

Table of Contents

<b>1. LUMBAR SPINE</b> .....	8
<b>4. INJECTIONS</b> .....	8
<b>Randomized Double-Blind Controlled Trial Comparing the Effectiveness of Lumbar Transforaminal Epidural Injections of Particulate and Nonparticulate Corticosteroids for Lumbosacral Radicular Pain</b> .....	8
Author information .....	8
Abstract.....	8
<b>6. PELVIC GIRDLE</b> .....	9
<b>Experimental Pelvic Pain Impairs the Performance During the Active Straight Leg Raise Test and Causes Excessive Muscle Stabilization.</b> .....	9
Author information .....	9
Abstract.....	9
<b>8. VISCERA</b> .....	11
<b>Effect of yoga on arterial stiffness in elderly subjects with increased pulse pressure: A randomized controlled study</b> .....	11
Methods .....	11
Results.....	11
<b>Beliefs and behaviour about smoking among inflammatory bowel disease patients.</b> .....	12
Author information .....	12
Abstract.....	12
<b>The effect of gluten on intestinal fermentation, gastric and gallbladder emptying in healthy volunteers.</b> .....	13
Author information .....	13
Abstract.....	13
<b>Is fructose malabsorption a cause of irritable bowel syndrome?</b> .....	15
Author information .....	15
Abstract.....	15
<b>The relationship between irritable bowel syndrome, functional dyspepsia, chronic fatigue and overactive bladder syndrome: a controlled study 6 years after acute gastrointestinal infection.</b> .....	16
Author information .....	16
Abstract.....	16
<b>13. CRANIUM/TMJ</b> .....	17
<b>TMJ and Tinnitus</b> .....	17
<b>Increased risk of tinnitus in patients with temporomandibular disorder: a retrospective population-based cohort study.</b> .....	17

## ABSTRACTS

Author information .....	17
Abstract.....	17
<b>14. HEADACHES.....</b>	<b>18</b>
<b>Diet and nutraceutical interventions for headache management: A review of the evidence.</b>	<b>18</b>
Author information .....	18
Abstract.....	18
<b>Migraine equivalents and related symptoms, psychological profile and headache features: which relationship? .....</b>	<b>19</b>
Author information .....	19
Abstract.....	19
<b>20. ROTATOR CUFF .....</b>	<b>20</b>
<b>Sleep disturbance associated with rotator cuff tear: correction with arthroscopic rotator cuff repair.....</b>	<b>20</b>
Author information .....	20
Abstract.....	20
<b>25. WRIST AND HAND .....</b>	<b>21</b>
<b>Force in the Scapholunate Interosseous Ligament During Active Wrist Motion.....</b>	<b>21</b>
Author information .....	21
Abstract.....	21
<b>30 A. IMPINGEMENT .....</b>	<b>22</b>
<b>The prevalence of radiographic findings of structural hip deformities in female collegiate athletes.....</b>	<b>22</b>
Abstract.....	22
<b>32 A. KNEE/ACL .....</b>	<b>23</b>
<b>Inflammatory cytokines and biomarkers of cartilage metabolism 8 years after anterior cruciate ligament reconstruction: results from operated and contralateral knees. ....</b>	<b>23</b>
Author information .....	23
Abstract.....	23
<b>Changes in involved and uninvolved limb function during rehabilitation after anterior cruciate ligament reconstruction: implications for limb symmetry index measures. ....</b>	<b>24</b>
Author information .....	24
Abstract.....	24
<b>33. MENISCUS.....</b>	<b>25</b>
<b>Alterations in knee kinematics after partial medial meniscectomy are activity dependent.</b>	<b>25</b>
<b>34. PATELLA .....</b>	<b>26</b>
<b>Comparison of two methods of determining patellofemoral joint stress during dynamic activities.....</b>	<b>26</b>

## ABSTRACTS

Author information .....	26
Abstract.....	26
<b>Prospective clinical and radiologic evaluation of patellofemoral matrix-induced autologous chondrocyte implantation.</b> .....	27
Author information .....	27
Abstract.....	27
<b>Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy.</b> .....	28
Author information .....	28
Abstract.....	28
<b>Evaluating eccentric hip torque and trunk endurance as mediators of changes in lower limb and trunk kinematics in response to functional stabilization training in women with patellofemoral pain.</b> .....	29
Author information .....	29
<b>37. OSTEOARTHRITIS/KNEE</b> .....	30
<b>Association Between Varus Thrust and "Pain and Stiffness" and "Activities of Daily Living" in Patients With Medial Knee Osteoarthritis.</b> .....	30
Author information .....	30
Abstract.....	30
<b>Quantity and quality of the lower extremity muscles in women with knee osteoarthritis....</b>	31
<b>Abstract</b> .....	31
<b>Organisation of the motor cortex differs between people with and without knee osteoarthritis.</b> .....	32
Author information .....	32
Abstract.....	32
<b>Stimulation of the superficial zone protein and lubrication in the articular cartilage by human platelet-rich plasma.</b> .....	33
Author information .....	33
Abstract.....	33
<b>41 A. ACHILLES TENDON AND CALF</b> .....	34
<b>Prevalence of morphological and mechanical stiffness alterations of mid Achilles tendons in asymptomatic marathon runners before and after a competition.</b> .....	34
Author information .....	34
Abstract.....	34
<b>43. HALLUX VALGUS</b> .....	35
<b>Corrective Bandage for Conservative Treatment of Metatarsus Adductus: Retrospective Study.</b> .....	35
Author information .....	35
Abstract.....	35

## ABSTRACTS

<b>44. RHUMATOID ARTHRITIS</b> .....	36
<b>Mortality in rheumatoid arthritis: the impact of disease activity, treatment with glucocorticoids, TNF<math>\alpha</math> inhibitors and rituximab.</b> .....	36
Author information .....	36
Abstract.....	36
<b>Diet and alcohol as risk factors for rheumatoid arthritis: a nested case-control study.</b> .....	37
Author information .....	37
Abstract.....	37
<b>45 A. MANUAL THERAPY LUMBAR &amp; GENERAL</b> .....	38
<b>Application of neuroplasticity theory through the use of the <i>Feldenkrais Method</i><sup>®</sup> with a runner with scoliosis and hip and lumbar pain: A case report</b> .....	39
<b>Abstract</b> .....	39
<b>45 D. MANUAL THERAPY EXTREMITIES</b> .....	41
<b>Efficacy of hand behind back mobilization with movement for acute shoulder pain and movement impairment: a randomized controlled trial</b> .....	41
Methods .....	41
Results .....	41
<b>46 A. UPPER LIMB NEUROMOBILIZATION</b> .....	42
<b>2015 Young Investigator Award Winner: Cervical Nerve Root Displacement and Strain During Upper Limb Neural Tension Testing: Part 2: Role of Foraminal Ligaments in the Cervical Spine.</b> .....	42
Author information .....	42
Abstract.....	42
<b>48 A. STM</b> .....	43
<b>Evidence for the Use of Ischemic Compression and Dry Needling in the Management of Trigger Points of the Upper Trapezius in Patients with Neck Pain: A Systematic Review.</b> ..	43
Author information .....	43
Abstract.....	43
<b>Traditional Chinese medicine for neck pain and low back pain: a systematic review and meta-analysis</b> .....	44
Author information .....	44
Abstract.....	44
<b>Acupuncture for chronic knee pain: a randomized clinical trial.</b> .....	45
Author information .....	45
Abstract.....	45
<b>Deconstructing Chronic Low Back Pain in the Older Adult-Step by Step Evidence and Expert-Based Recommendations for Evaluation and Treatment: Part II: Myofascial Pain.</b> .....	46

## ABSTRACTS

Author information .....	46
Abstract.....	46
<b>51. CFS/BET .....</b>	<b>47</b>
<b>Steadiness of Spinal Regions during Single-Leg Standing in Older Adults with and without Chronic Low Back Pain.....</b>	<b>47</b>
Author information .....	47
Abstract.....	47
<b>52. EXERCISE.....</b>	<b>49</b>
<b>Equipment-based Pilates reduces work-related chronic low back pain and disability: A pilot study.....</b>	<b>49</b>
Methods .....	49
Results.....	49
Physical fitness exercise vs. cognitive behavior therapy on reducing the depressive symptoms among community-dwelling elderly adults: A randomized controlled trial.....	50
Methods .....	50
Results.....	50
<b>Resistance exercise improves muscle strength, health status and pain intensity in fibromyalgia-a randomized controlled trial.....</b>	<b>51</b>
Author information .....	51
Abstract.....	51
<b>Effect of yoga on arterial stiffness in elderly subjects with increased pulse pressure: A randomized controlled study .....</b>	<b>52</b>
Methods .....	52
Results.....	52
<b>53. CORE .....</b>	<b>53</b>
<b>Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy. ....</b>	<b>53</b>
Author information .....	53
Abstract.....	53
<b>54. POSTURE .....</b>	<b>54</b>
<b>Postural Consequences of Cervical Sagittal Imbalance: A Novel Laboratory Model. ....</b>	<b>54</b>
Author information .....	54
Abstract.....	54
<b>Analysis of an unexplored group of sagittal deformity patients: low pelvic tilt despite positive sagittal malalignment.....</b>	<b>55</b>
Author information .....	55
Abstract.....	55
<b>56. ATHLETICS.....</b>	<b>56</b>

## ABSTRACTS

<b>Professional Pitchers With Glenohumeral Internal Rotation Deficit (GIRD) Display Greater Humeral Retrotorsion Than Pitchers Without GIRD.</b> .....	56
<b>Shoulder functional performance status of national collegiate athletic association swimmers: baseline kerlan-jobe orthopedic clinic scores.</b> .....	57
Author information .....	57
Abstract.....	57
<b>57. GAIT</b> .....	58
<b>Does walking improve disability status, function, or quality of life in adults with chronic low back pain? A systematic review.</b> .....	58
Author information .....	58
Abstract.....	58
<b>58. RUNNING</b> .....	59
<b>Prevalence of morphological and mechanical stiffness alterations of mid Achilles tendons in asymptomatic marathon runners before and after a competition.</b> .....	59
Author information .....	59
Abstract.....	59
<b>59. PAIN</b> .....	60
<b>Predictors of placebo response in peripheral neuropathic pain: insights from pregabalin clinical trials.</b> .....	60
Author information .....	60
Abstract.....	60
<b>61. FIBROMYALGIA</b> .....	61
<b>Resistance exercise improves muscle strength, health status and pain intensity in fibromyalgia-a randomized controlled trial.</b> .....	61
Author information .....	61
Abstract.....	61
<b>62 A. NUTRITION/VITAMINS</b> .....	62
<b>Tea consumption and the risk of depression: a meta-analysis of observational studies.</b> .....	62
Author information .....	62
Abstract.....	62
<b>Effects of tea intake on blood pressure: A meta-analysis of 21 randomized controlled trials</b> .....	63
Methods .....	63
Results.....	63
<b>Combined chondroitin sulfate and glucosamine for painful knee osteoarthritis: a multicentre, randomised, double-blind, non-inferiority trial versus celecoxib.</b> .....	64
Author information .....	64
Abstract.....	64

## ABSTRACTS

<b>63. PHARMACOLOGY</b> .....	65
<b>Comparative effectiveness of pharmacologic interventions for knee osteoarthritis: a systematic review and network meta-analysis.</b> .....	65
Abstract.....	65
<b>Differential cytotoxicity of corticosteroids on human mesenchymal stem cells.</b> .....	66
<b>Symptoms of depression are associated with opioid use regardless of pain severity and physical functioning among treatment-seeking chronic pain patients.</b> .....	67
Author information .....	67
Abstract.....	67
<b>64. ELECTROTHERAPY</b> .....	68
<b>Efficacy of Pulsed and Continuous Therapeutic Ultrasound in Myofascial Pain Syndrome: A Randomized Controlled Study.</b> .....	68
Author information .....	68
Abstract.....	68
<b>65. NEUROLOGICAL CONDITIONS</b> .....	69
<b>The Prevalence of Pain in Adults with Multiple Sclerosis: A Multicenter Cross-Sectional Survey.</b> .....	69
Author information .....	69
Abstract.....	69

## 1. LUMBAR SPINE

### 4. INJECTIONS

#### Type of epidural

Pain Med. 2015 Jun 22. doi: 10.1111/pme.12846.

#### **Randomized Double-Blind Controlled Trial Comparing the Effectiveness of Lumbar Transforaminal Epidural Injections of Particulate and Nonparticulate Corticosteroids for Lumbosacral Radicular Pain.**

Denis I<sup>1</sup>, Claveau G<sup>2</sup>, Filiatrault M<sup>1</sup>, Fugère F<sup>3</sup>, Fortin L<sup>4</sup>.

Author information

Abstract

#### **OBJECTIVE:**

To compare equivalent doses of a nonparticulate (dexamethasone) with a particulate (betamethasone) corticosteroid in lumbar transforaminal epidural steroid injections (TFESIs) in terms of pain, function, and complications.

#### **DESIGN:**

Fifty-six patients presenting with debilitating radicular pain were randomized in a double-blind controlled trial to receive a lumbar transforaminal injection of either dexamethasone 7.5 mg (n = 29) or betamethasone 6.0 mg (n = 27).

#### **SETTING:**

A pain clinic and physical medicine and rehabilitation department in two academic hospital centres.

#### **OUTCOME MEASURES:**

Data were collected at 1-, 3-, and 6-month follow-ups. The primary outcome was pain reduction on a visual analog scale (VAS) at 3 months. Secondary outcomes were functional improvement, as measured by the Oswestry Disability Index (ODI), and number and type of complications.

#### **RESULTS:**

No differences on the VAS, analyzed either as a continuous (P = 0.209) or categorical variable ( $\geq 50\%$  (P = 0.058) or  $\geq 75\%$  (P = 0.865) improvement) and ODI (P = 0.181) were found between the two groups at 3 months. At 6 months, improvement of ODI score was at the limit of statistical significance in favor of dexamethasone (P = 0.050). Multivariate regression analysis, adjusting for potential confounding variables, showed that differences on the ODI became statistically significant at the 6 month follow-up, also in favor of dexamethasone (adjusted P = 0.003). No serious complications were observed in either group.

#### **CONCLUSION:**

According to this study, pain relief and functional improvement are similar for both dexamethasone and betamethasone at 3 months. Considering its safety profile, dexamethasone could be considered as first choice for TFESI. However, given that the study was underpowered, more research is needed to support a recommendation of systematically using dexamethasone in TFESI.

Wiley Periodicals, Inc.



**KEYWORDS:**

Betamethasone; Dexamethasone; Lower Limb Pain; Nonparticulate and Particulate Steroids; Transforaminal Epidural Injection PMID:26095339

**6. PELVIC GIRDLE****ACTive SLR with induced pelvic pain**

Clin J Pain. 2015 Jul;31(7):642-51. doi: 10.1097/AJP.0000000000000139.

**Experimental Pelvic Pain Impairs the Performance During the Active Straight Leg Raise Test and Causes Excessive Muscle Stabilization.**

Palsson TS<sup>1</sup>, Hirata RP, Graven-Nielsen T.

Author information

Abstract

**OBJECTIVES:**

The active straight leg raise (ASLR) test is widely used clinically to assess severity of lumbopelvic pain due to decreased stability of the sacroiliac joint (SIJ). This study aimed to bypass the influence of decreased SIJ stability on the ASLR test by investigating the effect of experimental pelvic pain and hyperalgesia on the outcome of the ASLR test.

