Investigation of the Ober Test.**

Willett GM1, Keim SA2, Shostrom VK3, Lomneth CS2.

**BACKGROUND:**

Recent studies have questioned the importance of the iliotibial band (ITB) in lateral knee pain. The Ober test or modified Ober test is the most commonly recommended physical examination tool for assessment of ITB tightness. No studies support the validity of either Ober test for measuring ITB tightness.

**PURPOSE/HYPOTHESIS:**

The purpose of this study was to assess the effects of progressive transection of the ITB, gluteus medius and minimus (med/min) muscles, and hip joint capsule of lightly embalmed cadavers on Ober test results and to compare them with assessment of all structures intact. In addition, thigh position change between gluteus med/min transection and hip capsule transection was also assessed for both versions of the Ober test. It was hypothesized that transection of the ITB would significantly increase thigh adduction range of motion as measured by an inclinometer when performing either Ober test and that subsequent structure transections (gluteus med/min muscles followed by the hip joint capsule) would cause additional increases in thigh adduction.

**STUDY DESIGN:** Controlled laboratory study.

**METHODS:**

The lower limbs of lightly embalmed cadavers were assessed for midhigh ITB transection versus intact by use of the Ober (n = 28) and modified Ober (n = 34) tests; 18 lower limbs were assessed for all conditions (intact band, followed by sequential transections of the ITB midhigh, gluteus med/min muscles, hip joint capsule) by use of both Ober tests. Paired t tests were used to compare changes in Ober test results between conditions.

**RESULTS:**

No significant changes in thigh position (adduction) occurred in either version of the Ober test after ITB transection. Significant differences were noted for intact band versus gluteus med/min transection and intact band versus hip joint capsule transection ( $P < .0001$ ) for all findings for both tests. Mean inclinometer measurements for the modified Ober were 4.28° (n = 34 for intact vs ITB transection comparisons), 3.33° (n = 18 for subsequent intact vs gluteus muscle and hip capsule transection comparisons), 5.00° (n = 34 for midhigh ITB transection), 11.20° (gluteus med/min transection), and 13.20° (hip capsule transection). For the Ober test, measures were -2.90° (n = 28 for intact vs ITB transection comparisons), -2.20° (n = 18 for subsequent intact vs gluteus muscle and hip capsule transection comparisons), -2.20° (n = 34 for midhigh ITB transection), 6.50° (gluteus med/min transection), and 9.53° (hip capsule transection). Statistically significant differences were also noted between test findings comparing gluteus med/min transection to hip capsule transection (Ober,  $P < .0001$ ; modified Ober,  $P = .0036$ ).

**CONCLUSION:**

The study findings refute the hypothesis that the ITB plays a role in limiting hip adduction during either version of the Ober test and question the validity of these tests for determining ITB tightness. The findings underscore the influence of the gluteus medius and minimus muscles as well as the hip joint capsule on Ober test findings.

**CLINICAL RELEVANCE:**

The results of this study suggest that the Ober test assesses tightness of structures proximal to the hip joint, such as the gluteus medius and minimus muscles and the hip joint capsule, rather than the ITB.

**KEYWORDS:** Ober test; iliotibial band; knee pain; lightly embalmed cadaver; modified Ober test

**28. REPLACEMENTS****Progressive exercise**

Clin Rehabil. 2016 Feb 5. pii: 0269215516628305.

**Description of load progression and pain response during progressive resistance training early after total hip arthroplasty: Secondary analyses from a randomized controlled trial.**

Mikkelsen LR<sup>1</sup>, Petersen AK<sup>2</sup>, Mechlenburg I<sup>3</sup>, Mikkelsen S<sup>4</sup>, Søballe K<sup>5</sup>, Bandholm T<sup>6</sup>.

Abstract

**OBJECTIVE:**

To describe a progressive resistance training intervention implemented shortly after total hip arthroplasty, including a detailed description of load progression, pain response and adverse events to the training.

**DESIGN:**

Secondary analyses of data from the intervention group in a randomized controlled trial.

**SUBJECTS:**

This study reports data from the intervention group (n = 37).

**INTERVENTIONS:**

The protocol described supervised progressive resistance training of the operated leg two days/week in addition to home-based exercise five days/week and for 10 weeks. The relative load progressed from 12 repetition maximum to 8 repetition maximum during 10 weeks for the exercises: knee extension, hip abduction, -flexion and -extension.

**MAIN MEASURES:**

Training load in kilograms (kg) for each exercise, hip pain during, before and after exercise using the Visual Analog Scale and adverse events during the initial four weeks of training.

**RESULTS:**

The majority of patients experienced only moderate hip pain during exercise (range in median across exercises and sessions: 5-35 mm Visual Analog Scale) and mild pain at rest (median: 1-18 mm Visual Analog Scale), both of which decreased over time ( $p < 0.001$ ), despite a substantial increase in absolute training load (67%-166 % across exercises,  $p < 0.001$ ). Out of 152 training sessions, short term pain response (an increase  $>20$  mm Visual Analog Scale) occurred in 13 patients in 24 training sessions.

**CONCLUSION:**

Progressive resistance training as described in the present study can be implemented shortly following total hip arthroplasty with substantial load progression and no overall exacerbation of postoperative pain. Some patients may experience a short term pain response.

**TRIAL REGISTRATION PRIMARY TRIAL:**

NCT01214954.

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**KEYWORDS:** *Hip replacement; pain; physiotherapy; strength training*

PMID:26851251

**30 A. IMPINGEMENT****Surgery helps**

Scand J Med Sci Sports. 2016 Jan 21. doi: 10.1111/sms.12641

**Outcome after hip arthroscopy for femoroacetabular impingement in 289 patients with minimum 2-year follow-up.**

Sansone M<sup>1,2</sup>, Ahldén M<sup>1,2</sup>, Jónasson P<sup>1</sup>, Thomeé C<sup>1</sup>, Swärd L<sup>2</sup>, Öhlin A<sup>1</sup>, Baranto A<sup>1</sup>, Karlsson J<sup>1</sup>, Thomeé R<sup>3</sup>.

**Abstract**

Femoroacetabular impingement (FAI) is a common cause of hip pain and dysfunction. The purpose of this study was to report outcome 2 years after the arthroscopic treatment of FAI using validated outcome measurements. Two hundred and eighty-nine patients (males = 190, females = 99) with a mean age of 37 years underwent arthroscopic surgery for FAI. Patients were included consecutively in a hip arthroscopy registry. The cohort was evaluated using online web-based validated health-related patient-reported outcomes measurements, including the iHOT-12, HAGOS, EQ-5D, HSAS for physical activity level, VAS for overall hip function and overall satisfaction. The mean follow-up time was 25.4 months. Pre-operative scores compared with those obtained at follow-up revealed statistically and clinically significant improvements ( $P < 0.05$ ) for all measured outcomes; iHOT-12 (43 vs 66), VAS for global hip function (50 vs 71), HSAS (2.9 vs 3.6), EQ-5D index (0.58 vs 0.75), EQ-VAS (67 vs 75) and HAGOS different subscales (56 vs 76, 51 vs 69, 60 vs 78, 40 vs 65, 29 vs 57, 33 vs 58). At the 2-year follow-up, 236 patients (82%) reported they were satisfied with the outcome of surgery. We conclude that arthroscopic treatment for FAI resulted in statistically and clinically significant improvements in outcome parameters.