**METHODS:**

Thirty-four healthy participants took part in this randomized crossover study. Pelvic pain was induced by injecting hypertonic saline into the long posterior sacroiliac ligament. Isotonic saline was injected on the contralateral side as control. Pain intensity was assessed on an electronic visual analogue scale. The Likert scores of difficulty performing the ASLR test and simultaneous electromyography of trunk and thigh muscles were recorded before, during, and postpain. Pressure pain thresholds were assessed bilaterally in the pelvic area and lower limb.

**RESULTS:**

Compared with the control condition and baseline, hypertonic saline injections caused ( $P < 0.05$ ): (1) higher visual analogue scale scores of the pain intensity; (2) reduced pressure pain thresholds at the injection site and lateral to S2; (3) increased difficulty in performing the ASLR rated on the Likert scale; and (4) bilateral increase in the electromyography activity of stabilizing trunk and thigh muscles during pain.

**DISCUSSION:**

These data demonstrate that pain and hyperalgesia in conditions unaffected by biomechanical SIJ impairments change the outcome of the ASLR test toward what is seen in clinical lumbopelvic pain. This may implicate pain-related changes in motor control strategies potentially relevant for the transition from acute into chronic pain.

PMID: 25119510

**Innominate motions and LBP****Innominate movement patterns, rotation trends and range of motion in individuals with low back pain of sacroiliac joint origin**

Divya Bharatkumar Adhia<sup>1</sup> Stephan Milosavljevic<sup>1</sup>, Steve Tumilty  
 Melanie D. Bussey  
 DOI: <http://dx.doi.org/10.1016/j.math.2015.06.004>  
 Manual Therapy, 06/22/2015

**Highlights**

- Innominate kinematics comparison between SIJ-positive & SIJ-negative individuals
- SIJ pain individuals predominantly exhibit unilateral innominate movement patterns
- SIJ pain individuals exhibit significantly different innominate trends of rotation
- No significant between-group differences in innominate ranges of motion
- Demonstrates association between innominate kinematic anomalies and SIJ pain

**Abstract****Background**

Innominate kinematic anomalies resulting in low back pain (LBP) of sacroiliac joint (SIJ) origin (SIJ-positive), has always been a topic of contention, owing to difficulty in its evaluation. Recent technique of electromagnetic palpation-digitization has been able to accurately quantify innominate kinematics in healthy individuals.

**Objectives**

The purpose of this study is to determine if participants with LBP of SIJ origin (SIJ-positive) demonstrate significantly different innominate kinematics than participants with LBP of non-SIJ origin (SIJ-negative).

**Design**

Single-blinded cross-sectional case-control study.

**Method**

Participants [n(122)] between the ages of 18 to 50 years, suffering from chronic non-specific LBP ( $\geq 3$  months) volunteered in the study. An experienced musculoskeletal physiotherapist evaluated and classified participants into either SIJ-positive [n(45)] or SIJ-negative [n(77)] group, using the reference standard pain provocation tests [ $\geq 3$  positive tests = SIJ-positive]. A research physiotherapist, blinded to clinical groups, conducted the innominate kinematic testing using a valid and reliable electromagnetic palpation-digitization technique, during prone lying incremental hip abduction-external rotation test positions.

**Results**

The results of the mixed model regression analyses demonstrated that SIJ-positive participants exhibited significantly different innominate movement patterns and trends of rotation, but not innominate ranges of motion, when compared with SIJ-negative LBP participants.

**Conclusions**

These findings demonstrate association between SIJ pain and altered innominate kinematics, and has led the groundwork for further exploration of clinical measurement, relevance, and management of these potentially important movement observations.

**Keywords:**

Sacroiliac joint, Low back pain, Biomechanics, Range of motion

## 8. VISCERA

### Arterial stiffness and yoga

#### Effect of yoga on arterial stiffness in elderly subjects with increased pulse pressure: A randomized controlled study

Complementary Therapies in Medicine, 06/23/2015 Gurunathrao PS, et al.

This study aimed to determine the effect of yoga on arterial function in elderly with increased pulse pressure (PP). This findings suggest that yoga program offered was more effective than brisk-walk in reducing arterial stiffness along with BP in elderly individuals with increased PP. Yoga can also significantly reduce sympathetic activity and improve endothelial function with enhancement in bioavailability of NO.

#### Methods

- A randomized controlled study with two parallel groups.
- Elderly subjects with PP  $\geq$  60 mmHg (n=60).
- Yoga group (n=30) was assigned for yoga training and brisk-walking (BW) group (n=30) for brisk-walk with stretching exercise for one hour in the morning for 6 days in a week for twelve weeks.
- Arterial stiffness measures: Brachial-ankle pulse wave velocity (baPWV), Carotid-femoral pulse wave velocity (c-f PWV), aortic augmentation index (AIx75), arterial stiffness index at brachial (bASI) and tibial arteries (aASI).
- Total serum nitric oxide concentration (NOx) as an index of endothelial function.
- Heart rate variability (HRV) measures: Low frequency and high frequency in normalized units (LFnu, HFnu) and LF/HF ratio.

#### Results

- The mean between-group change (with 95% CI) in arterial stiffness: c-f PWV(m/s) [1.25(0.59 to 1.89);  $p < 0.001$ ], baPWV(m/s) [1.96(0.76 to 3.16),  $p < 0.01$ ], AIx75 [3.07(0.24 to 5.89),  $p = 0.066$ ], aASI [8.3(4.06 to 12.53),  $p < 0.001$ ]; endothelial function index: NO ( $\mu\text{mol/L}$ ) [-9.03(-14.57 to -3.47),  $p < 0.001$ ]; SBP (mmHg) [14.23(12.03 to 16.44),  $p < 0.001$ ], DBP(mmHg) [0.1(-1.95 to 2.15),  $p = 0.38$ ], PP (mmHg) [14.07(11.2 to 16.92),  $p < 0.001$ ], MAP(mmHg) [4.7(3.08 to 6.32),  $p < 0.001$ ]; and Cardiac autonomic function: LF (nu) [4.81(1.54 to 8.08),  $p < 0.01$ ], HF (nu) [-4.13(-7.57 to -0.69),  $p < 0.01$ ], LF/HF ratio [0.84(0.3 to 1.37),  $p < 0.001$ ], indicate significant difference in effects of two intervention on arterial stiffness, endothelial function, BP and cardiac autonomic activity.
- There was significant change within-yoga group in vascular function, BP and autonomic function, while no significant change within-BW group was observed.

**IBS and smoking**

Eur J Gastroenterol Hepatol. 2015 Jul;27(7):797-803. doi: 10.1097/MEG.0000000000000371.

**Beliefs and behaviour about smoking among inflammatory bowel disease patients.**

Saadoune N<sup>1</sup>, Peyrin-Biroulet L, Baumann C, Bigard MA, Wirth N, Martinet Y, Peyrin-Biroulet C.

Author information

Abstract

**BACKGROUND AND AIMS:**

We investigated the beliefs and behaviours about tobacco among inflammatory bowel disease (IBD) patients.

**MATERIALS AND METHODS:**

A questionnaire of 18 items was developed and administered to all consecutive patients followed for IBD at Nancy University Hospital from October 2012 to March 2013.

**RESULTS:**

Two hundred and thirty-one patients participated in the survey [Crohn's disease (CD)=171, ulcerative colitis (UC)=60]. Among IBD patients who were smokers at diagnosis, 10.5% of CD patients versus 14.3% of UC patients believed that tobacco could have triggered their IBD; about half the CD smokers at diagnosis were not aware that smoking might promote their disease. Three quarters of smokers after diagnosis knew that tobacco was not beneficial for their CD, whereas all UC were aware that smoking had a beneficial effect on their disease course. About half of the CD patients had stopped smoking during a flare-up. Four former smokers with UC (21.1%) resumed smoking during a relapse. Nearly 90% of IBD current smokers wished to quit smoking. About half the IBD patients were aware of the relation between smoking and IBD, and the Internet was a source for 24.3% of these patients.

**CONCLUSION:**

The majority of IBD patients are unaware of the effects of tobacco on their disease. Better information through a therapeutic education programme should be systematically recommended in IBD.

PMID: 25919776

**Gluten and bowel function**

Dig Liver Dis. 2015 May 23. pii: S1590-8658(15)00342-4. doi: 10.1016/j.dld.2015.05.013.

**The effect of gluten on intestinal fermentation, gastric and gallbladder emptying in healthy volunteers.**

Di Stefano M<sup>1</sup>, Carnevale Maffè G<sup>2</sup>, Bergonzi M<sup>2</sup>, Mengoli C<sup>2</sup>, Formagnana P<sup>2</sup>, Di Sabatino A<sup>2</sup>, Corazza GR<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

The relationship between gluten ingestion and gastrointestinal tract function is a matter of debate.

**AIM:**

We analysed the effect of gluten on gastric and gallbladder emptying and intestinal fermentation in healthy volunteers.

**METHODS:**

Ultrasound measurement of gastric and gallbladder emptying after both gluten-containing and gluten-free meals was performed in 18 volunteers (8 women, age 25.0±2.5 years; BMI 22±1.9). Breath hydrogen excretion after a gluten-containing meal, a gluten-free meal and a gluten-free meal with added gluten powder was measured in 16 volunteers (10 women, age 25.2±2.7 years; BMI 22±1.8). The severity of symptoms was monitored.

**RESULTS:**

Gluten presence in the meals was not recognised. Gastric emptying time was 81.6±13.8min after gluten-containing and 73.9±21.6min after gluten-free meals (p=0.11). Percentage ejection fraction after gluten-containing meals was 60±9% and 60.6±6% after gluten-free meals (p=0.68). Peak and cumulative hydrogen excretion were significantly higher after gluten-containing than after gluten-free meals (peak: 12.5±7.3 vs 6.5±5.1 parts-per-million, p<0.01; and cumulative: 2319±1720 vs 989±680 parts-per-million/minute, respectively; p<0.01). Adding gluten powder to the gluten-free meal did not modify fermentation. Symptoms were mild and not different after the meals.

**CONCLUSIONS:**

In healthy volunteers, gluten may induce gastrointestinal alterations. Further studies are needed to clarify which patients could benefit from dietary modification.

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**KEYWORDS:**

Gallbladder emptying; Gastric emptying; Intestinal fermentation; Non-coeliac gluten sensitivity

PMID: 26071788

**Connective Tissue Massage and constipation****Effect of Connective Tissue Manipulation on Symptoms and Quality of Life in Patients With Chronic Constipation: a Randomized Controlled Trial**

Ceren Gürsen, MS Mintaze Kerem Günel, PhD Serap Kaya, PhD Taylan Kav, MD  
Türkan Akbayrak, PhD

Journal of Manipulative and Physiological Therapeutics, 06/23/2015

DOI: <http://dx.doi.org/10.1016/j.jmpt.2015.06.003>

**Abstract****Objective**

The purpose of this study was to examine the effects of connective tissue manipulation (CTM) on the severity of constipation and health-related quality of life in individuals diagnosed with chronic constipation.

**Methods**

Fifty patients with a diagnosis of chronic constipation according to Rome III criteria were recruited and randomized to an intervention (n = 25) or control group (n = 25). The intervention group received CTM in addition to the lifestyle advice, whereas the control group was given only lifestyle advice for constipation. All assessments were performed at baseline and at the end of 4 weeks. The primary outcome measure was the Constipation Severity Instrument. Secondary outcomes included Patient Assessment of Constipation Quality of Life Questionnaire, Bristol Stool Scale, and 7-day bowel diary. Differences between groups were analyzed with t tests, Mann-Whitney U test and  $\chi^2$  test.

**Results**

Compared with the control group, subjects in the intervention group reported significantly greater improvement in total and subscale scores of the Constipation Severity Instrument and Patient Assessment of Constipation Quality of Life Questionnaire ( $P < .05$ ). Based on the results from bowel diaries, the improvements in the number of bowel movements, duration of defecation, stool consistency, and the feeling of incomplete evacuation in the intervention group were also significantly more than the control group ( $P < .05$ ).

**Conclusion**

This study showed that CTM and lifestyle advice were superior to reducing symptoms of constipation and quality of life compared with lifestyle advice alone for patients with chronic constipation.

**Key Indexing Terms:**

Constipation, Massage, Quality of Life, Randomized Controlled Trial

**IBS and fructose**

Med Hypotheses. 2015 Jun 2. pii: S0306-9877(15)00217-0. doi: 10.1016/j.mehy.2015.05.019.

**Is fructose malabsorption a cause of irritable bowel syndrome?**

DiNicolantonio JJ<sup>1</sup>, Lucan SC<sup>2</sup>.

Author information

Abstract

Irritable Bowel Syndrome (IBS) is a condition that may be marked by abdominal pain, bloating, fullness, indigestion, belching, constipation and/or diarrhea. IBS symptoms can result from malabsorption of fructose. Fructose is a monosaccharide found naturally in small quantities in fruits and some vegetables, and in much larger quantities in industrially manufactured sweets with added sugars (e.g. sucrose and high fructose corn syrup). Fructose malabsorption leads to osmotic diarrhea as well as gas and bloating due to fermentation in the colon.

A low-fructose diet has been found to improve IBS symptoms in some patients. This paper discusses the prevalence of fructose malabsorption and considers fructose ingestion as a possible cause of--and fructose restriction as a possible dietary treatment for--IBS.

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PMID: 26059250

**IBS / infection**

BMC Gastroenterol. 2015 Jun 10;15(1):66. doi: 10.1186/s12876-015-0296-0.

**The relationship between irritable bowel syndrome, functional dyspepsia, chronic fatigue and overactive bladder syndrome: a controlled study 6 years after acute gastrointestinal infection.**

Persson R<sup>1</sup>, Wensaas KA<sup>2</sup>, Hanevik K<sup>3</sup>, Eide GE<sup>4,5</sup>, Langeland N<sup>6,7</sup>, Rortveit G<sup>8,9</sup>.

Author information

Abstract

**BACKGROUND:**

To investigate in a cohort with previous gastrointestinal infection and a control group the prevalence of overactive bladder syndrome (OAB), and how it was associated with three other functional disorders; irritable bowel syndrome (IBS), functional dyspepsia (FD) and chronic fatigue (CF).

**METHODS:**

Controlled historic cohort study including 724 individuals with laboratory confirmed giardiasis six years earlier, and 847 controls matched by gender and age. Prevalence and odds ratios (OR) with 95 % confidence intervals (CI) were calculated.

**RESULTS:**

The prevalence of OAB was 18.7 % (134/716) in the exposed group and 13.6 % (113/833) in the control group ( $p = 0.007$ ). The association between OAB and IBS was strong in the control group (OR: 2.42; 95 % CI: 1.45 to 4.04), but insignificant in the Giardia exposed (OR: 1.29; 95 % CI: 0.88 to 1.88). The association between OAB and FD was weak in both groups. CF was strongly associated with OAB (OR: 2.73; 95 % CI: 1.85 to 4.02 in the exposed and OR: 2.79; 95 % CI: 1.69 to 4.62 in the controls), and this association remained when comorbid conditions were excluded.

**CONCLUSIONS:**

Sporadic IBS was associated with increased risk of OAB, whereas post-infectious IBS was not. An apparent association between OAB and previous Giardia infection can be ascribed to comorbid functional disorders.

PMID: 26058591



### 13. CRANIUM/TMJ

#### TMJ and Tinnitus

Eur Arch Otorhinolaryngol. 2015 Jan 9.

#### **Increased risk of tinnitus in patients with temporomandibular disorder: a retrospective population-based cohort study.**

Lee CF<sup>1</sup>, Lin MC, Lin HT, Lin CL, Wang TC, Kao CH.

Author information

Abstract

This study determined whether there is an increased risk of tinnitus in patients with temporomandibular joint (TMJ). We used information from health insurance claims obtained from Taiwan National Health Insurance (TNHI). Patients aged 20 years and older who were newly diagnosed with TMJ disorder served as the study cohort. The demographic factors and comorbidities that may be associated with tinnitus were also identified, including age, sex, and comorbidities of hearing loss, noise effects on the inner ear, and degenerative and vascular ear disorders. A higher proportion of TMJ disorder patients suffered from hearing loss (5.30 vs. 2.11 %), and degenerative and vascular ear disorders (0.20 vs. 0.08 %) compared with the control patients. The crude hazard ratio (HR) of tinnitus in the TMJ disorder cohort was 2.73-fold higher than that in the control patients, with an adjusted HR of 2.62 (95 % CI = 2.29-3.00).

The comorbidity-specific TMJ disorder cohort to the control patients' adjusted HR of tinnitus was higher for patients without comorbidity (adjusted HR = 2.75, 95 % CI = 2.39-3.17). We also observed a 3.22-fold significantly higher relative risk of developing tinnitus within the 3-year follow-up period (95 % CI = 2.67-3.89). Patients with TMJ disorder might be at increased risk of tinnitus.

PMID: 25573837

**14. HEADACHES****Diet changes and HA**

Cephalalgia. 2015 Jun 11. pii: 0333102415590239.

**Diet and nutraceutical interventions for headache management: A review of the evidence.**

Orr SL<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

The use of complementary and alternative medicines (CAM) is common among patients with primary headaches. In parallel, CAM research is growing. Diet interventions comprise another category of non-pharmacologic treatment for primary headache that is of increasing clinical and research interest.

**METHODS:**

A literature search was carried out to identify studies on the efficacy of diet and nutraceutical interventions for primary headache in the pediatric and adult populations. MEDLINE, Embase and EBM Reviews-Cochrane Central Register of Controlled Trials were searched to identify studies.

**RESULTS:**

There is a growing body of literature on the potential use of CAM and diet interventions for primary headache disorders. This review identified literature on the use of a variety of diet and nutraceutical interventions for headache. Most of the studies assessed the efficacy of these interventions for migraine, though some explored their role in tension-type headache and cluster headache. The quality of the evidence in this area is generally poor.

**CONCLUSIONS:**

CAM is becoming more commonplace in the headache world. Several interventions show promise, but caution needs to be exercised in using these agents given limited safety and efficacy data. In addition, interest in exploring diet interventions in the treatment of primary headaches is emerging. Further research into the efficacy of nutraceutical and diet interventions is warranted.

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**KEYWORDS:**

Diet; headache; herbal medicines; migraine; nutraceuticals; vitamins

PMID: 26069242

## HA and personality

J Headache Pain. 2015 Dec;16(1):536. doi: 10.1186/s10194-015-0536-2. Epub 2015 Jun 9.

**Migraine equivalents and related symptoms, psychological profile and headache features: which relationship?**

Tarantino S<sup>1</sup>, De Ranieri C, Dionisi C, Gagliardi V, Capuano A, Vigevano F, Gentile S, Valeriani M.

Author information

Abstract

**BACKGROUND:**

Migraine equivalents are common clinical conditions in children suffering from headache. Very few studies dealt with the psychological profile of children/adolescents with migraine equivalents. Our main aim was to compare the psychological profile between migraine children with and without migraine equivalents. Moreover, as secondary aim, exclusively in children with migraine equivalents, we investigated the possible relationship between migraine attack frequency and intensity and psychological factors.

**METHODS:**

We enrolled 136 young migraineurs. They were divided in two groups (patients with and without migraine equivalents). The psychological profile was assessed by means of SAFA Anxiety and Somatization questionnaires.

**RESULTS:**

Migraine equivalents were present in 101 patients (74.3%). Anxiety ( $p = 0.024$ ) and somatization ( $p = 0.001$ ) levels, but not hypochondria ( $p = 0.26$ ), were higher in patients with migraine equivalents. In children with migraine equivalents, a low frequency of attacks was related to separation anxiety ( $p = 0.034$ ).

**CONCLUSIONS:**

Migraine equivalents patients tend to feel more fearful and to experience more shyness. This, together with the tendency to somatization, may lead them to become vigilant in attachment relationships with their caregivers.

PMID: 26059348

**20. ROTATOR CUFF****Sleep disturbances**

Am J Sports Med. 2015 Jun;43(6):1455-9. doi: 10.1177/0363546515572769. Epub 2015 Mar 16.

**Sleep disturbance associated with rotator cuff tear: correction with arthroscopic rotator cuff repair.**

Austin L<sup>1</sup>, Pepe M<sup>2</sup>, Tucker B<sup>2</sup>, Ong A<sup>2</sup>, Nugent R<sup>2</sup>, Eck B<sup>2</sup>, Tjoumakaris F<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Sleep disturbance is a common complaint of patients with a rotator cuff tear. Inadequate and restless sleep, along with pain, is often a driving symptom for patients to proceed with rotator cuff repair. To date, no studies have examined sleep disturbance in patients undergoing rotator cuff repair, and there is no evidence that surgery improves sleep disturbance.

**HYPOTHESIS:**

Sleep disturbance is prevalent in patients with a symptomatic rotator cuff tear, and sleep disturbance improves after arthroscopic rotator cuff repair.

**STUDY DESIGN:**

Case series; Level of evidence, 4.

**METHODS:**

A total of 56 patients undergoing arthroscopic rotator cuff repair for full-thickness tears were enrolled in a prospective study. Patients were surveyed preoperatively and postoperatively at intervals of 2, 6, 12, 18, and 24 weeks. Patient outcomes were scored using the Pittsburgh Sleep Quality Index (PSQI), Simple Shoulder Test (SST), visual analog scale for pain (VAS), and single assessment numeric evaluation (SANE). Demographic and surgical factors were also collected for analysis.

**RESULTS:**

Preoperative PSQI scores indicative of sleep disturbance were reported in 89% of patients. After surgery, a statistically significant improvement in PSQI was achieved at 3 months ( $P = .0012$ ; 91% follow-up) and continued through 6 months ( $P = .0179$ ; 93% follow-up). Six months after surgery, only 38% of patients continued to have sleep disturbance. Multivariable linear regression of all surgical and demographic factors versus PSQI was performed and demonstrated that preoperative and prolonged postoperative narcotic use negatively affected sleep.

**CONCLUSION:**

Sleep disturbance is common in patients undergoing rotator cuff repair. After surgery, sleep disturbance improves to levels comparable with those of the general public. Preoperative and prolonged postoperative use of narcotic pain medication negatively affects sleep.

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**KEYWORDS:**

aging athlete; rotator cuff; shoulder; sleep

PMID: 25776185

**25. WRIST AND HAND****Scapholunate lig**

J Hand Surg Am. 2015 May 28. pii: S0363-5023(15)00445-1. doi: 10.1016/j.jhsa.2015.04.007.

**Force in the Scapholunate Interosseous Ligament During Active Wrist Motion.**

Dimitris C<sup>1</sup>, Werner FW<sup>2</sup>, Joyce DA<sup>1</sup>, Harley BJ<sup>1</sup>.

Author information

Abstract

**PURPOSE:**

To examine the force experienced by the scapholunate interosseous ligament (SLIL) during movements of the wrist.

**METHODS:**

Six fresh-frozen cadaveric wrists were freed of soft tissue and tested in a computer controlled, servohydraulic simulator. Each wrist was tested cyclically through simulated active arcs of flexion-extension and dart throw motion. Tensile forces were recorded across the scapholunate joint with the SLIL cut through a cable placed through the scaphoid to the lunate and fixed to a force transducer external to the wrist.

**RESULTS:**

The average recorded maximal tensile force across the scapholunate joint during all tested motions was 20 N. During wrist flexion-extension and the dart throw motion, SLIL force was greater at maximum extension than at maximum flexion. No significant differences among the different motions at maximum flexion or extension or for maximal force during motion were found.

**CONCLUSIONS:**

Forces during the flexion-extension and dart throw motions were significantly higher in extension than in flexion. However, during simple unresisted wrist motions, the force did not exceed 20 N.

**CLINICAL RELEVANCE:**

This information can be used to evaluate surgical methods used for SLIL repairs and thus provide better outcomes for patients.

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**KEYWORDS:**

Scapholunate interosseous ligament force

PMID: 26026356

**30 A. IMPINGEMENT****Female athletes assessment**

Am J Sports Med. 2015 Jun;43(6):1324-30. doi: 10.1177/0363546515576908. Epub 2015 Mar 31.

**The prevalence of radiographic findings of structural hip deformities in female collegiate athletes.**

Kapron AL<sup>1</sup>, Peters CL<sup>1</sup>, Aoki SK<sup>1</sup>, Beckmann JT<sup>1</sup>, Erickson JA<sup>1</sup>, Anderson MB<sup>1</sup>, Pelt CE<sup>2</sup>.

**Abstract**

**BACKGROUND:** Structural deformities of the hip, including femoroacetabular impingement (FAI) and acetabular dysplasia, often limit athletic activity. Previous studies have reported an increased prevalence of radiographic cam FAI in male athletes, but data on the prevalence of structural hip deformities in female athletes are lacking.

**PURPOSE:** (1) To quantify the prevalence of radiographic FAI deformities and acetabular dysplasia in female collegiate athletes from 3 sports: volleyball, soccer, and track and field. (2) To identify possible relationships between radiographic measures of hip morphologic characteristics and physical examination findings.

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

**METHODS:**

Anteroposterior (AP) pelvis and frog-leg lateral radiographs were obtained from 63 female athletes participating in Division I collegiate volleyball, soccer, and track and field. Lateral center edge angle (LCEA) and acetabular index were measured on AP films. Alpha angle and head-neck offset were measured on frog-leg lateral films. Pain during the supine impingement examination and hip rotation at 90° of flexion were recorded. Random-effects linear regression was used for group comparisons and correlation analyses to account for the lack of independence of observations made on left and right hips.

**RESULTS:**

Radiographic cam deformity (alpha angle >50° and/or head-neck offset <8 mm) was found in 48% (61/126) of hips. Radiographic pincer deformity (LCEA >40°) was noted in only 1% (1/126) of hips. No hips had radiographic mixed FAI (at least 1 of the 2 cam criteria and LCEA >40°). Twenty-one percent (26/126) of hips had an LCEA <20°, indicative of acetabular dysplasia, and an additional 46% (58/126) of hips had borderline dysplasia (LCEA ≥20° and ≤25°). Track and field athletes had significantly increased alpha angles (48.2° ± 7.1°) compared with the soccer players (40.0° ± 6.8°; P < .001) and volleyball players (39.1° ± 5.9°; P < .001). There was no significant difference in the LCEA (all P > .914) or the prevalence of dysplasia (LCEA <20°) between teams (all P > .551). There were no significant correlations between the radiographic measures and internal rotation (all P > .077). There were no significant differences (all P > .089) in radiographic measures between hips that were painful (n = 26) during the impingement examination and those that were not.

**CONCLUSION:**

These female athletes had a lower prevalence of radiographic FAI deformities compared with previously reported values for male athletes and a higher prevalence of acetabular dysplasia than reported for women in previous studies. **KEYWORDS:** acetabular dysplasia; female athletes; femoroacetabular impingement; football (soccer); hip; track and field; volleyball

PMID:25828079

**32 A. KNEE/ACL****Inflammation in knee**

Am J Sports Med. 2015 Jun;43(6):1460-6. doi: 10.1177/0363546515574059. Epub 2015 Mar 18.

**Inflammatory cytokines and biomarkers of cartilage metabolism 8 years after anterior cruciate ligament reconstruction: results from operated and contralateral knees.**

Åhlén M<sup>1</sup>, Roshani L<sup>2</sup>, Lidén M<sup>3</sup>, Struglics A<sup>4</sup>, Rostgård-Christensen L<sup>5</sup>, Kartus J<sup>6</sup>.

Author information

Abstract

**BACKGROUND:**

Patients who sustain an acute anterior cruciate ligament (ACL) rupture are at increased risk to develop posttraumatic arthritis (PTA) in the injured knee whether the ACL is reconstructed or treated nonoperatively. Inflammatory cytokines and cartilage degradation biomarkers are elevated at the time of acute injury and postoperatively. This suggests that one mechanism for PTA may be an inflammatory degradative process initiated on the acute injury and sustained for some length of time independent of whether adequate joint stability is restored.

**HYPOTHESIS:**

Inflammatory cytokines and biomarkers of cartilage degradation are elevated in the synovial fluid several years after reconstruction of the ACL, indicating an ongoing imbalance between extracellular matrix destruction and repair.

**STUDY DESIGN:**

Cross-sectional study; Level of evidence, 3.

**METHODS:**

In 11 patients who had undergone ACL reconstruction 8 years earlier, knee synovial fluid was aspirated from the operated knee and the contralateral nonoperated knee. The synovial fluid was analyzed for interleukin (IL)-1 $\beta$ , IL-6, tumor necrosis factor (TNF)- $\alpha$ , sulfated glycosaminoglycans (sGAG), aggrecan neoepitope fragment (ARGS-aggrecan), and cartilage oligomeric matrix protein (COMP). At follow-up, the patients underwent bilateral weightbearing radiographs and bilateral MRIs of their knees.

**RESULTS:**

No significant differences between the operated and the contralateral knee were found for the synovial fluid concentrations of IL-1 $\beta$ , IL-6, TNF- $\alpha$ , sGAG, ARGS-aggrecan, or COMP. There were significantly more radiographically visible osteoarthritic changes in the operated knees compared with the contralateral knees. MRIs revealed that all grafts and all contralateral ACLs were intact and, furthermore, that there was significantly more meniscal and cartilage damage in the index knees than the contralateral knees.

**CONCLUSION:**

Eight years after ACL reconstruction, there were no significant differences in inflammatory cytokines and biomarkers for cartilage degeneration between the nonoperated and the ACL-reconstructed knee, even though there were more osteoarthritic changes and meniscal and cartilage damage in the operated knee, as seen on weightbearing radiographs and MRI.

**KEYWORDS:** ACL reconstruction; ARGS-aggrecan; COMP; cytokines; osteoarthritis; sGAG

PMID: 25787698

**Leg symmetry**

Am J Sports Med. 2015 Jun;43(6):1391-8. doi: 10.1177/0363546515576127. Epub 2015 Mar 31.

**Changes in involved and uninvolved limb function during rehabilitation after anterior cruciate ligament reconstruction: implications for limb symmetry index measures.**

Rohman E<sup>1</sup>, Steubs JT<sup>1</sup>, Tompkins M<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Functional testing is used to assess anterior cruciate ligament (ACL) reconstruction rehabilitation, with the goal of symmetric ability. The pattern of change in the uninvolved limb's function during rehabilitation is not established.

**HYPOTHESES:**

(1) Involved and uninvolved limb ability increases during rehabilitation, but the uninvolved limb ability increases to a lesser degree. (2) Hop tests will show larger initial asymmetry and will improve the most with rehabilitation.

**STUDY DESIGN:**

Cohort study; Level of evidence, 3.

**METHODS:**

This was a retrospective case series of 122 patients who underwent ACL reconstruction at our ambulatory surgery center and received multiple postoperative Standard Functional Tests (SFTs) between October 2009 and October 2013. Ten of the 12 individual tests within the SFT battery were analyzed. The patients' earliest and latest SFTs were compared for changes in Limb Symmetry Index (LSI) and absolute function in each limb. We also analyzed the subgroup with SFTs (n = 38) at both 4 and 6 months postoperatively.