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**KEYWORDS:**

FAI ; Hip arthroscopy; registry

PMID: 26791778

**Impingement groin hernias**

Am J Sports Med. 2015 Sep;43(9):2146-51. doi: 10.1177/0363546515591259. Epub 2015 Jul 17.

**Sonographic prevalence of groin hernias and adductor tendinopathy in patients with femoroacetabular impingement.**

Naal FD1, Dalla Riva F2, Wuerz TH3, Dubs B4, Leunig M2.

**BACKGROUND:**

Femoroacetabular impingement (FAI) is a common debilitating condition that is associated with groin pain and limitation in young and active patients. Besides FAI, various disorders such as hernias, adductor tendinopathy, athletic pubalgia, lumbar spine affections, and others can cause similar symptoms.

**PURPOSE:**

To determine the prevalence of inguinal and/or femoral herniation and adductor insertion tendinopathy using dynamic ultrasound in a cohort of patients with radiographic evidence of FAI.

**STUDY DESIGN:**

Case series; Level of evidence, 4.

**METHODS:**

This retrospective study consisted of 74 patients (36 female and 38 male; mean age, 29 years; 83 symptomatic hips) with groin pain and radiographic evidence of FAI. In addition to the usual diagnostic algorithm, all patients underwent a dynamic ultrasound examination for signs of groin herniation and tendinopathy of the proximal insertion of the adductors.

**RESULTS:**

Evidence of groin herniation was found in 34 hips (41%). There were 27 inguinal (6 female, 21 male) and 10 femoral (9 female, 1 male) hernias. In 3 cases, inguinal and femoral herniation was coexistent. Overall, 5 patients underwent subsequent hernia repair. Patients with groin herniation were significantly older than those without (33 vs 27 years, respectively;  $P = .01$ ). There were no significant differences for any of the radiographic or clinical parameters. Tendinopathy of the proximal adductor insertion was detected in 19 cases (23%; 11 female, 8 male). Tendinopathy was coexistent with groin herniation in 8 of the 19 cases. There were no significant differences for any of the radiographic or clinical parameters between patients with or without tendinopathy. Patients with a negative diagnostic hip injection result were more likely to have a concomitant groin hernia than those with a positive injection result (80% vs 27%, respectively). Overall, 38 hips underwent FAI surgery with satisfactory outcomes in terms of score values and subjective improvement.

**CONCLUSION:**

The results demonstrate that groin herniation and adductor insertion tendinopathy coexist frequently in patients with FAI. Although the clinical effect is yet unclear, 5 patients underwent hernia repair. Dynamic ultrasound is a useful tool to detect such pathological abnormalities. Diagnostic hip injections can be helpful to differentiate between the sources of pain.

**KEYWORDS:**

FAI; adductor tendinopathy; diagnostic hip injection; femoroacetabular impingement; groin pain; hernia

**32 A. KNEE/ACL****Testing for**

Arthroscopy. 2016 Jan 25. pii: S0749-8063(15)00893-2. doi: 10.1016/j.arthro.2015.11.018

**Factors Associated With High-Grade Lachman, Pivot Shift, and Anterior Drawer at the Time of Anterior Cruciate Ligament Reconstruction.**

Magnussen RA<sup>1</sup>, Reinke EK<sup>2</sup>, Huston LJ<sup>2</sup>; MOON Group, Hewett TE<sup>3</sup>, Spindler KP<sup>4</sup>.  
Collaborators (15)

Abstract

**PURPOSE:**

To determine which patient and injury factors are associated with the detection of high-grade laxity on examination under anesthesia before anterior cruciate ligament (ACL) reconstruction.

**METHODS:**

We identified 2,318 patients who underwent primary ACL reconstruction without associated ligament injuries. Demographic data and information regarding meniscal tears were collected. Patients with high-grade Lachman (difference from contralateral side >10 mm), pivot-shift (International Knee Documentation Committee grade 3+), or anterior drawer (difference from contralateral side >10 mm) tests were identified by physical examination under anesthesia before ACL reconstruction. Logistic regression modeling was used to evaluate whether chronicity of the ACL injury, patient age, sex, body mass index, generalized ligamentous laxity, and presence of meniscal tears were associated with increased odds of high-grade laxity, while we controlled for examining surgeon.

**RESULTS:**

Patients with chronic tears (>6 months from injury) had greater than twice the odds of having high-grade Lachman, pivot-shift, and anterior drawer tests (all  $P < .001$ ) relative to patients with acute tears (<3 months from injury). Generalized ligamentous laxity (odds ratio [OR], 2.33;  $P < .001$ ) and the presence of medial (OR, 1.63;  $P < .001$ ) or lateral (OR, 1.41;  $P = .013$ ) meniscus tears were associated with increased odds of a high-grade Lachman test. Age younger than 20 years (OR, 1.34;  $P = .023$ ), female sex (OR, 1.49;  $P = .001$ ), generalized ligamentous laxity (OR, 3.46;  $P < .001$ ), and the presence of a medial (OR, 1.53;  $P < .001$ ) or lateral (OR, 1.27;  $P = .041$ ) meniscus tear were associated with increased odds of a high-grade pivot-shift test. Generalized ligamentous laxity (OR, 2.27;  $P < .001$ ) and the presence of a medial (OR, 1.73;  $P = .001$ ) or lateral (OR, 1.50;  $P = .010$ ) meniscus tear were associated with increased odds of a high-grade anterior drawer test.

**CONCLUSIONS:**

Chronic ACL tears, generalized ligamentous laxity, and meniscus tears are associated with increased odds of high-grade laxity with all 3 tests. Female patients and age younger than 20 years are associated with increased odds of a high-grade pivot-shift test.

**LEVEL OF EVIDENCE:**

Level II, lesser-quality prospective study.

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PMID: 26821957

**Postural stability**

J Sport Rehabil. 2016 Jan 26.

**Dual-Tasking Effects on Dynamic Postural Stability in Athletes With and Without Anterior Cruciate Ligament Reconstruction.**

Mohammadi Rad S<sup>1</sup>, Salavati M, Takamjani IE, Akhbari B, Sherafat S, Negahban H, Lali P, Mazaheri M.

Abstract

**PURPOSE:**

To compare the effect of dual-tasking on postural stability between patients with anterior cruciate ligament reconstruction (ACL-R) and healthy controls.

**METHODS:**

Single-limb postural stability was assessed in 17 athletes with ACL-R and 17 healthy matched athletes while standing on a Biodex Balance System platform in four conditions: stability level of 8 (i.e. more stable support surface) with eyes open; stability level of 8 with eyes closed; stability level of 6 (i.e. less stable support surface) with eyes open; and stability level of 6 with eyes closed. Postural stability tasks were performed with and without auditory Stroop task. The anterior-posterior stability index (APSI), medial-lateral stability index (MLSI) and overall stability index (OSI) as measures of postural performance, as well as reaction time and error ratio as measures of cognitive performance were recorded.

**RESULTS:**

Dual-tasking effect on postural stability was not significantly different between the groups in three postural conditions. Only in level 6 with eyes open, for APSI and OSI, patients with ACL-R showed lower postural stability under dual-task condition. However, these patients showed poorer performance on both reaction time and error ratio in all postural conditions.

**CONCLUSIONS:**

The patients with ACL-R appeared to sacrifice their cognitive performance in order to optimize their performance on postural stability. This posture-first strategy was reflected by more pronounced effect of dual-tasking on auditory Stroop task than postural stability task. In situations where maintenance of posture is challenging, giving priority to the postural task at the expense of cognitive performance can ensure safety from balance loss.

PMID:26812747

**Return to sports**

Med Sci Sports Exerc. 2015 Dec 21.

**Clinical Predictors of Knee Mechanics at Return to Sport Following ACL Reconstruction.**

Kline PW1, Johnson DL, Ireland ML, Noehren B.

**Abstract****PURPOSE:**

Despite significant rehabilitation, many athletes experience protracted weakness and faulty mechanics following anterior cruciate ligament reconstruction (ACLR). Clinical tests performed early in rehabilitation that predict knee mechanics at return-to-sport are virtually unknown and critically needed to guide clinical decision making. The purpose of this study is to determine if quadriceps strength, Y-Balance anterior reach distance (YB-A), and single-limb step-down test performance (SLSD) conducted 3 months post-ACLR are predictive of knee flexion excursion (KFLEX) and knee extensor moment (KEM) during running 6 months post-ACLR.

**METHODS:**

Thirty (16 F) subjects were collected 3 and 6 months post-ACLR. Age  $21.3 \pm 7.6$  years, mass  $69.85 \pm 11.4$  kg, height  $1.73 \pm 0.09$  m. At 3 months post-ACLR, subjects performed isometric quadriceps strength testing, YB-A, and SLSD assessments. At 6 months post-ACLR, subjects underwent 3-D motion analysis while running on an instrumented treadmill. Pearson's correlation coefficients and stepwise multiple regression were used to assess the relationships of 3 month and 6 month variables.

**RESULTS:**

Quadriceps strength ( $r=.493$ ,  $p<0.01$ ), YB-A ( $r=.394$ ,  $p=0.03$ ), and SLSD ( $r=.648$ ,  $p<0.01$ ) were significantly correlated to KFLEX. Quadriceps strength ( $.505$ ,  $p<0.01$ ) and SLSD ( $.541$ ,  $p<0.01$ ) were significantly correlated with KEM, while YB-A ( $.276$ ,  $p=0.06$ ) was not. SLSD and quadriceps strength were predictive of KEM (Adj R  $.36$ ,  $p=.001$ ) while only SLSD was predictive of KFLEX (Adj R  $.40$ ,  $p<.001$ ).

**CONCLUSIONS:**

After ACLR, better performance in SLSD and quadriceps strength 3 months post-surgery is predictive of improved sagittal plane knee mechanics during running 6 months post-surgery.

### 40. ANKLE SPRAINS AND INSTABILITY

#### Star excursion test

#### **A new approach of the star excursion balance test to assess dynamic postural control in people complaining from chronic ankle instability**

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Gait and Posture, 02/11/2016 Pionnier R, et al.

**T**he purpose of this study was to quantitatively and qualitatively assess dynamic balance with accuracy in individuals with chronic ankle instability (CAI). The limited body movements and accelerations during the unipodal stance in the CAI group could highlight a protective strategy. The present findings could help clinicians to better understand the motor strategies used by CAI patients during dynamic balance and may guide the rehabilitation process.

**Injury factors**

Med Sci Sports Exerc. 2016 Jan 19.

**Diaphragm Recruitment Increases during a Bout of Targeted Inspiratory Muscle Training.**

Ramsook AH1, Koo R, Molgat-Seon Y, Dominelli PB, Syed N, Ryerson CJ, Sheel AW, Guenette JA.

Abstract

**PURPOSE:**

The extent to which the diaphragm is targeted during a bout of inspiratory muscle training (IMT) is unknown. The purpose of this study was to characterize the relative activation patterns of the diaphragm and extra-diaphragmatic inspiratory muscles during a bout of IMT and to determine if diaphragmatic recruitment can be increased by giving subjects specific diaphragmatic breathing instructions (IMTdi).

**METHODS:**

Ten healthy men were instrumented with surface electromyography (EMG) electrodes on the sternocleidomastoid (EMGscm), scalenes (EMGsca), parasternal intercostals (EMGpic), and 7th intercostal space (EMG7ic). A multi-pair esophageal electrode catheter measured crural diaphragm EMG (EMGdi) and transdiaphragmatic pressure (Pdi). Trial 1 of IMT involved 25 dynamic inspiratory maneuvers at 40% of maximal inspiratory mouth pressure using a variable flow resistive loading device where subjects were free to choose their own inspiratory muscle recruitment strategy. Trial 2 involved the same procedures, but subjects were given specific instructions to actively recruit their diaphragm. Cervical magnetic stimulation of the phrenic nerves verified the absence of diaphragmatic fatigue before commencing the second trial.

**RESULTS:**

Compared to IMT, IMTdi resulted in a significant increase in EMGdi ( $56 \pm 12$  vs.  $73 \pm 10\%$ max,  $p=0.002$ ) and Pdi swings ( $39 \pm 14$  vs.  $64 \pm 17$ cmH<sub>2</sub>O,  $p<0.0001$ ) and decrease in EMGsca ( $52 \pm 21$  vs.  $36 \pm 22\%$ max,  $p=0.04$ ). There was no difference in EMG7ic ( $26 \pm 19$  vs.  $33 \pm 21\%$ max,  $p=0.36$ ), EMGpic ( $31 \pm 24$  vs.  $25 \pm 15\%$ max,  $p=0.22$ ), and EMGscm ( $58 \pm 21$  vs.  $45 \pm 24\%$ max,  $p=0.08$ ) when comparing IMT vs. IMTdi, respectively.

**CONCLUSIONS:**

Simple diaphragmatic breathing instructions can significantly increase the recruitment of the diaphragm during IMT compared to a bout of IMT where individuals are free to choose their own inspiratory muscle recruitment strategy.

PMID: 26795460

### Risk factors

Sports Medicine pp 1-8 08 February 2016

- 
- **Neuromuscular Risk Factors for Knee and Ankle Ligament Injuries in Male Youth Soccer Players**

- Paul J. Read
- , Jon L. Oliver
- , Mark B. A. De Ste Croix
- , Gregory D. Myer
- , Rhodri S. Lloyd

#### **Abstract**

Injuries reported in male youth soccer players most commonly occur in the lower extremities, and include a high proportion of ligament sprains at the ankle and knee with a lower proportion of overuse injuries. There is currently a paucity of available literature that examines age- and sex-specific injury risk factors for such injuries within youth soccer players. Epidemiological data have reported movements that lead to non-contact ligament injury include running, twisting and turning, over-reaching and landing. Altered neuromuscular control during these actions has been suggested as a key mechanism in females and adult populations; however, data available in male soccer players is sparse.

The focus of this article is to review the available literature and elucidate prevalent risk factors pertaining to male youth soccer players which may contribute to their relative risk of injury.

#### 44. RHUMATOID ARTHRITIS

##### OA and inflammation

Bone. 2016 Jan 23. pii: S8756-3282(16)30005-9. doi: 10.1016/j.bone.2016.01.019.