**RESULTS:**

In all patients with multiple SFTs, involved limb performance increased in all tests except eyes-closed stork. Uninvolved limb performance increased in 4 SFT component tests and decreased in none. LSI significantly improved in 6 tests, all of which also showed involved limb improvement that was significant. Of these 6 tests, 5 showed initial LSI below 90%: single-leg squat, retro step-up, single-leg hop, crossover triple hop, and timed hop. Retro step-up and single-leg hop showed LSI improvements greater than 10 percentage points. In patients with 4- and 6-month data, involved limb performance increased in all tests except single-leg triple hop. Uninvolved limb performance increased in 5 SFT component tests and decreased in none. LSI significantly improved in 4 tests, all of which had initial LSI below 90%, and showed involved limb improvement that was significant. Retro step-up, single-leg hop, and crossover triple hop showed LSI improvements greater than 10 percentage points.

**CONCLUSION:**

During ACL reconstruction rehabilitation, LSI improvements indicated absolute increases in involved limb ability and were not attributable to uninvolved limb deterioration. The single-leg squat, retro step-up, single-leg hop, crossover triple hop, and timed hop are suggested as highly useful tests, since all showed initial LSI below 90%, with significant LSI improvement after rehabilitation. **KEYWORDS:** ACL physical therapy/rehabilitation; ACL reconstruction; functional test; limb symmetry index PMID:5828078



### 33. MENISCUS

#### Changes in kinematics

Am J Sports Med. 2015 Jun;43(6):1399-407. doi: 10.1177/0363546515577360. Epub 2015 Mar 31.

#### **Alterations in knee kinematics after partial medial meniscectomy are activity dependent.**

Edd SN<sup>1</sup>, Netravali NA<sup>2</sup>, Favre J<sup>3</sup>, Giori NJ<sup>4</sup>, Andriacchi TP<sup>5</sup>.

#### **BACKGROUND:**

Alterations in knee kinematics after partial meniscectomy have been linked to the increased risk of osteoarthritis in this population. Understanding differences in kinematics during static versus dynamic activities of increased demand can provide important information regarding the possible underlying mechanisms of these alterations.

#### **HYPOTHESIS:**

Differences in the following 2 kinematics measures will increase with activity demand: (1) the offset toward external tibial rotation for the meniscectomized limb compared with the contralateral limb during stance and (2) the difference in knee flexion angle at initial foot contact between the meniscectomized and contralateral limbs.

#### **STUDY DESIGN: Controlled laboratory study.**

#### **METHODS:**

This study compared side-to-side differences in knee flexion and rotation angles during static and dynamic activities. Thirteen patients (2 female) were tested in a motion capture laboratory at 6 ± 2 months after unilateral, arthroscopic, partial medial meniscectomy during a static reference pose and during 3 dynamic activities: walking, stair ascent, and stair descent.

#### **RESULTS:**

The meniscectomized limb demonstrated more external tibial rotation compared with the contralateral limb during dynamic activities, and there was a trend that this offset increased with activity demand (repeated-measures analysis of variance [ANOVA] for activity,  $P = .07$ ; mean limb difference: static pose,  $-0.1^\circ \pm 3.3^\circ$ ,  $P = .5$ ; walking,  $1.2^\circ \pm 3.8^\circ$ ,  $P = .1$ ; stair ascent,  $2.0^\circ \pm 3.2^\circ$ ,  $P = .02$ ; stair descent,  $3.0^\circ \pm 3.5^\circ$ ,  $P = .005$ ). Similarly, the meniscectomized knee was more flexed at initial contact than the contralateral limb during dynamic activities (repeated-measures ANOVA for activity  $P = .006$ ; mean limb difference: reference pose,  $1.0^\circ \pm 2.5^\circ$ ,  $P = .09$ ; walking,  $2.0^\circ \pm 3.9^\circ$ ,  $P = .05$ ; stair ascent,  $5.9^\circ \pm 5.3^\circ$ ,  $P = .009$ ; stair descent,  $3.5^\circ \pm 4.0^\circ$ ,  $P = .004$ ).

#### **CONCLUSION:**

These results suggest both a structural element and a potential muscular element for the differences in kinematics after partial medial meniscectomy and highlight the importance of challenging the knee with activities of increased demands to detect differences in kinematics from the contralateral limb.

#### **CLINICAL RELEVANCE:**

With further investigation, these findings could help guide clinical rehabilitation of patients with torn meniscus tissue, especially in the context of the patients' increased risk of joint degeneration.

**KEYWORDS:** *biomechanics; gait analysis; meniscus; osteoarthritis; stairs; walking*  
**MID:** 25828080

**34. PATELLA****Measuring stress**

Gait Posture. 2015 May 29. pii: S0966-6362(15)00477-4. doi: 10.1016/j.gaitpost.2015.05.017.

**Comparison of two methods of determining patellofemoral joint stress during dynamic activities.**

Kernozek TW<sup>1</sup>, Vannatta CN<sup>2</sup>, van den Bogert AJ<sup>3</sup>.

Author information

Abstract

**BACKGROUND:**

Joint specific models rely on muscle force estimates to quantify tissue specific stresses. Traditionally, muscle forces have been estimated using inverse dynamics alone. Inverse dynamics coupled with static optimization techniques allow for an alternative method in estimating muscle forces. Differences between these two techniques have not been compared for determining the quadriceps force for estimating patellofemoral joint stress.

**METHODS:**

Eleven female participants completed five squats and ten running trials. Motion capture and force platform data were processed using both solely inverse dynamics and inverse dynamics with static optimization to estimate the quadriceps force in a patellofemoral joint model.

**FINDINGS:**

Patellofemoral joint stress calculations were consistently higher when using the combination of inverse dynamics and static optimization as compared to the inverse dynamics alone ( $p < 0.05$ ) yielding estimates that were 30-106% greater.

**INTERPRETATION:**

When implementing joint models to estimate tissue specific stresses, the choice of technique used to estimate muscle forces plays an important role in determining the magnitude of estimated stresses in patellofemoral joint models.

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**KEYWORDS:**

Inverse dynamics; Knee; Running; Squatting; Static optimization

PMID: 26050874

**Matrix induced improvements**

Am J Sports Med. 2015 Jun;43(6):1362-72. doi: 10.1177/0363546515574063. Epub 2015 Mar 17.

**Prospective clinical and radiologic evaluation of patellofemoral matrix-induced autologous chondrocyte implantation.**

Ebert JR<sup>1</sup>, Fallon M<sup>2</sup>, Smith A<sup>3</sup>, Janes GC<sup>4</sup>, Wood DJ<sup>5</sup>.

Author information

Abstract

**BACKGROUND:**

While matrix-induced autologous chondrocyte implantation (MACI) has demonstrated encouraging outcomes in the treatment of knee chondral defects, there remains little available research specifically investigating its use in the patellofemoral joint.

**PURPOSE:**

To prospectively evaluate the clinical and radiologic outcome of MACI in the patellofemoral joint.

**STUDY DESIGN:**

Case series; Level of evidence, 4.

**METHODS:**

In 47 consecutive patients undergoing patellofemoral MACI, clinical (Knee injury and Osteoarthritis Outcome Score, 36-Item Short Form Health Survey, visual analog scale for pain, 6-minute walk test, knee range of motion, and strength assessment) and magnetic resonance imaging (MRI) assessments were undertaken before and 3, 12, and 24 months after surgery. The MRI was performed to assess graft infill and determine an overall MRI composite score. Results were analyzed according to (1) the patient sample overall and (2) after stratification into 4 subgroups per implant location (patella or trochlea) as well as whether or not adjunct tibial tubercle transfer for patellofemoral malalignment was required.

**RESULTS:**

The overall patient sample, as well as each of the 4 procedural subgroups, demonstrated clinically and statistically significant ( $P < .05$ ) improvements over time for all clinical scores. Graft infill and the MRI composite score also demonstrated statistically significant ( $P < .05$ ) improvements over time, with no evidence of a main effect for procedure group or interaction between procedure group and time. At 24 months after surgery, 40.4% ( $n = 19$ ) of patients exhibited complete graft infill comparable with the adjacent native cartilage, with a further 6.4% ( $n = 3$ ) demonstrating a hypertrophic graft. A further 31.9% ( $n = 15$ ) of patients exhibited 50% to 100% tissue infill, and 17% ( $n = 8$ ) demonstrated <50% tissue infill. Two patients (4.3%) demonstrated graft failure. At 24 months after surgery, 85% ( $n = 40$ ) of patients were satisfied with the results of their MACI surgery.

**CONCLUSION:**

These results demonstrate that MACI provides improved clinical and radiologic outcomes to 24 months in patients undergoing treatment specifically for articular cartilage defects on the patella or trochlea, with and without concurrent realignment of the extensor mechanism if required.

**KEYWORDS:** *clinical outcomes; magnetic resonance imaging; matrix-induced autologous chondrocyte implantation; patellofemoral joint*

PMID: 25784629

## Prolonged holds

Br J Sports Med. 2015 May 15. pii: bjsports-2014-094386. doi: 10.1136/bjsports-2014-094386.

**Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy.**

Rio E<sup>1</sup>, Kidgell D<sup>2</sup>, Purdam C<sup>3</sup>, Gaida J<sup>4</sup>, Moseley GL<sup>5</sup>, Pearce AJ<sup>6</sup>, Cook J<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

Few interventions reduce patellar tendinopathy (PT) pain in the short term. Eccentric exercises are painful and have limited effectiveness during the competitive season. Isometric and isotonic muscle contractions may have an immediate effect on PT pain.

**METHODS:**

This single-blinded, randomised cross-over study compared immediate and 45 min effects following a bout of isometric and isotonic muscle contractions. Outcome measures were PT pain during the single-leg decline squat (SLDS, 0-10), quadriceps strength on maximal voluntary isometric contraction (MVIC), and measures of corticospinal excitability and inhibition. Data were analysed using a split-plot in time-repeated measures analysis of variance (ANOVA).

**RESULTS:**

6 volleyball players with PT participated. Condition effects were detected with greater pain relief immediately from isometric contractions: isometric contractions reduced SLDS (mean±SD) from 7.0±2.04 to 0.17±0.41, and isotonic contractions reduced SLDS (mean±SD) from 6.33±2.80 to 3.75±3.28 (p<0.001). Isometric contractions released cortical inhibition (ratio mean±SD) from 27.53%±8.30 to 54.95%±5.47, but isotonic contractions had no significant effect on inhibition (pre 30.26±3.89, post 31.92±4.67; p=0.004). Condition by time analysis showed pain reduction was sustained at 45 min postisometric but not isotonic condition (p<0.001). The mean reduction in pain scores postisometric was 6.8/10 compared with 2.6/10 postisotonic. MVIC increased significantly following the isometric condition by 18.7±7.8%, and was significantly higher than baseline (p<0.001) and isotonic condition (p<0.001), and at 45 min (p<0.001).

**CONCLUSIONS:**

A single resistance training bout of isometric contractions reduced tendon pain immediately for at least 45 min postintervention and increased MVIC. The reduction in pain was paralleled by a reduction in cortical inhibition, providing insight into potential mechanisms. Isometric contractions can be completed without pain for people with PT. The clinical implications are that isometric muscle contractions may be used to reduce pain in people with PT without a reduction in muscle strength.

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**KEYWORDS:**

Exercise; Knee; Neuromuscular; Sports & exercise medicine; Tendinopathy

PMID:25979840

**Core and PF pain**

Am J Sports Med. 2015 Jun;43(6):1485-93. doi: 10.1177/0363546515574690. Epub 2015 Mar 19.

**Evaluating eccentric hip torque and trunk endurance as mediators of changes in lower limb and trunk kinematics in response to functional stabilization training in women with patellofemoral pain.**

Baldon Rde M<sup>1</sup>, Piva SR<sup>2</sup>, Scattone Silva R<sup>2</sup>, Serrão FV<sup>3</sup>.

Author information

- <sup>1</sup>Department of Physiotherapy, Federal University of São Carlos, São Carlos, Brazil.
- <sup>2</sup>Department of Physical Therapy University of Pittsburgh, Pittsburgh, Pennsylvania, USA.
- <sup>3</sup>Department of Physical Therapy University of Pittsburgh, Pittsburgh, Pennsylvania, USA [fserrao@ufscar.br](mailto:fserrao@ufscar.br).
- BACKGROUND:

Altered movement patterns of the trunk and lower limbs have been associated with patellofemoral pain (PFP). It has been assumed that increasing the strength of the hip and trunk muscles would improve lower limb and trunk kinematics in these patients. However, evidence in support of that assumption is limited.

**PURPOSE:**

To determine whether increases in the strength of hip muscles and endurance of trunk muscles in response to functional stabilization training will mediate changes in frontal plane lower limb kinematics in patients with PFP.

**STUDY DESIGN: Controlled laboratory study.**

**METHODS:**

Thirty-one female athletes were randomized to either a functional stabilization training group that emphasized strengthening of the trunk and hip muscles or a standard training group that emphasized stretching and quadriceps strengthening. Patients attended a baseline assessment session, followed by 8 weeks of intervention, and were then reassessed at the end of the intervention period. The potential mediators that were evaluated included eccentric torque of hip muscles and endurance of the trunk muscles. The outcome variables were the lower limb and trunk kinematics in the frontal plane assessed during a single-legged squat task.

**RESULTS:**

The eccentric strength of the gluteus muscles showed a mediation effect ranging from 18% to 32% on changes to frontal plane kinematics (decreased ipsilateral trunk inclination, pelvis contralateral depression, and hip adduction excursions) observed in the functional stabilization training group after intervention.

**CONCLUSION:**

Although the mediation effects were small, the results suggest that improvements in the strength of the gluteus muscles can influence the frontal plane movement patterns of the lower limb and trunk in women with PFP.

**CLINICAL RELEVANCE:**

Patients with PFP might benefit from strengthening of the hip muscles to improve frontal plane lower limb and trunk kinematics during functional tasks.

**KEYWORDS:**

biomechanics; clinical assessment; injury prevention; knee; patella; rehabilitation PMID: 25790834

**37. OSTEOARTHRITIS/KNEE****Varus thrust!!**

Phys Ther. 2015 Jun 18.

**Association Between Varus Thrust and "Pain and Stiffness" and "Activities of Daily Living" in Patients With Medial Knee Osteoarthritis.**

Fukutani N<sup>1</sup>, Iijima H<sup>2</sup>, Fukumoto T<sup>3</sup>, Uritani D<sup>4</sup>, Kaneda E<sup>5</sup>, Ota K<sup>6</sup>, Aoyama T<sup>7</sup>, Tsuboyama T<sup>8</sup>, Matsuda S<sup>9</sup>.

Author information

Abstract

**BACKGROUND:**

Increasing evidence highlights potential associations between varus thrust and health domains associated with knee osteoarthritis (OA).

**OBJECTIVE:**

We aimed to investigate the association between varus thrust and 2 subcategories-"pain and stiffness" and "activities of daily living (ADL)"-of the Japanese Knee Osteoarthritis Measure (JKOM).

**DESIGN:**

Cross-sectional study.

**METHODS:**

In total, 296 outpatients with knee OA visiting orthopedics clinics were enrolled. The inclusion criteria were age  $\geq 50$  years, medial knee OA and Kellgren/Lawrence (K/L) grade  $\geq 1$ , and the ability to walk independently. Standard posterior-anterior knee radiographs were measured for varus alignment. Participants were video recorded while walking and evaluated for the presence or absence of varus thrust. Pain and stiffness of the knee joint and ADL were evaluated using the JKOM. We performed multivariate regressions (outcomes: pain and stiffness and ADL; predictor: varus thrust).