#### **Inflammatory mediators in osteoarthritis: A critical review of the state of the art, prospects, and future challenges.**

Rahmati M<sup>1</sup>, Mobasheri A<sup>2</sup>, Mozafari M<sup>3</sup>.

##### Abstract

Osteoarthritis (OA) has traditionally been defined as a prototypical non-inflammatory arthropathy, but today there is compelling evidence to suggest that it has an inflammatory component. Many recent studies have shown the presence of synovitis in a large number of patients with OA and demonstrated a direct association between joint inflammation and the progression of OA. Pro-inflammatory cytokines, reactive oxygen species (ROS), nitric oxide, matrix degrading enzymes and biomechanical stress are major factors responsible for the progression of OA in synovial joints. The aim of this review is to discuss the significance of a wide range of significant inflammatory mediators and their contribution to the progression of OA. We also discuss some of the currently available guidelines, practices, and prospects. In addition, this review argues for new innovation in methodologies and instrumentation for the non-invasive detection of inflammation in OA by modern imaging techniques.

We propose that identifying early inflammatory events and targeting these alterations will help to ameliorate the major symptoms such as inflammation and pain in OA patients.

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##### **KEYWORDS:**

Cartilage; Inflammatory mediators; Osteoarthritis; Synovitis; Synovium

PMID: 26812612

**45 B. MANUAL THERAPY CERVICAL**

Manip more effective than mob for HA's

BMC Musculoskelet Disord. 2016 Feb 6;17(1):64. doi: 10.1186/s12891-016-0912-3.

**Upper cervical and upper thoracic manipulation versus mobilization and exercise in patients with cervicogenic headache: a multi-center randomized clinical trial.**

Dunning JR<sup>1,2,3</sup>, Butts R<sup>4</sup>, Mourad F<sup>5</sup>, Young I<sup>6</sup>, Fernandez-de-Las Peñas C<sup>7</sup>, Hagins M<sup>8</sup>, Stanislawski T<sup>9</sup>, Donley J<sup>10</sup>, Buck D<sup>11</sup>, Hooks TR<sup>12</sup>, Cleland JA<sup>13</sup>.

Abstract

**BACKGROUND:**

Although commonly utilized interventions, no studies have directly compared the effectiveness of cervical and thoracic manipulation to mobilization and exercise in individuals with cervicogenic headache (CH). The purpose of this study was to compare the effects of manipulation to mobilization and exercise in individuals with CH.

**METHODS:**

One hundred and ten participants (n = 110) with CH were randomized to receive both cervical and thoracic manipulation (n = 58) or mobilization and exercise (n = 52). The primary outcome was headache intensity as measured by the Numeric Pain Rating Scale (NPRS). Secondary outcomes included headache frequency, headache duration, disability as measured by the Neck Disability Index (NDI), medication intake, and the Global Rating of Change (GRC). The treatment period was 4 weeks with follow-up assessment at 1 week, 4 weeks, and 3 months after initial treatment session. The primary aim was examined with a 2-way mixed-model analysis of variance (ANOVA), with treatment group (manipulation versus mobilization and exercise) as the between subjects variable and time (baseline, 1 week, 4 weeks and 3 months) as the within subjects variable.

**RESULTS:**

The 2X4 ANOVA demonstrated that individuals with CH who received both cervical and thoracic manipulation experienced significantly greater reductions in headache intensity ( $p < 0.001$ ) and disability ( $p < 0.001$ ) than those who received mobilization and exercise at a 3-month follow-up. Individuals in the upper cervical and upper thoracic manipulation group also experienced less frequent headaches and shorter duration of headaches at each follow-up period ( $p < 0.001$  for all). Additionally, patient perceived improvement was significantly greater at 1 and 4-week follow-up periods in favor of the manipulation group ( $p < 0.001$ ).

**CONCLUSIONS:**

Six to eight sessions of upper cervical and upper thoracic manipulation were shown to be more effective than mobilization and exercise in patients with CH, and the effects were maintained at 3 months.

**TRIAL REGISTRATION:**

NCT01580280 April 16, 2012.

PMID: 26852024

**51. CFS/BET****FB and LBP**

Scand J Work Environ Health. 2016 Feb 1. pii: 3549. doi: 10.5271/sjweh.3549.

**Social support modifies association between forward bending of the trunk and low-back pain: Cross-sectional field study of blue-collar workers.**

Villumsen M<sup>1</sup>, Holtermann A, Samani A, Madeleine P, Jørgensen MB.

Abstract

**OBJECTIVES:**

This study aimed to investigate the association between forward bending of the trunk and low-back pain intensity (LBPi) among blue-collar workers in Denmark as well as whether the level of social support modifies the association.

**METHODS:**

In total, 457 workers were included in the study. The forward bending of  $\geq 30^\circ$  was computed from accelerometer recordings for several consecutive days during work, categorized into long (highest tertile) and short-moderate (remaining tertiles) duration. LBPi was measured on a 0-10 scale and categorized into low ( $\leq 5$ ) and high ( $> 5$ ) pain. Self-reported social support was categorized into low, moderate, and high levels. Multi-adjusted logistic regressions estimated the association between forward bending and LBPi and the effect modification by social support.

**RESULTS:**

Forward bending and LBPi were not significantly associated but modified by social support. Workers with low social support and long duration of forward bending had higher likelihood of high LBPi [odds ratio (OR) 2.97, 95% confidence interval (95% CI) 1.11-7.95] compared to workers with high social support and long duration of forward bending. Among workers with low social support, workers with long duration of forward bending had higher likelihood of high LBPi (OR 3.28, 95% CI 0.99-10.90) compared to workers with short-moderate duration of forward bending. Among workers with high social support, workers with short duration of forward bending had reduced likelihood of high LBPi (OR 0.39, 95% CI 0.16-0.95) compared to workers with short-moderate duration of forward bending.

**CONCLUSIONS:**

Social support modifies the association between objectively measured forward bending and LBPi among blue-collar workers.

PMID: 26828769

**52. EXERCISE****Use of bands for strengthening**

J Sport Rehabil. 2016 Jan 26.

**Strength Training Using Elastic Band Improves Muscle Power and Throwing Performance in Young Female Handball Players.**

Mascarin NC<sup>1</sup>, de Lira CA, Vancini RL, de Castro Pochini A, da Silva AC, Andrade Mdos S.

Abstract

**CONTEXT:**

Imbalance in shoulder rotator muscles has been considered a risk factor for injuries in handball. Strength training programs (STP) may play an important preventive role.

**OBJECTIVE:**

To verify the effects of an STP by using elastic band on shoulder muscles and ball throwing speed.

**DESIGN:**

Randomized and prospective controlled trial.

**SETTING:**

Exercise Physiology Laboratory.

**PARTICIPANTS:**

Thirty nine female handball players were randomly assigned to experimental (EG, n=21, 15.3±1.1yrs) or control (CG, n=18, 15.0±0.8yrs) groups.

**INTERVENTION:**

The EG performed the STP with elastic band progressive exercises for six weeks before regular handball training and the CG underwent only their regular training.

**MAIN OUTCOME MEASURES:**

Before and after the STP, both groups underwent a ball throwing speed test and isokinetic test to assess shoulder internal (IR) and external rotator (ER) muscular performance.