**RESULTS:**

Varus thrust was present in 46 (16.2%) of 284 patients. Multivariate regression analyses demonstrated that varus thrust is independently associated with pain and stiffness, adjusted for age, sex, body mass index, K/L grade, and varus alignment (Beta = 0.17, P = 0.005). However, the association between varus thrust and ADL was not significant (Beta = 0.11, P = 0.058). Based on sensitivity analyses, including participants of K/L grade 1 had little influence on this analysis.

**LIMITATIONS:**

Only 16.2% of our participants had a varus thrust. Moreover, a cause-effect relation between varus thrust and pain and stiffness remains unknown, owing to the cross-sectional design of this study.

**CONCLUSIONS:**

Varus thrust was associated with pain and stiffness in patients with medial knee OA. However, the association between varus thrust and ADL did not reach significance.

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PMID: 26089038

### Muscle changes and OA

#### **Quantity and quality of the lower extremity muscles in women with knee osteoarthritis**

Ultrasound in Medicine and Biology, 06/23/2015 Taniguchi M, et al.

##### **Abstract**

The objective of the study described here was to compare lower extremity muscle quantity and quality between individuals with and those without knee osteoarthritis (OA). Twenty-one women with knee OA (mild, n = 8; severe, n = 13) and 23 healthy patients participated. Ultrasonography was used to measure muscle thickness (MT) and echo intensity (EI) of the rectus femoris, vastus intermedius, vastus lateralis, vastus medialis, biceps femoris, gluteus maximus, gluteus medius, gastrocnemius, soleus and tibialis anterior. MTs of the vastus medialis and vastus intermedius were smaller, and EIs of the vastus medialis, vastus intermedius, gluteus medius and tibialis anterior were larger, in the severe OA group compared than in the healthy group.

Compared with the healthy group, the mild OA group had decreased MT and enhanced EI. Changes in quality and quantity occurring with knee OA progression differed among muscles. In the vastus medialis, change was observed from an earlier stage.

**Impact on motor cortex**

Arthritis Res Ther. 2015 Jun 18;17(1):164.

**Organisation of the motor cortex differs between people with and without knee osteoarthritis.**

Shanahan CJ<sup>1,2</sup>, Hodges PW<sup>3</sup>, Wrigley TV<sup>4</sup>, Bennell KL<sup>5</sup>, Farrell MJ<sup>6,7</sup>.

Author information

Abstract

**INTRODUCTION:**

The aim of this study was to investigate possible differences in the organisation of the motor cortex in people with knee osteoarthritis (OA) and whether there is an association between cortical organisation and accuracy of a motor task.

**METHODS:**

fMRI data were collected while 11 participants with moderate/severe right knee OA (6 male,  $69 \pm 6$  [mean  $\pm$  SD] years) and seven asymptomatic controls (5 male,  $64 \pm 6$  years) performed three visually guided, variable force, force matching motor tasks involving isolated isometric muscle contractions of: 1) quadriceps (knee), 2) tibialis anterior (ankle) and, 3) finger/thumb flexor (hand) muscles. fMRI data were used to map the loci of peak activation in the motor cortex during the three tasks and to assess whether there were differences in the organisation of the motor cortex between the groups for the three motor tasks. Root mean square of the difference between target and generated forces during muscle contraction quantified task accuracy.

**RESULTS:**

A 4.1 mm anterior shift in the representation of the knee ( $p = 0.03$ ) and swap of the relative position of the knee and ankle representations in the motor cortex ( $p = 0.003$ ) were found in people with knee OA. Poorer performance of the knee task was associated with more anterior placement of motor cortex loci in people with ( $p = 0.05$ ) and without ( $p = 0.02$ ) knee OA.

**CONCLUSIONS:**

Differences in the organisation of the motor cortex in knee OA was demonstrated in relation to performance of knee and ankle motor tasks and was related to quality of performance of the knee motor task. These results highlight the possibility mechanistic link between cortical changes and modified motor behavior in people with knee OA.

PMID: 26080802



**PRP valuable for cartilage**

Am J Sports Med. 2015 Jun;43(6):1467-73. doi: 10.1177/0363546515575023. Epub 2015 Mar 26.

**Stimulation of the superficial zone protein and lubrication in the articular cartilage by human platelet-rich plasma.**

Sakata R<sup>1</sup>, McNary SM<sup>1</sup>, Miyatake K<sup>1</sup>, Lee CA<sup>1</sup>, Van den Bogaerde JM<sup>1</sup>, Marder RA<sup>1</sup>, Reddi AH<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Platelet-rich plasma (PRP) contains high concentrations of autologous growth factors that originate from platelets. Intra-articular injections of PRP have the potential to ameliorate the symptoms of osteoarthritis in the knee. Superficial zone protein (SZP) is a boundary lubricant in articular cartilage and plays an important role in reducing friction and wear and therefore is critical in cartilage homeostasis.

**PURPOSE:**

To determine if PRP influences the production of SZP from human joint-derived cells and to evaluate the lubricating properties of PRP on normal bovine articular cartilage.

**STUDY DESIGN:**

Controlled laboratory study.

**METHODS:**

Cells were isolated from articular cartilage, synovium, and the anterior cruciate ligament (ACL) from 12 patients undergoing ACL reconstruction. The concentrations of SZP in PRP and culture media were measured by enzyme-linked immunosorbent assay. Cellular proliferation was quantified by determination of cell numbers. The lubrication properties of PRP from healthy volunteers on bovine articular cartilage were investigated using a pin-on-disk tribometer.

**RESULTS:**

In general, PRP stimulated proliferation in cells derived from articular cartilage, synovium, and ACL. It also significantly enhanced SZP secretion from synovium- and cartilage-derived cells. An unexpected finding was the presence of SZP in PRP ( $2.89 \pm 1.23 \mu\text{g/mL}$  before activation and  $3.02 \pm 1.32 \mu\text{g/mL}$  after activation). In addition, under boundary mode conditions consisting of high loads and low sliding speeds, nonactivated and thrombin-activated PRP decreased the friction coefficient ( $\mu = 0.012$  and  $\mu = 0.015$ , respectively) compared with saline ( $\mu = 0.047$ ,  $P < .004$ ) and high molecular weight hyaluronan ( $\mu = 0.080$ ,  $P < .006$ ). The friction coefficient of the cartilage with PRP was on par with that of synovial fluid.

**CONCLUSION:**

PRP significantly stimulates cell proliferation and SZP secretion by articular cartilage and synovium of the human knee joint. Furthermore, PRP contains endogenous SZP and, in a functional bioassay, lubricates bovine articular cartilage explants.

**CLINICAL RELEVANCE:**

These findings provide evidence to explain the biochemical and biomechanical mechanisms underlying the efficacy of PRP treatment for osteoarthritis or damage in the knee joint.

KEYWORDS: PRG4; lubrication; lubricin; osteoarthritis; platelet-rich plasma; superficial zone protein PMID: 25813869

#### 41 A. ACHILLES TENDON AND CALF

##### Runners and stiffness of AT

Skeletal Radiol. 2015 Aug;44(8):1119-27. doi: 10.1007/s00256-015-2132-6. Epub 2015 Mar 19.

#### Prevalence of morphological and mechanical stiffness alterations of mid Achilles tendons in asymptomatic marathon runners before and after a competition.

Ooi CC<sup>1</sup>, Schneider ME, Malliaras P, Counsel P, Connell DA.

Author information

Abstract

##### **OBJECTIVE:**

To determine the prevalence of morphological and mechanical stiffness alterations at the mid Achilles tendon in asymptomatic marathon runners before and after a competition. To assess the relationship between pre-existing Achilles tendon alterations and pain after running.

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

All marathon runners from a local running club who were participating in the Melbourne Marathon 2013 (full marathon category) were invited for conventional ultrasound and sonoelastography 1 week leading up to the marathon and again within 3 days post-marathon. Another group of active, healthy individuals not involved in running activities were recruited as controls. Intratendinous morphological (tendon thickness, hypoechogenicities), Doppler as well as stiffness properties of the Achilles were recorded. Achilles tendon pain was evaluated using the visual analogue scale (VAS) and Victorian Institute of Sports Assessment-Achilles (VISA-A).

##### **RESULTS:**

Twenty-one asymptomatic runners (42 Achilles tendons) and 20 healthy controls (40 Achilles tendons) were examined. On the pre-marathon evaluation, runners showed significantly more morphological changes on B-mode ultrasound compared to the controls ( $p < 0.001$ ). Marathon running induced a significant reduction in tendon stiffness ( $p = 0.049$ ) and an increase in Doppler signals ( $p = 0.036$ ). Four runners (4/21, 19 %) reported Achilles tendon pain after the race [VAS 4.0 ( $\pm 1.9$ ), VISA 74.2 ( $\pm 10.1$ )]. Reduced tendon stiffness at baseline was associated with post-marathon Achilles tendon pain ( $p = 0.016$ ).

##### **CONCLUSION:**

Marathon runners demonstrate a higher prevalence of morphological alterations compared to non-runners. Marathon running caused a significant change in Achilles tendon stiffness and Doppler signals. Pre-existing soft Achilles tendon properties on sonoelastography may be a predisposing risk for development of symptoms post-running.

PMID: 25787114

### 43. HALLUX VALGUS

#### Corrective taping

Phys Ther. 2015 Jun 18.

#### **Corrective Bandage for Conservative Treatment of Metatarsus Adductus: Retrospective Study.**

Utrilla-Rodriguez E<sup>1</sup>, Guerrero-Martínez-Cañavete MJ<sup>2</sup>, Albornoz-Cabello M<sup>3</sup>, Munuera PV<sup>4</sup>.  
Author information

Abstract

#### **BACKGROUND:**

Metatarsus adductus is the most common congenital foot deformity observed in children.

#### **OBJECTIVE:**

To analyze the evolution of a corrective bandage of the semi-rigid metatarsus adductus (MA) foot in newborn and to recommend the age interval at which to start treatment of MA with corrective bandage alone, without the need of splints.

#### **STUDY DESIGN:**

An observational, clinical study was performed at the University Hospital "Virgen Macarena," in Seville, Spain. Children born with semi-rigid metatarsus adductus feet at the Virgen Macarena University Hospital in Seville during the years 2010-2011 were included. Corrective bandaging was applied to all children until clinical correction of the deformity. Sex, laterality of the deformity, weight and length of the newborn, age at the start of treatment, antecedents related to the pregnancy and birth, type of treatment (bandaging, splints) and correction or no correction with bandaging alone were recorded. Age differences at the start of the bandaging treatment between patients whose deformity was corrected with and without the need of splints were examined. The ROC curve method was applied to analyze the predictive ability of the age at the start of bandaging treatment relative to whether the deformity was corrected or not corrected with bandaging alone.

#### **RESULTS:**

The bandage achieved complete correction in 68.1% of the metatarsus adductus patients and corrected the deformity more frequently in girls compared to boys ( $p=0.017$ ). Of the 56 patients who began the treatment within the first month of life, 92.8% were corrected with the corrective bandaging alone.

#### **CONCLUSIONS:**

Corrective bandages showed high effectiveness, particularly in girls, and overall when started within the first month of life.

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PMID 26089041

#### 44. RHUMATOID ARTHRITIS

##### Mortality with RA

Ann Rheum Dis. 2015 Feb;74(2):415-21. doi: 10.1136/annrheumdis-2013-204021. Epub 2013 Nov 29.

##### **Mortality in rheumatoid arthritis: the impact of disease activity, treatment with glucocorticoids, TNF $\alpha$ inhibitors and rituximab.**

Listing J<sup>1</sup>, Kekow J<sup>2</sup>, Manger B<sup>3</sup>, Burmester GR<sup>4</sup>, Pattloch D<sup>1</sup>, Zink A<sup>5</sup>, Strangfeld A<sup>1</sup>.  
Author information

Abstract

##### **OBJECTIVES:**

To investigate the impact of disease activity, the course of the disease, its treatment over time, comorbidities and traditional risk factors on survival.

##### **METHODS:**

Data of the German biologics register RABBIT were used. Cox regression was applied to investigate the impact of time-varying covariates (disease activity as measured by the DAS28, functional capacity, treatment with glucocorticoids, biologic or synthetic disease modifying antirheumatic drugs (DMARDs)) on mortality after adjustment for age, sex, comorbid conditions and smoking.

##### **RESULTS:**

During 31 378 patient-years of follow-up, 463 of 8908 patients died (standardised mortality ratio: 1.49 (95% CI 1.36 to 1.63)). Patients with persistent, highly active disease (mean DAS28 > 5.1) had a significantly higher mortality risk (adjusted HR (HRadj)=2.43; (95% CI 1.64 to 3.61)) than patients with persistently low disease activity (mean DAS28 < 3.2). Poor function and treatment with glucocorticoids > 5 mg/d was significantly associated with an increased mortality, independent of disease activity. Significantly lower mortality was observed in patients treated with tumour necrosis factor  $\alpha$  (TNF $\alpha$ ) inhibitors (HRadj=0.64 (95% CI 0.50 to 0.81), rituximab (HRadj=0.57 (95% CI 0.39 to 0.84), or other biologics (HRadj=0.64 (95% CI 0.42 to 0.99), compared to those receiving methotrexate. To account for treatment termination in patients at risk, an HRadj for patients ever exposed to TNF $\alpha$  inhibitors or rituximab was calculated. This resulted in an HRadj of 0.77 (95% CI 0.60 to 0.97).

##### **CONCLUSIONS:**

Patients with long-standing high disease activity are at substantially increased risk of mortality. Effective control of disease activity decreases mortality. TNF $\alpha$  inhibitors and rituximab seem to be superior to conventional DMARDs in reducing this risk.

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##### **KEYWORDS:**

DAS28; DMARDs (biologic); Methotrexate; Rheumatoid Arthritis

PMID: 24291654

## RA and diet

Rheumatol Int. 2015 Mar;35(3):533-9. doi: 10.1007/s00296-014-3185-x. Epub 2014 Nov 27.

**Diet and alcohol as risk factors for rheumatoid arthritis: a nested case-control study.**

Sundström B<sup>1</sup>, Johansson I, Rantapää-Dahlqvist S.

Author information

## Abstract

The aim of this study was to investigate whether alcohol and diet, assessed as both macronutrients and dietary patterns, increased the risk of development of rheumatoid arthritis (RA) through a nested case-control design in the Västerbotten Intervention Program (VIP) cohort. Individuals in the VIP who had developed RA after the dietary survey were identified from medical records at the department of rheumatology at the University Hospital, Umeå (n = 386), and matched to 1,886 controls from the same database. Diet was assessed as food groups, as macronutrients and as scores of dietary patterns, namely the carbohydrate-restricted diet score, the Mediterranean diet score and the healthy diet indicator score. When analysing the dietary patterns, consumption of food groups and different macronutrients, a significant association was found in the highest tertile of carbohydrate-restricted diet among the cases with a subsequent anti-CCP-positive disease 1.40 (1.02-1.92), as well as in the highest tertile of protein consumption among smokers (OR = 1.80, 95% CI 1.09-2.95). However, after additional adjustment for sodium intake, these associations were no longer statistically significant. No association was observed between alcohol consumption and the risk of RA.

To summarize, there were no significant associations between diet, or alcohol consumption, and the risk of development of RA within this cohort. The lack of any significant associations of alcohol consumption may be explained by a low consumption in the studied population overall or alternatively by methodological issues raised recently.