**RESULTS:**

Average power values for IR muscles presented a significant group vs. time interaction effect (F=3.9, p=0.05), EG presented significantly higher values after the STP (p= 0.03). Ball speed presented higher values in EG after the STP in standing (p= 0.04) and jumping (p=0.03) throws. IR peak torque values and balance in shoulder rotator muscles presented no group vs. time interaction effect.

**CONCLUSIONS:**

STP using elastic bands performed for 6 weeks was effective to improve muscular power and ball speed for young female handball players.

PMID: 26812746

**55. SCOLIOSIS****Sagittal posture****Sagittal balance is more than just alignment: why PJK remains an unresolved problem**

- Steven D. Glassman, Mark P. Coseo and Leah Y. Carreon

*Scoliosis and Spinal Disorders* 2016;11:1

DOI: 10.1186/s13013-016-0064-0

**Background**

The durability of adult spinal deformity surgery remains problematic. Revision rates above 20 % have been reported, with a range of causes including wound infection, nonunion and adjacent level pathology. While some of these complications have been amenable to changes in patient selection or surgical technique, Proximal Junctional Kyphosis (PJK) remains an unresolved challenge. This study examines the contributions of non-mechanical factors to the incidence of postoperative sagittal imbalance and PJK after adult deformity surgery.

**Methods**

We reviewed a consecutive series of adult spinal deformity patients who required revision for PJK from 2013 to 2015 and examined in their medical records in detail.

**Results**

Neurologic disorders were identified in 22 (76 %) of the 29 PJK cases reviewed in this series. Neurologic disorders included Parkinson's disease (1), prior stroke (5), metabolic encephalopathy (2), seizure disorder (1), cervical myelopathy (7), thoracic myelopathy (1), diabetic neuropathy (5) and other neuropathy (4). Other potential comorbidities affecting standing balance included untreated cataracts (9), glaucoma (1) and polymyositis (1). Eight patients were documented to have frequent falls, with twelve cases having a fall right before symptoms related to the PJK were noted.

**Conclusion**

PJK is an important contributing factor to the substantial and unsustainable rate of revision surgery following adult deformity correction. Multiple efforts to avoid PJK via alterations in surgical technique have been largely unsuccessful. This study suggests that non-mechanical neuromuscular co-morbidities play an important role in post-operative sagittal imbalance and PJK. Recognizing the multi-factorial etiology of PJK may lead to more successful strategies to avoid PJK and improve surgical outcomes.

**Keywords** Adult spinal deformity Adult scoliosis Proximal junctional kyphosis PJK

**56. ATHLETICS****Enhancing endurance**

Med Sci Sports Exerc. 2016 Jan 18.

**Noradrenaline Reuptake Inhibition Impairs Cortical Output and Limits Endurance Time.**

Klass M<sup>1</sup>, Duchateau J, Rabec S, Meeusen R, Roelands B.

Abstract

**PURPOSE:**

To assess the neural mechanisms that limit endurance time, we compared a fatiguing task performed under the influence of reboxetine (REB), a noradrenaline reuptake inhibitor, and placebo (PLA).

**METHODS:**

Nine male subjects (age:  $24 \pm 2$  yr) participated in this study. The fatiguing task involved repeated 3-s submaximal isometric contractions of the knee extensors ( $\sim 33\%$  MVC) with 2 s rest between each contraction and performed until task failure. Before, during and after exercise, changes in voluntary activation, corticospinal (motor evoked potential - MEP) and spinal excitability (Hoffman - H reflex), and muscle contractile properties were tested using electrical and transcranial magnetic stimulation (TMS). A psychomotor vigilance task assessed reaction time before and after exercise.

**RESULTS:**

Compared with PLA, REB reduced the endurance time by 15.6% ( $P=0.04$ ). MVC torque decreased to a similar extent at task failure in both conditions ( $P<0.01$ ), while the rate of decline was greater in REB than in PLA ( $P=0.02$ ). The level of voluntary activation tested by TMS and electrical stimulation decreased ( $P<0.01$ ) by 10-15% at the end of the task but the mean rate of decline was greater in REB ( $P\leq 0.03$ ). Whereas MEP did not change during fatigue, H reflex and electrically-evoked torque decreased similarly in PLA and REB conditions ( $P\leq 0.02$ ). After exercise, reaction time increased by 3.5% ( $P=0.02$ ) in REB but did not change in PLA condition.

**CONCLUSION:**

These findings suggest that, due to noradrenaline reuptake inhibition, the output from the motor cortex is decreased at a greater rate than in PLA condition, contributing thereby to shorten endurance time.

PMID: 26784275

**Groin pain**

Br J Sports Med. 2015 Nov 30. pii: bjsports-2015-094912. doi: 10.1136/bjsports-2015-094912.

**Athletic groin pain (part 1): a prospective anatomical diagnosis of 382 patients-clinical findings, MRI findings and patient-reported outcome measures at baseline.**

Falvey ÉC1, King E2, Kinsella S3, Franklyn-Miller A4.

**BACKGROUND:**

Athletic groin pain remains a common field-based team sports time-loss injury. There are few reports of non-surgically managed cohorts with athletic groin pain.

**AIM:**

To describe clinical presentation/examination, MRI findings and patient-reported outcome (PRO) scores for an athletic groin pain cohort.

**METHODS:**

All patients had a history including demographics, injury duration, sport played and standardised clinical examination. All patients underwent MRI and PRO score to assess recovery. A clinical diagnosis of the injured anatomical structure was made based on these findings. Statistical assessment of the reliability of accepted standard investigations undertaken in making an anatomical diagnosis was performed.

**RESULT:**

382 consecutive athletic groin pain patients, all male, enrolled. Median time in pain at presentation was (IQR) 36 (16-75) weeks. Most (91%) played field-based ball-sports. Injury to the pubic aponeurosis (PA) 240 (62.8%) was the most common diagnosis. This was followed by injuries to the hip in 81 (21.2%) and adductors in 56 (14.7%) cases. The adductor squeeze test (90° hip flexion) was sensitive (85.4%) but not specific for the pubic aponeurosis and adductor pathology (negative likelihood ratio 1.95). Analysed in series, positive MRI findings and tenderness of the pubic aponeurosis had a 92.8% post-test probability.

**CONCLUSIONS:**

In this largest cohort of patients with athletic groin pain combining clinical and MRI diagnostics there was a 63% prevalence of PA injury. The adductor squeeze test was sensitive for athletic groin pain, but not specific individual pathologies. MRI improved diagnostic post-test probability. No hernia or incipient hernia was diagnosed.

**Warm up ex for Soccer**

J Strength Cond Res. 2016 Jan 20

**Comparison of two types of warm-up upon repeated sprint performance in experienced soccer players.**

van den Tillaar R1, von Heimburg E.