PMID: 25428595

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Innominate motions and LBP****Innominate movement patterns, rotation trends and range of motion in individuals with low back pain of sacroiliac joint origin**

Divya Bharatkumar Adhia Stephan Milosavljevic<sup>1</sup> , Steve Tumilty  
 Melanie D. Bussey  
 DOI: <http://dx.doi.org/10.1016/j.math.2015.06.004>  
 Manual Therapy , 06/22/2015

## Highlights

- Innominate kinematics comparison between SIJ-positive & SIJ-negative individuals
- SIJ pain individuals predominantly exhibit unilateral innominate movement patterns
- SIJ pain individuals exhibit significantly different innominate trends of rotation
- No significant between-group differences in innominate ranges of motion
- Demonstrates association between innominate kinematic anomalies and SIJ pain

## Abstract

## Background

Innominate kinematic anomalies resulting in low back pain (LBP) of sacroiliac joint (SIJ) origin (SIJ-positive), has always been a topic of contention, owing to difficulty in its evaluation. Recent technique of electromagnetic palpation-digitization has been able to accurately quantify innominate kinematics in healthy individuals.

## Objectives

The purpose of this study is to determine if participants with LBP of SIJ origin (SIJ-positive) demonstrate significantly different innominate kinematics than participants with LBP of non-SIJ origin (SIJ-negative).

## Design

Single-blinded cross-sectional case-control study.

## Method

Participants [n(122)] between the ages of 18 to 50 years, suffering from chronic non-specific LBP ( $\geq 3$  months) volunteered in the study. An experienced musculoskeletal physiotherapist evaluated and classified participants into either SIJ-positive [n(45)] or SIJ-negative [n(77)] group, using the reference standard pain provocation tests [ $\geq 3$  positive tests = SIJ-positive]. A research physiotherapist, blinded to clinical groups, conducted the innominate kinematic testing using a valid and reliable electromagnetic palpation-digitization technique, during prone lying incremental hip abduction-external rotation test positions.

## Results

The results of the mixed model regression analyses demonstrated that SIJ-positive participants exhibited significantly different innominate movement patterns and trends of rotation, but not innominate ranges of motion, when compared with SIJ-negative LBP participants.


## Conclusions

These findings demonstrate association between SIJ pain and altered innominate kinematics, and has led the groundwork for further exploration of clinical measurement, relevance, and management of these potentially important movement observations.

## Keywords:

Sacroiliac joint, Low back pain, Biomechanics, Range of motion

**Feldenkrais method and LBP****Application of neuroplasticity theory through the use of the *Feldenkrais Method*<sup>®</sup> with a runner with scoliosis and hip and lumbar pain: A case report**

Lori K. Myers, PT, DPT, OCS, SCS, GCFP  

DOI: <http://dx.doi.org/10.1016/j.jbmt.2015.06.003>

**Abstract**

Neuroplasticity theory has gained considerable attention in recent years in the professions of medicine, psychology and neuroscience. Most research on neuroplasticity has been in neurology focusing on stroke and other central nervous system disease and injury. Further research is necessary to advance the connection of neuroplasticity theory to musculoskeletal conditions and rehabilitation. The theory of neuroplasticity as it applies to the acquisition of new skills and modification of maladaptive, pain-perpetuating and inefficient movement patterns is fundamental to the *Feldenkrais Method*. This case report demonstrates the application of neuroplasticity theory with the *Feldenkrais Method* as the primary intervention for a 42-year-old female runner with a history of adolescent idiopathic scoliosis who presented with hip and lumbar pain. The client had clinically meaningful improvements in pain intensity and the Global Rating of Change scale while meeting her goals to resume pain free running, repetitive stair climbing at work, and other leisure activities.

**Keywords:**

Neuroplasticity, Feldenkrais, Awareness Through Movement, Functional Integration, Physical therapy, Scoliosis

**CT manipulation and constipation****Effect of Connective Tissue Manipulation on Symptoms and Quality of Life in Patients With Chronic Constipation: a Randomized Controlled Trial**

Ceren Gürsen, MS Mintaze Kerem Günel, PhD Serap Kaya, PhD Taylan Kav, MD  
Türkan Akbayrak, PhD

Journal of Manipulative and Physiological Therapeutics, 06/23/2015

DOI: <http://dx.doi.org/10.1016/j.jmpt.2015.06.003>

**Abstract****Objective**

The purpose of this study was to examine the effects of connective tissue manipulation (CTM) on the severity of constipation and health-related quality of life in individuals diagnosed with chronic constipation.

**Methods**

Fifty patients with a diagnosis of chronic constipation according to Rome III criteria were recruited and randomized to an intervention (n = 25) or control group (n = 25). The intervention group received CTM in addition to the lifestyle advice, whereas the control group was given only lifestyle advice for constipation. All assessments were performed at baseline and at the end of 4 weeks. The primary outcome measure was the Constipation Severity Instrument. Secondary outcomes included Patient Assessment of Constipation Quality of Life Questionnaire, Bristol Stool Scale, and 7-day bowel diary. Differences between groups were analyzed with t tests, Mann-Whitney U test and  $\chi^2$  test.

**Results**

Compared with the control group, subjects in the intervention group reported significantly greater improvement in total and subscale scores of the Constipation Severity Instrument and Patient Assessment of Constipation Quality of Life Questionnaire ( $P < .05$ ). Based on the results from bowel diaries, the improvements in the number of bowel movements, duration of defecation, stool consistency, and the feeling of incomplete evacuation in the intervention group were also significantly more than the control group ( $P < .05$ ).

**Conclusion**

This study showed that CTM and lifestyle advice were superior to reducing symptoms of constipation and quality of life compared with lifestyle advice alone for patients with chronic constipation.

**Key Indexing Terms:**

Constipation, Massage, Quality of Life, Randomized Controlled Trial



## 45 D. MANUAL THERAPY EXTREMITIES

### MWM shoulder

#### **Efficacy of hand behind back mobilization with movement for acute shoulder pain and movement impairment: a randomized controlled trial**

Journal of Manipulative and Physiological Therapeutics, 06/23/2015

Satpute KH, et al.

The aim of this study was to investigate the effects of hand-behind-back (HBB) Mulligan mobilization with movement (MWM) techniques on acute shoulder pain, impairment, and disability. In this study, the outcomes of patients with acute shoulder pain and disability receiving shoulder HBB MWM with exercise improved greater than those receiving exercise/hot packs alone.

#### Methods

- This double-blind, randomized, controlled trial recruited 44 patients with acute shoulder pain and movement impairment presenting to an Indian general hospital.
- Participants were allocated to receive either MWM and exercise/hot pack (n = 22) or exercise/hot pack alone (n = 22).
- The average duration of symptoms was 4.1 and 4.7 weeks in the exercise and MWM groups, respectively.
- The primary outcome was HBB range of motion (ROM).
- Secondary variables were shoulder internal rotation ROM, pain intensity score, and shoulder disability identified by the shoulder pain and disability index.
- All variables were evaluated by a blinded assessor before and immediately after 9 treatment sessions over 3 weeks.

#### Results

- Paired t tests revealed that both groups demonstrated statistically significant improvements ( $P < .001$ ) with large effect sizes for all variables. However, for all variables, the MWM-with-exercise group showed significantly greater improvements ( $P < .05$ ) than the exercise group.
- Hand-behind-back ROM showed a mean difference of  $9.31^\circ$  (95% confidence interval, 7.38-11.27), favoring greater improvement in the MWM-with-exercise group.

**46 A. UPPER LIMB NEUROMOBILIZATION****Cervical foraminal lig. And tension**

Spine (Phila Pa 1976). 2015 Jun 1;40(11):801-8. doi: 10.1097/BRS.0000000000000687.

**2015 Young Investigator Award Winner: Cervical Nerve Root Displacement and Strain During Upper Limb Neural Tension Testing: Part 2: Role of Foraminal Ligaments in the Cervical Spine.**

Lohman CM<sup>1</sup>, Gilbert KK, Sobczak S, Brismée JM, James CR, Day M, Smith MP, Taylor L, Dugailly PM, Pendergrass T, Sizer PJ.

Author information

Abstract

**STUDY DESIGN:**

A cross-sectional cadaveric examination of the mechanical effect of foraminal ligaments on cervical nerve root displacement and strain.

**OBJECTIVE:**

To determine the role of foraminal ligaments by examining differences in cervical nerve root displacement and strain during upper limb neural tension testing (ULNTT) before and after selective cutting of foraminal ligaments.

**SUMMARY OF BACKGROUND DATA:**

Although investigators have determined that lumbar spine foraminal ligaments limit displacement and strain of lumbosacral nerve roots, similar studies have not been conducted to prove that it is true for the cervical region. Because the size, shape, and orientation of cervical spine foraminal ligaments are similar to those in the lumbar spine, it is hypothesized that foraminal ligaments in the cervical spine will function in a similar fashion.

**METHODS:**

Radiolucent markers were implanted into cervical nerve roots C5-C8 of 9 unembalmed cadavers. Posteroanterior fluoroscopic images were captured at resting and upper limb neural tension testing positioning before and after selective cutting of foraminal ligaments.

**RESULTS:**

Selective cutting of foraminal ligaments resulted in significant increases in inferolateral displacement (average, 2.94 mm [ligaments intact]-3.87 mm [ligaments cut],  $P < 0.05$ ) and strain (average, 9.33% [ligaments intact]-16.31% [ligaments cut],  $P < 0.03$ ) of cervical nerve roots C5-C8 during upper limb neural tension testing.

**CONCLUSION:**

Foraminal ligaments in the cervical spine limited cervical nerve root displacement and strain during upper limb neural tension testing. Foraminal ligaments seem to have a protective role, reducing displacement and strain to cervical nerve roots during tension events.

**LEVEL OF EVIDENCE: 2.**

PMID: 26091155

**48 A. STM****Dry needling**

Am J Phys Med Rehabil. 2015 Jul;94(7):573-583.

**Evidence for the Use of Ischemic Compression and Dry Needling in the Management of Trigger Points of the Upper Trapezius in Patients with Neck Pain: A Systematic Review.**

Cagnie B<sup>1</sup>, Castelein B, Pollie F, Steelant L, Verhoeven H, Cools A.

Author information

**Abstract**

The aim of this review was to describe the effects of ischemic compression and dry needling on trigger points in the upper trapezius muscle in patients with neck pain and compare these two interventions with other therapeutic interventions aiming to inactivate trigger points. Both PubMed and Web of Science were searched for randomized controlled trials using different key word combinations related to myofascial neck pain and therapeutic interventions. Four main outcome parameters were evaluated on short and medium term: pain, range of motion, functionality, and quality-of-life, including depression. Fifteen randomized controlled trials were included in this systematic review. There is moderate evidence for ischemic compression and strong evidence for dry needling to have a positive effect on pain intensity. This pain decrease is greater compared with active range of motion exercises (ischemic compression) and no or placebo intervention (ischemic compression and dry needling) but similar to other therapeutic approaches. There is moderate evidence that both ischemic compression and dry needling increase side-bending range of motion, with similar effects compared with lidocaine injection.

There is weak evidence regarding its effects on functionality and quality-of-life. On the basis of this systematic review, ischemic compression and dry needling can both be recommended in the treatment of neck pain patients with trigger points in the upper trapezius muscle. Additional research with high-quality study designs are needed to develop more conclusive evidence.

PMID: 25768071

**Acupuncture and LBP and Neck pain – positive**

PLoS One. 2015 Feb 24;10(2):e0117146. doi: 10.1371/journal.pone.0117146. eCollection 2015.

**Traditional Chinese medicine for neck pain and low back pain: a systematic review and meta-analysis.**

Yuan QL<sup>1</sup>, Guo TM<sup>2</sup>, Liu L<sup>1</sup>, Sun F<sup>3</sup>, Zhang YG<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

Neck pain (NP) and low back pain (LBP) are common symptoms bothering people in daily life. Traditional Chinese medicine (TCM) has been used to treat various symptoms and diseases in China and has been demonstrated to be effective. The objective of the present study was to review and analyze the existing data about pain and disability in TCM treatments for NP and LBP.

**METHODS:**

Studies were identified by a comprehensive search of databases, such as MEDLINE, EMBASE, and Cochrane Library, up to September 1, 2013. A meta-analysis was performed to evaluate the efficacy and safety of TCM in managing NP and LBP.

**RESULTS:**

Seventy five randomized controlled trials (n = 11077) were included. Almost all of the studies investigated individuals experiencing chronic NP (CNP) or chronic LBP (CLBP). We found moderate evidence that acupuncture was more effective than sham-acupuncture in reducing pain immediately post-treatment for CNP (visual analogue scale (VAS) 10 cm, mean difference (MD) = -0.58 (-0.94, -0.22), 95% confidence interval, p = 0.01), CLBP (standardized mean difference = -0.47 (-0.77, -0.17), p = 0.003), and acute LBP (VAS 10 cm, MD = -0.99 (-1.24, -0.73), p < 0.001). Cupping could be more effective than waitlist in VAS (100 mm) (MD = -19.10 (-27.61, -10.58), p < 0.001) for CNP or medications (e.g. NSAID) for CLBP (MD = -5.4 (-8.9, -0.19), p = 0.003). No serious or life-threatening adverse effects were found.

**CONCLUSIONS:**

Acupuncture, acupressure, and cupping could be efficacious in treating the pain and disability associated with CNP or CLBP in the immediate term. Gua sha, tai chi, qigong, and Chinese manipulation showed fair effects, but we were unable to draw any definite conclusions, and further research is still needed. The efficacy of tuina and moxibustion is unknown because no direct evidence was obtained. These TCM modalities are relatively safe.

PMID: 25710765

**Acupuncture not effective in treatment of knee pain**

JAMA. 2014 Oct 1;312(13):1313-22. doi: 10.1001/jama.2014.12660.

**Acupuncture for chronic knee pain: a randomized clinical trial.**

Hinman RS<sup>1</sup>, McCrory P<sup>2</sup>, Pirotta M<sup>3</sup>, Relf I<sup>3</sup>, Forbes A<sup>4</sup>, Crossley KM<sup>5</sup>, Williamson E<sup>6</sup>, Kyriakides M<sup>3</sup>, Novy K<sup>3</sup>, Metcalf BR<sup>1</sup>, Harris A<sup>7</sup>, Reddy P<sup>8</sup>, Conaghan PG<sup>9</sup>, Bennell KL<sup>1</sup>.  
Author information

Abstract

**IMPORTANCE:**

There is debate about benefits of acupuncture for knee pain.

**OBJECTIVE:**

To determine the efficacy of laser and needle acupuncture for chronic knee pain.

**DESIGN, SETTING, AND PARTICIPANTS:**

Zelen-design clinical trial (randomization occurred before informed consent), in Victoria, Australia (February 2010-December 2012). Community volunteers (282 patients aged  $\geq 50$  years with chronic knee pain) were treated by family physician acupuncturists.

**INTERVENTIONS:**

No acupuncture (control group, n = 71) and needle (n = 70), laser (n = 71), and sham laser (n = 70) acupuncture. Treatments were delivered for 12 weeks. Participants and acupuncturists were blinded to laser and sham laser acupuncture. Control participants were unaware of the trial.

**MAIN OUTCOMES AND MEASURES:**

Primary outcomes were average knee pain (numeric rating scale, 0 [no pain] to 10 [worst pain possible]; minimal clinically important difference [MCID], 1.8 units) and physical function (Western Ontario and McMaster Universities Osteoarthritis Index, 0 [no difficulty] to 68 [extreme difficulty]; MCID, 6 units) at 12 weeks. Secondary outcomes included other pain and function measures, quality of life, global change, and 1-year follow-up. Analyses were by intention-to-treat using multiple imputation for missing outcome data.

**RESULTS:**

At 12 weeks and 1 year, 26 (9%) and 50 (18%) participants were lost to follow-up, respectively. Analyses showed neither needle nor laser acupuncture significantly improved pain (mean difference; -0.4 units; 95% CI, -1.2 to 0.4, and -0.1; 95% CI, -0.9 to 0.7, respectively) or function (-1.7; 95% CI, -6.1 to 2.6, and 0.5; 95% CI, -3.4 to 4.4, respectively) compared with sham at 12 weeks. Compared with control, needle and laser acupuncture resulted in modest improvements in pain (-1.1; 95% CI, -1.8 to -0.4, and -0.8; 95% CI, -1.5 to -0.1, respectively) at 12 weeks, but not at 1 year. Needle acupuncture resulted in modest improvement in function compared with control at 12 weeks (-3.9; 95% CI, -7.7 to -0.2) but was not significantly different from sham (-1.7; 95% CI, -6.1 to 2.6) and was not maintained at 1 year. There were no differences for most secondary outcomes and no serious adverse events.

**CONCLUSIONS AND RELEVANCE:**

In patients older than 50 years with moderate or severe chronic knee pain, neither laser nor needle acupuncture conferred benefit over sham for pain or function. Our findings do not support acupuncture for these patients.

**TRIAL REGISTRATION:**

anzctr.org.au Identifier: ACTRN12609001001280.

**Myofascial treatment and LBP**

Pain Med. 2015 Jun 18. doi: 10.1111/pme.12821.

**Deconstructing Chronic Low Back Pain in the Older Adult-Step by Step Evidence and Expert-Based Recommendations for Evaluation and Treatment: Part II: Myofascial Pain.**

Lisi AJ<sup>1,2,3</sup>, Breuer P<sup>4</sup>, Gallagher RM<sup>5,6,7</sup>, Rodriguez E<sup>8</sup>, Rossi MI<sup>8,9</sup>, Schmader K<sup>10,11</sup>, Scholten JD<sup>12,2</sup>, Weiner DK<sup>8,9,13,14,15</sup>.

Author information

Abstract

**OBJECTIVE:**

To present an algorithm of sequential treatment options for managing myofascial pain (MP) in older adults, along with a representative clinical case.

**METHODS:**

A modified Delphi process was used to synthesize evidence-based recommendations. A multidisciplinary expert panel developed the algorithm, which was subsequently refined through an iterative process of input from a primary care physician panel.

**RESULTS:**

We present an algorithm and supportive materials to help guide the care of older adults with MP, an important contributor to chronic low back pain (CLBP). Addressing any perpetuating factors should be the first step of managing MP. Patients should be educated on self-care approaches, home exercise, and the use of safe analgesics when indicated. Trigger point deactivation can be accomplished by manual therapy, injection therapy, dry needling, and/or acupuncture.

**CONCLUSIONS:**

The algorithm presented gives a structured approach to guide primary care providers in planning treatment for patients with MP as a contributor to CLBP.

Wiley Periodicals, Inc.

**KEYWORDS:**

Chronic Low Back Pain; Chronic Pain; Degenerative Disc Disease; Elderly; Low Back Pain; Lumbar; Myofascial Pain; Older Adults; Pain Disorder; Spinal Stenosis

PMID: 26087225

**51. CFS/BET****Balance and LBP in elderly**

PLoS One. 2015 May 29;10(5):e0128318. doi: 10.1371/journal.pone.0128318. eCollection 2015.

**Steadiness of Spinal Regions during Single-Leg Standing in Older Adults with and without Chronic Low Back Pain.**

Kuo YL<sup>1</sup>, Huang KY<sup>2</sup>, Chiang PT<sup>3</sup>, Lee PY<sup>3</sup>, Tsai YJ<sup>3</sup>.

Author information

**Abstract**

The aims of this study were to compare the steadiness index of spinal regions during single-leg standing in older adults with and without chronic low back pain (LBP) and to correlate measurements of steadiness index with the performance of clinical balance tests. Thirteen community-dwelling older adults (aged 55 years or above) with chronic LBP and 13 age- and gender-matched asymptomatic volunteers participated in this study. Data collection was conducted in a university research laboratory. Measurements were steadiness index of spinal regions (trunk, thoracic spine, lumbar spine, and pelvis) during single-leg standing including relative holding time (RHT) and relative standstill time (RST), and clinical balance tests (timed up and go test and 5-repetition sit to stand test). The LBP group had a statistically significantly smaller RHT than the control group, regardless of one leg stance on the painful or non-painful sides. The RSTs on the painful side leg in the LBP group were not statistically significantly different from the average RSTs of both legs in the control group; however, the RSTs on the non-painful side leg in the LBP group were statistically significantly smaller than those in the control group for the trunk, thoracic spine, and lumbar spine. No statistically significant intra-group differences were found in the RHTs and RSTs between the painful and non-painful side legs in the LBP group. Measurements of clinical balance tests also showed insignificant weak to moderate correlations with steadiness index.

In conclusion, older adults with chronic LBP demonstrated decreased spinal steadiness not only in the symptomatic lumbar spine but also in the other spinal regions within the kinetic chain of the spine. When treating older adults with chronic LBP, clinicians may also need to examine their balance performance and spinal steadiness during balance challenging tests.

PMID: 26024534

### Use of lumbar spine and hips in flexion activities

#### Correlation of lumbar-hip kinematics between trunk flexion and other functional tasks

Journal of Manipulative and Physiological Therapeutics, 06/23/2015 Alqhtani RS, et al.

##### Abstract

##### Objective

The purpose of this study was to explore the relationship between the kinematic profiles of flexion of the upper lumbar and lower lumbar (LL) spine and hip and 3 sagittally dominant functional tasks (lifting, stand-to-sit, and sit-to-stand).

##### Methods

Fifty-three participants were recruited for this study. Four sensors were attached to the skin over the S1, L3, T12, and lateral thigh. Relative angles between adjacent sensors were used to quantify the motion for the hip, LL, and upper lumbar spine. Pearson correlation coefficients were used to explore the relationship between the movements and more functional tasks. One-way analysis of variance was used to determine the significance of differences between the variables.

##### Results

Flexion resulted in a greater or similar range of motion (ROM) to the other tasks investigated for both spinal regions but less ROM for the hip. Strong correlations for ROM are reported between forward flexion tasks and lifting for the LL spine ( $r = 0.83$ ) and all regions during stand-to-sit and sit-to-stand ( $r = 0.70-0.73$ ). No tasks were strongly correlated for velocity ( $r = 0.03-0.55$ ).

##### Conclusion

Strong correlations were only evident for the LL spine ROM between lifting and flexion; all other tasks afforded moderate or weak correlations. This study suggests that sagittal tasks use different lumbar-hip kinematics and place different demands on the lumbar spine and hip.

##### Key Indexing Terms:

Flexion, Lifting, Sitting, Standing, Lumbar, Hip, Correlation, Function, Tasks



### 52. EXERCISE

#### Pilates and LBP

#### **Equipment-based Pilates reduces work-related chronic low back pain and disability: A pilot study**

Journal of Bodywork & Movement Therapies , 06/22/2015

**S**tieglitz DD, et al. – This study investigated effectiveness of an equipment-based Pilates protocol for reducing pain and disability in individuals with work-related chronic low back pain (CLBP). Rehabilitative Pilates exercise reduced pain and disability in workers with CLBP. Further research is needed to investigate Pilates exercise for rehabilitation of work-related injuries in large populations.

#### Methods

- Twelve workers with non-specific CLBP participated in a quasi-experimental, one-group, pretest-posttest pilot study of supervised 6-week equipment-based Pilates exercise.
- Pain severity was assessed using a 100-mm visual analog scale (VAS).
- Physical function was assessed using the Oswestry disability index (ODI).

#### Results

- The Pilates intervention significantly reduced pain (mean decrease in VAS  $30.75 \pm 20.27$ ,  $p < 0.0001$ ) and disability (mean decrease in ODI  $11.25 \pm 13.20$ ,  $p < 0.02$ ) with large and borderline large effect sizes, respectively.

### Exercise and depression

Physical fitness exercise vs. cognitive behavior therapy on reducing the depressive symptoms among community-dwelling elderly adults: A randomized controlled trial

International Journal of Nursing Studies, 06/22/2015Huang TT, et al.

**T**he purpose of this study was to compare the effectiveness of a physical fitness exercise program vs. a cognitive behavior therapy (CBT) program for community-dwelling elderly adults with depressive symptoms. Results showed there were significant decreases in depressive symptoms and more perceived social support amongst those in the CBT group immediately after a 12-week intervention. When considering the longer term effectiveness in the decrease of depressive symptoms and raising the patients' quality of life, the exercise program may be a better intervention.

#### Methods

- A prospective randomized control trial was conducted in three communities in northern Taiwan.
- A total of 57 participants who had depressive symptoms and were without impaired cognition were randomly assigned to one of the three groups: the physical fitness exercise program group, the cognitive behavior therapy (CBT) group, or the control group.
- None of the participants withdrew during the 9 months of follow-up for this study.
- The primary (Geriatric Depression Scale-15, GDS-15), and secondary outcomes (6-min walk distance, SF-36, and Inventory of Socially Supportive Behaviors scales, ISSB) were collected immediately (T2), at 3 months (T3), and at 6 months after the interventions (T4).

#### Results

- After the interventions, the CBT group participants demonstrated significantly lower symptoms of depression ( $P=0.009$ ) at T2 and perceived more social support from those around them at 3 time-point comparisons ( $P<0.001$ ,  $P<0.001$ , and  $P=0.004$ , respectively) than the control group.
- Participants in the physical fitness exercise program group had decreased GDS-15 scores at 3 time-point comparisons ( $P=0.003$ ,  $0.012$ , and  $0.037$ , respectively), had a substantially greater 6-min walk distance ( $P=0.023$ ), a better quality of life ( $P<0.001$ ), and a better perceived social support at T2 ( $P<0.001$ ).

## Exercise and FM

Arthritis Res Ther. 2015 Jun 18;17(1):161.

**Resistance exercise improves muscle strength, health status and pain intensity in fibromyalgia-a randomized controlled trial.**

Larsson A<sup>1,2</sup>, Palstam A<sup>3,4</sup>, Löfgren M<sup>5</sup>, Ernberg M<sup>6</sup>, Bjersing J<sup>7</sup>, Bileviciute-Ljungar I<sup>8</sup>, Gerdle B<sup>9,10</sup>, Kosek E<sup>11</sup>, Mannerkorpi K<sup>12,13</sup>.

Author information

Abstract

**INTRODUCTION:**

Fibromyalgia (FM) is characterized by persistent widespread pain, increased pain sensitivity and tenderness. Muscle strength in women with FM is reduced compared to healthy women. The aim of this study was to examine the effects of a progressive resistance exercise program on muscle strength, health status, and current pain intensity in women with FM.

**METHODS:**

A total of 130 women with FM (age 22-64 years, symptom duration 0-35 years) were included in this assessor-blinded randomized controlled multi-center trial examining the effects of progressive resistance group exercise compared with an active control group. A person-centred model of exercise was used to support the participants' self-confidence for management of exercise because of known risks of activity-induced pain in FM. The intervention was performed twice a week for 15 weeks and was supervised by experienced physiotherapists. Primary outcome measure was isometric knee-extension force (Steve Strong®), secondary outcome measures were health status (FIQ total score), current pain intensity (VAS), 6MWT, isometric elbow-flexion force, hand-grip force, health related quality of life, pain disability, pain acceptance, fear avoidance beliefs, and patient global impression of change (PGIC). Outcomes were assessed at baseline and immediately after the intervention. Long-term follow up comprised the self-reported questionnaires only and was conducted after 13-18 months. Between-group and within-group differences were calculated using non-parametric statistics.

**RESULTS:**

Significant improvements were found for isometric knee-extension force ( $p = 0.010$ ), health status ( $p = 0.038$ ), current pain intensity ( $p = 0.033$ ), 6MWT ( $p = 0.003$ ), isometric elbow flexion force ( $p = 0.02$ ), pain disability ( $p = 0.005$ ), and pain acceptance ( $p = 0.043$ ) in the resistance exercise group ( $n = 56$ ) when compared to the control group ( $n = 49$ ). PGIC differed significantly ( $p = 0.001$ ) in favor of the resistance exercise group at post-treatment examinations. No significant differences between the resistance exercise group and the active control group were found regarding change in self-reported questionnaires from baseline to 13-18 months.

**CONCLUSIONS:**

Person-centered progressive resistance exercise was found to be a feasible mode of exercise for women with FM, improving muscle strength, health status, and current pain intensity when assessed immediately after the intervention.

**TRIAL REGISTRATION:**

ClinicalTrials.gov identification number: NCT01226784 , Oct 21, 2010.

PMID: 26084281

Arterial stiffness and yoga

**Effect of yoga on arterial stiffness in elderly subjects with increased pulse pressure: A randomized controlled study**

Complementary Therapies in Medicine, 06/23/2015 Gurunathrao PS, et al.

This study aimed to determine the effect of yoga on arterial function in elderly with increased pulse pressure (PP). This findings suggest that yoga program offered was more effective than brisk-walk in reducing arterial stiffness along with BP in elderly individuals with increased PP. Yoga can also significantly reduce sympathetic activity and improve endothelial function with enhancement in bioavailability of NO.

Methods

- A randomized controlled study with two parallel groups.
- Elderly subjects with PP  $\geq$  60 mmHg (n=60).
- Yoga group (n=30) was assigned for yoga training and brisk-walking (BW) group (n=30) for brisk-walk with stretching exercise for one hour in the morning for 6 days in a week for twelve weeks.
- Arterial stiffness measures: Brachial-ankle pulse wave velocity (baPWV), Carotid-femoral pulse wave velocity (c-f PWV), aortic augmentation index (AIx75), arterial stiffness index at brachial (bASI) and tibial arteries (aASI).
- Total serum nitric oxide concentration (NOx) as an index of endothelial function.
- Heart rate variability (HRV) measures: Low frequency and high frequency in normalized units (LFnu, HFnu) and LF/HF ratio.

Results

- The mean between-group change (with 95% CI) in arterial stiffness: c-f PWV(m/s) [1.25(0.59 to 1.89); p<0.001], baPWV(m/s) [1.96(0.76 to 3.16), p<0.01], AIx75 [3.07(0.24 to 5.89), p=0.066], aASI [8.3(4.06 to 12.53), p<0.001]; endothelial function index: NO ( $\mu$ mol/L) [-9.03(-14.57 to -3.47), p<0.001]; SBP (mmHg) [14.23(12.03 to 16.44), p<0.001], DBP(mmHg) [0.1(-1.95 to 2.15), p=0.38], PP (mmHg) [14.07(11.2 to 16.92), p<0.001], MAP(mmHg) [4.7(3.08 to 6.32), p<0.001]; and Cardiac autonomic function: LF (nu) [4.81(1.54 to 8.08), p<0.01], HF (nu) [-4.13(-7.57 to -0.69), p<0.01], LF/HF ratio [0.84(0.3 to 1.37), p<0.001], indicate significant difference in effects of two intervention on arterial stiffness, endothelial function, BP and cardiac autonomic activity.
- There was significant change within-yoga group in vascular function, BP and autonomic function, while no significant change within-BW group was observed.

**53. CORE****Prolonged holds at the knee**

Br J Sports Med. 2015 May 15. pii: bjsports-2014-094386. doi: 10.1136/bjsports-2014-094386.

**Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy.**

Rio E<sup>1</sup>, Kidgell D<sup>2</sup>, Purdam C<sup>3</sup>, Gaida J<sup>4</sup>, Moseley GL<sup>5</sup>, Pearce AJ<sup>6</sup>, Cook J<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

Few interventions reduce patellar tendinopathy (PT) pain in the short term. Eccentric exercises are painful and have limited effectiveness during the competitive season. Isometric and isotonic muscle contractions may have an immediate effect on PT pain.