**Abstract**

The aim of the study was to compare the effects of a long warm-up and a short warm-up upon repeated sprint performance in soccer players. Ten male soccer players (age  $21.9 \pm 1.9$  yr, body mass  $77.7 \pm 8.3$  kg, body height  $1.85 \pm 0.03$  m) conducted two types of warm-ups with one week in between: a long warm-up (20 minutes: LWup) and a short warm-up (10 minutes: SWup). Each warm-up was followed by a repeated sprint test consisting of 8 x 30 m sprints with a new start every 30<sup>th</sup> second. The best sprint time, total sprinting time and % decrease in time together with heart rate, lactate and rate of perceived exertion (RPE) were measured. No significant differences in performance were found for the repeated sprint test parameters (total sprint time:  $35.99 \pm 1.32$  s [LWup] and  $36.12 \pm 0.96$  s [SWup]; best sprint time:  $4.32 \pm 0.13$  s [LWup] and  $4.30 \pm 0.10$  s [SWup] and % sprint decrease:  $4.16 \pm 2.15$  % [LWup] and  $5.02 \pm 2.07$  % [SWup]). No differences in lactate concentration after the warm-up and after the repeated sprint test were found. However, RPE and heart rate were significantly higher after the long warm-up and the repeated sprint test compared with the short warm-up.

It was concluded that a short warm-up is as effective as a long warm-up for repeated sprints in soccer. Therefore, in regular training less warm-up time is needed; the extra time could be used for important soccer skill training.

**58. RUNNING****Muscle differentiation****Discriminant musculo-skeletal leg characteristics between sprint and endurance elite Caucasian runners**

1. T. Bex<sup>1</sup>, F. Iannaccone<sup>2,3</sup>, J. Stautemas<sup>1</sup>, A. Baguet<sup>1</sup>, M. De Beule<sup>2,4</sup>, B. Verheghe<sup>2,4</sup>,
2. P. Aerts<sup>1,5</sup>, D. De Clercq<sup>1</sup> and W. Derave<sup>1,\*</sup>

DOI: 10.1111/sms.12649

Scandinavian Journal of Medicine &amp; Science in Sports

Keywords:

- Running;
- morphological properties;
- performance

Excellence in either sprinting or endurance running requires specific musculo-skeletal characteristics of the legs. This study aims to investigate the morphology of the leg of sprinters and endurance runners of Caucasian ethnicity. Eight male sprinters and 11 male endurance runners volunteered to participate in this cross-sectional study. They underwent magnetic resonance imaging and after data collection, digital reconstruction was done to calculate muscle volumes and bone lengths. Sprinters have a higher total upper leg volume compared to endurance runners (7340 vs 6265 cm<sup>3</sup>). Specifically, the rectus femoris, vastus lateralis, and hamstrings showed significantly higher muscle volumes in the sprint group. For the lower leg, only a higher muscle volume was found in the gastrocnemius lateralis for the sprinters. No differences were found in muscle volume distribution, center of mass in the different muscles, or relative bone lengths. There was a significant positive correlation between ratio hamstrings/quadriceps volume and best running performance in the sprint group.

Sprinters and endurance runners of Caucasian ethnicity showed the greatest distinctions in muscle volumes, rather than in muscle distributions or skeletal measures. Sprinters show higher volumes in mainly the proximal and lateral leg muscles than endurance runners.

**Shin pain in runners**

Med Sci Sports Exerc. 2016 Jan 26.

**Influence of Step Rate on Shin Injury and Anterior Knee Pain in High School Runners.**

Luedke LE<sup>1</sup>, Heiderscheit BC, Williams DS, Rauh MJ.

Abstract

**PURPOSE:**

High school cross country runners have a high incidence of injury, particularly at the shin and knee. An increased step rate during running has been shown to reduce impact forces and loading of the lower extremity joints. The purpose of this prospective study was to examine step rate as a risk factor for injury occurrence.

**MATERIALS/METHODS:**

Running step rates of 68 healthy high school cross country runners (47 females; 21 males; mean age 16.2±1.3 yrs) were assessed at a fixed speed (3.3±0.0 m/s) and self-selected speed (mean 3.8±0.5 m/s). Runners were prospectively followed during the interscholastic season to determine athletic exposures, occurrences of shin injury and anterior knee pain, and days lost to injury.

**RESULTS:**

During the season, 19.1% of runners experienced a shin injury and 4.4% experienced anterior knee pain. Most injuries (63.6%) were classified as minor (1-7 days lost). At the fixed speed, runners in the lowest tertile of step rate (≤164 steps/min) were more likely (OR=6.67; 95% CI, 1.2-36.7; p=0.03) to experience a shin injury compared to runners in the highest tertile (≥174 steps/min). Similarly, for self-selected speed, runners in the lowest tertile (≤166 steps/min) (OR=5.85; 95% CI, 1.1-32.1; p<0.04) were more likely to experience a shin injury than runners in the highest tertile (≥178 steps/min). Anterior knee pain incidence was not significantly influenced by step rate.

**CONCLUSION:**

A lower running step rate was associated with a greater likelihood of shin injury at both self-selected and fixed running speeds. Future studies evaluating whether increasing running step rate reduces shin injury risk and time lost during a high-school cross country season should be considered.

PMID: 26818150

**Economical running?**

Sports Med. 2016 Jan 27.

**Is There an Economical Running Technique? A Review of Modifiable Biomechanical Factors Affecting Running Economy.**

Moore IS1.

**Abstract**

Running economy (RE) has a strong relationship with running performance, and modifiable running biomechanics are a determining factor of RE. The purposes of this review were to (1) examine the intrinsic and extrinsic modifiable biomechanical factors affecting RE; (2) assess training-induced changes in RE and running biomechanics; (3) evaluate whether an economical running technique can be recommended and; (4) discuss potential areas for future research. Based on current evidence, the intrinsic factors that appeared beneficial for RE were using a preferred stride length range, which allows for stride length deviations up to 3 % shorter than preferred stride length; lower vertical oscillation; greater leg stiffness; low lower limb moment of inertia; less leg extension at toe-off; larger stride angles; alignment of the ground reaction force and leg axis during propulsion; maintaining arm swing; low thigh antagonist-agonist muscular coactivation; and low activation of lower limb muscles during propulsion. Extrinsic factors associated with a better RE were a firm, compliant shoe-surface interaction and being barefoot or wearing lightweight shoes. Several other modifiable biomechanical factors presented inconsistent relationships with RE. Running biomechanics during ground contact appeared to play an important role, specifically those during propulsion. Therefore, this phase has the strongest direct links with RE. Recurring methodological problems exist within the literature, such as cross-comparisons, assessing variables in isolation, and acute to short-term interventions.

Therefore, recommending a general economical running technique should be approached with caution. Future work should focus on interdisciplinary longitudinal investigations combining RE, kinematics, kinetics, and neuromuscular and anatomical aspects, as well as applying a synergistic approach to understanding the role of kinetics.

**59. PAIN****Accident and wide spread pain**

*Pain*. 2016 Feb;157(2):438-44. doi: 10.1097/j.pain.0000000000000388.

**Chronic widespread pain after motor vehicle collision typically occurs through immediate development and nonrecovery: results of an emergency department-based cohort study.**

Hu J<sup>1</sup>, Bortsov AV, Ballina L, Orrey DC, Swor RA, Peak D, Jones J, Rathlev N, Lee DC, Domeier R, Hendry P, Parry BA, McLean SA.

## Abstract

Motor vehicle collision (MVC) can trigger chronic widespread pain (CWP) development in vulnerable individuals. Whether such CWP typically develops through the evolution of pain from regional to widespread or through the early development of widespread pain with nonrecovery is currently unknown. We evaluated the trajectory of CWP development (American College of Rheumatology criteria) among 948 European-American individuals who presented to the emergency department (ED) for care in the early aftermath of MVC. Pain extent was assessed in the ED and 6 weeks, 6 months, and 1 year after MVC on 100%, 91%, 89%, and 91% of participants, respectively. Individuals who reported prior CWP at the time of ED evaluation (n = 53) were excluded. Trajectory modeling identified a 2-group solution as optimal, with the Bayes Factor value (138) indicating strong model selection. Linear solution plots supported a nonrecovery model. Although the number of body regions with pain in the non-CWP group steadily declined, the number of body regions with pain in the CWP trajectory group (192/895, 22%) remained relatively constant over time.

These data support the hypothesis that individuals who develop CWP after MVC develop widespread pain in the early aftermath of MVC, which does not remit.

PMID: 26808013

### Smoking increases pain intensity

#### **Pain intensity and smoking behavior among treatment seeking smokers**

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Psychiatry Research, 02/08/2016Bakhshaie J, et al.

**T**he current investigation advances this work in three important ways: controlling for negative affectivity and gender; examining pain intensity in smokers from a community sample, rather than specialized pain treatment centers; and, studying smokers who are highly motivated to quit. The data provide evidence that more intense pain is related to more severe smoking behavior and nicotine dependence. Pain reduction could be an important target in regard to smokers with chronic pain.

## Neuropathic pain

Spinal Cord. 2016 Jan 12. doi: 10.1038/sc.2015.225.

**Neuroplasticity of ascending and descending pathways after somatosensory system injury: reviewing knowledge to identify neuropathic pain therapeutic targets.**

Boadas-Vaello P<sup>1</sup>, Castany S<sup>1</sup>, Homs J<sup>1,2</sup>, Álvarez-Pérez B<sup>1</sup>, Deulofeu M<sup>1</sup>, Verdú E<sup>1</sup>.

Abstract

**STUDY DESIGN:**

This is a narrative review of the literature.

**OBJECTIVES:**

This review aims to be useful in identifying therapeutic targets. It focuses on the molecular and biochemical neuroplasticity changes that occur in the somatosensory system, including ascending and descending pathways, during the development of neuropathic pain. Furthermore, it highlights the latest experimental strategies, based on the changes reported in the damaged nociceptive neurons during neuropathic pain states.

**SETTING:**

This study was conducted in Girona, Catalonia, Spain.

**METHODS:**

A MEDLINE search was performed using the following terms: descending pain pathways; ascending pain pathways; central sensitization; molecular pain; and neuropathic pain pharmacological treatment.

**RESULTS AND CONCLUSION:**

Neuropathic pain triggered by traumatic lesions leads to sensitization and hyperexcitability of nociceptors and projection neurons of the dorsal horn, a strengthening in the descendent excitatory pathway and an inhibition of the descending inhibitory pathway of pain. These functional events are associated with molecular plastic changes such as overexpression of voltage-gated ion channels, algogen-sensitive receptors and synthesis of several neurotransmitters. Molecular studies on the plastic changes in the nociceptive somatosensory system enable the development of new pharmacological treatments against neuropathic pain, with higher specificity and effectiveness than classical drug treatments. Although research efforts have already focused on these aspects, additional research may be necessary to further explore the potential therapeutic targets in neuropathic pain involved in the neuroplasticity changes of neuropathological pathways from the injured somatosensory system. Spinal Cord advance online publication, 12 January 2016; doi:10.1038/sc.2015.225.

PMID: 26754470

**61. FIBROMYALGIA****Genetic factors**

Eur J Pain. 2016 Feb 5. doi: 10.1002/ejp.837.

**Association between catechol-O-methyl transferase gene polymorphisms and fibromyalgia in a Korean population: A case-control study.**

Park DJ<sup>1</sup>, Kim SH<sup>2</sup>, Nah SS<sup>3</sup>, Lee JH<sup>4</sup>, Kim SK<sup>5</sup>, Lee YA<sup>6</sup>, Hong SJ<sup>6</sup>, Kim HS<sup>7</sup>, Lee HS<sup>8</sup>, Kim HA<sup>9</sup>, Joung CI<sup>10</sup>, Kim SH<sup>11</sup>, Lee SS<sup>1</sup>.

Abstract

**BACKGROUND:**

Although polymorphisms of the catechol-O-methyl transferase (COMT) gene have been implicated in altered pain sensitivity, results concerning the association between COMT gene polymorphisms and fibromyalgia (FM) are equivocal. We assessed the associations between COMT single-nucleotide polymorphisms (SNP) and FM risk and symptom severity.

**METHODS:**

In total, 409 FM patients and 423 controls were enrolled. Alleles and genotypes at five positions [rs6269 (A>G), rs4633 (C>T), rs4818 (C>G), rs4680 (C>G) and rs165599 (A>G)] in the COMT gene were genotyped from peripheral blood DNA.

**RESULTS:**

Alleles and genotypes of the rs4818 COMT gene polymorphism were significantly associated with increased susceptibility to FM. The rs4818 GG genotype was more strongly associated with FM compared to the CC genotype (OR = 1.680, 95% CI: 1.057, 2.672, p = 0.027). Although allele and genotype frequencies did not differ among groups, the rs4633 CT genotype was not associated with the presence of FM following adjustment for age and sex (OR = 0.745; 95% CI: 0.558, 0.995; p = 0.046). However, no association was observed between clinical measures and individual COMT SNPs. In haplotype analysis, there was a significant association between ACG haplotype and FM susceptibility sex (OR = 2.960, 95% CI: 1.447, 6.056, p = 0.003) and the number of tender points (p = 0.046).

**CONCLUSIONS:**

This large-scale study suggests that polymorphisms of the COMT gene may be associated with FM risk and pain sensitivity in Korean FM patients. However, our results differed to those of previous studies, suggesting ethnic variation in COMT gene polymorphisms in FM.

**WHAT DOES THIS STUDY ADD:**

By contrast to Caucasian and Latin-American populations, the COMT gene polymorphisms are associated with FM risk and pain sensitivity in Korean FM patients, suggesting ethnic variation in COMT gene polymorphisms.

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PMID:26849490

**62 A. NUTRITION/VITAMINS****Calcium and improved mortality****Calcium intake and mortality from all causes, cancer, and cardiovascular disease: the Cancer Prevention Study II Nutrition Cohort**

American Journal of Clinical Nutrition, 02/12/2016

**Y**ang B, et al. – In this study, the authors investigated associations of supplemental, dietary, and total calcium intakes with all-cause, CVD-specific, and cancer-specific mortality in a large, prospective cohort. In this cohort, associations of calcium intake and mortality varied by sex. For women, total and supplemental calcium intakes are associated with lower mortality, whereas for men, supplemental calcium intake  $\geq 1000$  mg/d may be associated with higher all-cause and CVD-specific mortality.

**Methods**

- A total of 132,823 participants in the Cancer Prevention Study II Nutrition Cohort, who were followed from baseline (1992 or 1993) through 2012 for mortality outcomes, were included in the analysis.
- Dietary and supplemental calcium information was first collected at baseline and updated in 1999 and 2003.
- Multivariable-adjusted Cox proportional hazards models with cumulative updating of exposures were used to calculate RRs and 95% CIs for associations between calcium intake and mortality.

**Results**

- During a mean follow-up of 17.5 y, 43,186 deaths occurred.
- For men, supplemental calcium intake was overall not associated with mortality outcomes (P-trend  $> 0.05$  for all), but men who were taking  $\geq 1000$  mg supplemental calcium/d had a higher risk of all-cause mortality (RR: 1.17; 95% CI: 1.03, 1.33), which was primarily attributed to borderline statistically significant higher risk of CVD-specific mortality (RR: 1.22; 95% CI: 0.99, 1.51).
- For women, supplemental calcium was inversely associated with mortality from all causes [RR (95% CI): 0.90 (0.87, 0.94), 0.84 (0.80, 0.88), and 0.93 (0.87, 0.99) for intakes of 0.1 to  $< 500$ , 500 to  $< 1000$ , and  $\geq 1000$  mg/d, respectively; P-trend  $< 0.01$ ].
- Total calcium intake was inversely associated with mortality in women (P-trend  $< 0.01$ ) but not in men; dietary calcium was not associated with all-cause mortality in either sex.

## Concord grape juice

**Concord grape juice, cognitive function, and driving performance: a 12-wk, placebo-controlled, randomized crossover trial in mothers of preteen children**

American Journal of Clinical Nutrition, 02/12/2016

Lamport DJ, et al.

In this study, the authors sought to examine the effects of the daily consumption of concord grape juice (CGJ) for 12 wk on cognitive function, driving performance, and blood pressure in healthy, middle-aged working mothers. Cognitive benefits associated with the long-term consumption of flavonoid-rich grape juice are not exclusive to adults with mild cognitive impairment. Moreover, these cognitive benefits are apparent in complex everyday tasks such as driving. Effects may persist beyond the cessation of flavonoid consumption, and future studies should carefully consider the length of washout within crossover designs.

### Methods

- Twenty-five healthy mothers (aged 40–50 y) of preteen children who were employed for  $\geq 30$  h/wk consumed 12 ounces (355 mL) of either CGJ (containing 777 mg total polyphenols) or an energy-, taste-, and appearance-matched placebo daily for 12 wk according to a randomized crossover design with a 4-wk washout.
- Verbal and spatial memory, executive function, attention, blood pressure, and mood were assessed at baseline and at 6 and 12 wk.
- Immediately after the cognitive battery, a subsample of 17 women completed a driving performance assessment at the University of Leeds Driving Simulator.
- The 25-min driving task required participants to match the speed and direction of a lead vehicle.

### Results

- Significant improvements in immediate spatial memory and driving performance were observed after CGJ relative to placebo.
- There was evidence of an enduring effect of CGJ such that participants who received CGJ in arm 1 maintained better performance in the placebo arm.

## Fish and improved mortality

J Am Heart Assoc. 2016 Jan 26;5(1). pii: e002543. doi: 10.1161/JAHA.115.002543.

**Dietary  $\alpha$ -Linolenic Acid, Marine  $\omega$ -3 Fatty Acids, and Mortality in a Population With High Fish Consumption: Findings From the PREvención con DIeta MEDiterránea (PREDIMED) Study.****BACKGROUND:**

Epidemiological evidence suggests a cardioprotective role of  $\alpha$ -linolenic acid (ALA), a plant-derived  $\omega$ -3 fatty acid. It is unclear whether ALA is beneficial in a background of high marine  $\omega$ -3 fatty acids (long-chain n-3 polyunsaturated fatty acids) intake. In persons at high cardiovascular risk from Spain, a country in which fish consumption is customarily high, we investigated whether meeting the International Society for the Study of Fatty Acids and Lipids recommendation for dietary ALA (0.7% of total energy) at baseline was related to all-cause and cardiovascular disease mortality. We also examined the effect of meeting the society's recommendation for long-chain n-3 polyunsaturated fatty acids ( $\geq 500$  mg/day).

**METHODS AND RESULTS:**

We longitudinally evaluated 7202 participants in the PREvención con DIeta MEDiterránea (PREDIMED) trial. Multivariable-adjusted Cox regression models were fitted to estimate hazard ratios. ALA intake correlated to walnut consumption ( $r=0.94$ ). During a 5.9-y follow-up, 431 deaths occurred (104 cardiovascular disease, 55 coronary heart disease, 32 sudden cardiac death, 25 stroke). The hazard ratios for meeting ALA recommendation ( $n=1615$ , 22.4%) were 0.72 (95% CI 0.56-0.92) for all-cause mortality and 0.95 (95% CI 0.58-1.57) for fatal cardiovascular disease. The hazard ratios for meeting the recommendation for long-chain n-3 polyunsaturated fatty acids ( $n=5452$ , 75.7%) were 0.84 (95% CI 0.67-1.05) for all-cause mortality, 0.61 (95% CI 0.39-0.96) for fatal cardiovascular disease, 0.54 (95% CI 0.29-0.99) for fatal coronary heart disease, and 0.49 (95% CI 0.22-1.01) for sudden cardiac death. The highest reduction in all-cause mortality occurred in participants meeting both recommendations (hazard ratio 0.63 [95% CI 0.45-0.87]).

**CONCLUSIONS:**

In participants without prior cardiovascular disease and high fish consumption, dietary ALA, supplied mainly by walnuts and olive oil, relates inversely to all-cause mortality, whereas protection from cardiac mortality is limited to fish-derived long-chain n-3 polyunsaturated fatty acids.

**CLINICAL TRIAL REGISTRATION:**

URL: <http://www.Controlled-trials.com/>. Unique identifier: ISRCTN35739639.

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**KEYWORDS:**

fatty acid; nutrition; sudden cardiac death

PMID: 26813890

## Supplements

Ann Nutr Metab. 2016 Feb 6;68(2):145-155.

**Effect of Omega-3 and Vitamins E + C Supplements on the Concentration of Serum B-Vitamins and Plasma Redox Aminothiol Antioxidant Status in Elderly Men after Strength Training for Three Months.**

Stea TH<sup>1</sup>, Stølevik SB, Berntsen S, Ezzathkah Bastani N, Paulsen G, Lohne Seiler H, Hetlelid KJ, Blomhoff R, Mansoor MA.

Abstract

**BACKGROUND:**

Data on redox plasma aminothiol status in individuals on strength training are very limited. Therefore, we studied the effect of omega-3 and vitamins E + C supplementation on the concentration of B-vitamins and redox aminothiol status in elderly men after strength training for 3 months.

**METHODS:**

Healthy men, age  $60 \pm 6$  (mean  $\pm$  SD) were randomly divided into 3 groups: group I received placebo (n = 17), group II consumed omega-3 (700 mg, n = 17), and group III consumed vitamins E + C (235 mg +1 g, n = 16) daily for 3 months. All participants completed a strength training program for the same period.

**RESULTS:**

The concentration of serum vitamin B12 decreased and the concentration of serum folate increased in group I after the intervention (p = 0.01, p = 0.009). The concentration of plasma 5-pyridoxal phosphate decreased in groups II and III (p = 0.03 and p = 0.01), whereas the concentration of serum uric acid decreased only in group II (p = 0.02). We detected an increase in the concentration of reduced form of aminothiols in all groups (p < 0.001). The red/ox plasma aminothiol status was significantly changed in all groups after the intervention (p < 0.05).

**CONCLUSION:**

Omega-3 and vitamins E + C supplementation affect the concentrations of serum B-vitamins and redox plasma aminothiol status in healthy elderly men on strength training.

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PMID: 26848570