**METHODS:**

This single-blinded, randomised cross-over study compared immediate and 45 min effects following a bout of isometric and isotonic muscle contractions. Outcome measures were PT pain during the single-leg decline squat (SLDS, 0-10), quadriceps strength on maximal voluntary isometric contraction (MVIC), and measures of corticospinal excitability and inhibition. Data were analysed using a split-plot in time-repeated measures analysis of variance (ANOVA).

**RESULTS:**

6 volleyball players with PT participated. Condition effects were detected with greater pain relief immediately from isometric contractions: isometric contractions reduced SLDS (mean±SD) from 7.0±2.04 to 0.17±0.41, and isotonic contractions reduced SLDS (mean±SD) from 6.33±2.80 to 3.75±3.28 (p<0.001). Isometric contractions released cortical inhibition (ratio mean±SD) from 27.53%±8.30 to 54.95%±5.47, but isotonic contractions had no significant effect on inhibition (pre 30.26±3.89, post 31.92±4.67; p=0.004). Condition by time analysis showed pain reduction was sustained at 45 min postisometric but not isotonic condition (p<0.001). The mean reduction in pain scores postisometric was 6.8/10 compared with 2.6/10 postisotonic. MVIC increased significantly following the isometric condition by 18.7±7.8%, and was significantly higher than baseline (p<0.001) and isotonic condition (p<0.001), and at 45 min (p<0.001).

**CONCLUSIONS:**

A single resistance training bout of isometric contractions reduced tendon pain immediately for at least 45 min postintervention and increased MVIC. The reduction in pain was paralleled by a reduction in cortical inhibition, providing insight into potential mechanisms. Isometric contractions can be completed without pain for people with PT. The clinical implications are that isometric muscle contractions may be used to reduce pain in people with PT without a reduction in muscle strength.

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**KEYWORDS:**

Exercise; Knee; Neuromuscular; Sports & exercise medicine; Tendinopathy

PMID: 25979840

**54. POSTURE****Cervical posture**

Spine (Phila Pa 1976). 2015 Jun 1;40(11):783-92. doi: 10.1097/BRS.0000000000000877.

**Postural Consequences of Cervical Sagittal Imbalance: A Novel Laboratory Model.**

Patwardhan AG<sup>1</sup>, Havey RM, Khayatzadeh S, Muriuki MG, Voronov LI, Carandang G, Nguyen NL, Ghanayem AJ, Schuit D, Patel AA, Smith ZA, Sears W.

Author information

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Abstract

**STUDY DESIGN:**

A biomechanical study using human spine specimens.

**OBJECTIVE:**

To study postural compensations in lordosis angles that are necessary to maintain horizontal gaze in the presence of forward head posture and increasing T1 sagittal tilt.

**SUMMARY OF BACKGROUND DATA:**

Forward head posture relative to the shoulders, assessed radiographically using the horizontal offset distance between the C2 and C7 vertebral bodies (C2-C7 [sagittal vertical alignment] SVA), is a measure of global cervical imbalance. This may result from kyphotic alignment of cervical segments, muscle imbalance, as well as malalignment of thoracolumbar spine.

**METHODS:**

Ten cadaveric cervical spines (occiput-T1) were tested. The T1 vertebra was anchored to a tilting and translating base. The occiput was free to move vertically but its angular orientation was constrained to ensure horizontal gaze regardless of sagittal imbalance. A 5-kg mass was attached to the occiput to mimic head weight. Forward head posture magnitude and T1 tilt were varied and motions of individual vertebrae were measured to calculate C2-C7 SVA and lordosis across C0-C2 and C2-C7.

**RESULTS:**

Increasing C2-C7 SVA caused flexion of lower cervical (C2-C7) segments and hyperextension of suboccipital (C0-C1-C2) segments to maintain horizontal gaze. Increasing kyphotic T1 tilt primarily increased lordosis across the C2-C7 segments. Regression models were developed to predict the compensatory C0-C2 and C2-C7 angulation needed to maintain horizontal gaze given values of C2-C7 SVA and T1 tilt.

**CONCLUSION:**

This study established predictive relationships between radiographical measures of forward head posture, T1 tilt, and postural compensations in the cervical lordosis angles needed to maintain horizontal gaze. The laboratory model predicted that normalization of C2-C7 SVA will reduce suboccipital (C0-C2) hyperextension, whereas T1 tilt reduction will reduce the hyperextension in the C2-C7 segments. The predictive relationships may help in planning corrective strategy in patients experiencing neck pain, which may be attributed to sagittal malalignment.

PMID: 25768685

## Pelvic tilt

Eur Spine J. 2015 May 31.

**Analysis of an unexplored group of sagittal deformity patients: low pelvic tilt despite positive sagittal malalignment.**

Ferrero E<sup>1</sup>, Vira S, Ames CP, Kebaish K, Obeid I, O'Brien MF, Gupta MC, Boachie-Adjei O, Smith JS, Mundis GM, Challier V, Protopsaltis TS, Schwab FJ, Lafage V; International Spine Study Group.

Author information

Abstract

**PURPOSE:**

In adult spinal deformity (ASD), patients increase pelvic tilt (PT) to maintain standing alignment. Previously, ASD patients with low PT and high disability were described. This study investigates this unusual population in terms of demographic, radiographic, and clinical features after three-column osteotomy (3CO).

**METHODS:**

In this multicenter retrospective study, ASD patients underwent single lumbar 3CO. Since PT is proportional to pelvic incidence (PI), the low PT group (LowPT) was defined as having a baseline (BL) PT/PI <25th percentile. HRQOL and full spine x-rays were analyzed at BL and 1 year. LowPT patients were compared to those with high PT/PI (HighPT) in a matched range of T1 pelvic angle.

**RESULTS:**

LowPT group had PT/PI <0.4 (n = 31). High disability was reported at baseline for both groups with significant improvement postoperatively, but without difference between groups. LowPT had significantly smaller lumbar lordosis but larger SVA, T1 spinopelvic inclination. Postoperatively, there were improvements in all sagittal modifiers except PT in LowPT. 33 % of LowPT had an increase in PT (>5°) postoperatively. This subset had more deformity at baseline, achieving good T1SPi postoperative correction but without achieving the SRS-Schwab target SVA at 1 year.

**CONCLUSION:**

LowPT group had high levels of disability. After 3CO surgery, low PT patients experience only partial improvements in sagittal vertical axis (SVA) and 33 % of the group increased their PT. Further work is necessary to determine optimal realignment approaches for this unusual set of patients. It is unclear if neuromuscular pathology plays a role in the setting of high SVA without pelvic retroversion.

PMID: 26026474

**56. ATHLETICS****Pitchers and GIRD**

Am J Sports Med. 2015 Jun;43(6):1448-54. doi: 10.1177/0363546515575020. Epub 2015 Mar 25.

**Professional Pitchers With Glenohumeral Internal Rotation Deficit (GIRD) Display Greater Humeral Retrotorsion Than Pitchers Without GIRD.**

Noonan TJ<sup>1</sup>, Shanley E<sup>2</sup>, Bailey LB<sup>3</sup>, Wyland DJ<sup>4</sup>, Kissenberth MJ<sup>4</sup>, Hawkins RJ<sup>4</sup>, Thigpen CA<sup>5</sup>.

**BACKGROUND:** *Dominant shoulder glenohumeral internal rotation deficit (GIRD) has been associated with pitching arm injuries. The relationship of humeral torsion on development of GIRD is not clear.*

**HYPOTHESIS:** *Pitchers displaying GIRD will display greater humeral retrotorsion when compared with those without GIRD.*

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

**METHODS:**

Humeral torsion and shoulder range of motion (ROM) were measured in 222 professional pitchers before spring training from 2009 to 2012. Shoulder external rotation (ER) and internal rotation (IR) ROM were assessed in 90° of abduction with the scapula stabilized. Humeral torsion was measured via ultrasound using previously described and validated methods. Side-to-side differences in total arc of motion (ER + IR), ER, and IR ROM and humeral torsion were calculated as nondominant minus dominant arm measures for analysis. Pitchers were classified as having GIRD if their dominant arm displayed an IR deficit  $\geq 15^\circ$  concomitant with a total arc of motion deficit  $\geq 10^\circ$  compared with their nondominant arm. A mixed-model analysis of variance (side  $\times$  GIRD) was used to compare dominant and nondominant humeral torsion between pitchers with GIRD (n = 60) and those without GIRD (n = 162). Independent t tests were used to compare the side-to-side difference in humeral torsion between pitchers with GIRD and those without GIRD ( $\alpha = 0.05$ ).

**RESULTS:**

Pitchers with GIRD displayed significantly less humeral torsion (ie, greater retrotorsion) in their dominant arm as compared with those without GIRD (GIRD =  $4.5^\circ \pm 11.8^\circ$ , no GIRD =  $10.4^\circ \pm 11.7^\circ$ ;  $P = .002$ ). Pitchers with GIRD also displayed a greater side-to-side difference in humeral torsion (GIRD =  $19.5^\circ \pm 11.9^\circ$ , no GIRD =  $12.3^\circ \pm 12.4^\circ$ ;  $P = .001$ ). However, pitchers with GIRD did not display an increase in dominant ER ROM (dominant ER =  $131.8^\circ \pm 14.3^\circ$ , nondominant ER  $126.6^\circ \pm 13.1^\circ$ ) when compared with those without GIRD (dominant ER =  $132.0^\circ \pm 14.2^\circ$ , nondominant ER  $122.6^\circ \pm 13.1^\circ$ ;  $P = .03$ ). Pitchers with GIRD displayed expected alterations in ROM (IR =  $28.8^\circ \pm 9.6^\circ$ , total arc =  $160.6^\circ \pm 15.4^\circ$ ;  $P < .01$  for both) when compared with those without GIRD (IR =  $39.9^\circ \pm 9.9^\circ$ , total arc =  $171.2^\circ \pm 15.5^\circ$ ).

**CONCLUSION:**

Pitchers with GIRD displayed greater side-to-side differences and dominant humeral retrotorsion as compared with those without GIRD. The greater humeral retrotorsion may place greater stress on the posterior shoulder resulting in ROM deficits. Pitchers with greater humeral retrotorsion appear to be more susceptible to developing ROM deficits associated with injury and may need increased monitoring and customized treatment programs to mitigate their increased injury risk.

**KEYWORDS:** baseball; glenohumeral internal rotation deficit (GIRD); range of motion (ROM)

PMID: 25807953



**Swimmers shoulders**

Am J Sports Med. 2015 Jun;43(6):1513-7. doi: 10.1177/0363546515574058. Epub 2015 Mar 19.

**Shoulder functional performance status of national collegiate athletic association swimmers: baseline kerlan-jobe orthopedic clinic scores.**

Wymore L<sup>1</sup>, Fronek J<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Shoulder trouble, described in the literature as "swimmer's shoulder," has been associated with competitive swimmers. The Kerlan-Jobe Orthopedic Clinic (KJOC) Shoulder and Elbow Score is a validated survey used to define functional and performance measures of the upper extremity in overhead athletes. To date, no study has investigated the baseline functional scores for swimmers actively competing in the sport.

**PURPOSE:**

To establish a baseline score for National Collegiate Athletic Association (NCAA) swimmers actively competing in the sport.

**STUDY DESIGN:**

Cross-sectional study; Level of evidence, 3.

**METHODS:**

After institutional review board approval, the KJOC Shoulder and Elbow Score was administered to 5 NCAA swim teams (N = 99 participants; 46 men, 53 women). The results on 10 specific individual questions and on the total score were calculated according to the survey's original description. The mean scores were calculated for all participants. The Mann-Whitney U test was used to determine differences between sexes, years swimming, and self-reported injury status.

**RESULTS:**

The mean  $\pm$  SD baseline KJOC score (out of a possible 100) for all participants was  $79.0 \pm 18.7$ ; the mean score for men was  $81.9 \pm 15.6$  and for women  $76.6 \pm 20.8$ . The score for athletes identifying themselves as injured at baseline was  $53.9 \pm 18.8$ , compared with  $84.4 \pm 13.6$  for those not reporting as injured ( $P < .001$ ). Athletes competing  $\geq 11$  years had a mean score of  $72.0 \pm 22.1$ ; those competing  $\leq 10$  years scored  $86.4 \pm 11.4$  ( $P = .007$ ).

**CONCLUSION:**

Baseline scores for swimmers, which were lower than expected, were lower than baseline scores seen in studies of other overhead sports athletes. The data corroborate previous studies identifying swimmers as having a high level of shoulder trouble. Further research is indicated for improving shoulder symptoms and performance in competitive swimmers.

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**KEYWORDS:**

KJOC scores; athletic training; clinical assessment; shoulder; swimming

PMID: 25790836

**57. GAIT****Walking and LBP**

Clin Rehabil. 2015 Jun 18. pii: 0269215515590487.

**Does walking improve disability status, function, or quality of life in adults with chronic low back pain? A systematic review.**

Lawford BJ<sup>1</sup>, Walters J<sup>2</sup>, Ferrar K<sup>3</sup>.

Author information

Abstract

**OBJECTIVE:**

To establish the effectiveness of walking alone and walking compared to other non-pharmacological management methods to improve disability, quality of life, or function in adults with chronic low back pain.

**DATA SOURCES:**

A systematic search of the following databases was undertaken: Medline, Embase, CINAHL, Scopus, Pedro, SportDiscus, Cochrane Central Register of Controlled Trials. The following keywords were used: 'back pain' or 'low back pain' or 'chronic low back pain' and 'walk\*' or 'ambulation' or 'treadmill\*' or 'pedometer\*' or 'acceleromet\*' or 'recreational' and 'disability' or 'quality of life' or 'function\*'.

**REVIEW METHODS:**

Primary research studies with an intervention focus that investigated walking as the primary intervention compared to no intervention or any other non-pharmacological method in adults with chronic low back pain (duration >3 months).

**RESULTS:**

Seven randomised controlled trials involving 869 participants were included in the review. There was no evidence that walking was more effective than other management methods such as usual care, specific strength exercises, medical exercise therapy, or supervised exercise classes. One study found over-ground walking to be superior to treadmill walking, and another found internet-mediated walking to be more beneficial than non-internet-mediated walking in the short term.

**CONCLUSION:**

There is low quality evidence to suggest that walking is as effective as other non-pharmacological management methods at improving disability, function, and quality of life in adults with chronic low back pain.

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**KEYWORDS:**

Chronic low back pain; disability; function; quality of life; walking

PMID: 26088673

**58. RUNNING****Runners and stiffness of AT**

Skeletal Radiol. 2015 Aug;44(8):1119-27. doi: 10.1007/s00256-015-2132-6. Epub 2015 Mar 19.

**Prevalence of morphological and mechanical stiffness alterations of mid Achilles tendons in asymptomatic marathon runners before and after a competition.**

Ooi CC<sup>1</sup>, Schneider ME, Malliaras P, Counsel P, Connell DA.

Author information

Abstract

**OBJECTIVE:**

To determine the prevalence of morphological and mechanical stiffness alterations at the mid Achilles tendon in asymptomatic marathon runners before and after a competition. To assess the relationship between pre-existing Achilles tendon alterations and pain after running.

**MATERIALS AND METHODS:**

All marathon runners from a local running club who were participating in the Melbourne Marathon 2013 (full marathon category) were invited for conventional ultrasound and sonoelastography 1 week leading up to the marathon and again within 3 days post-marathon. Another group of active, healthy individuals not involved in running activities were recruited as controls. Intratendinous morphological (tendon thickness, hypoechogenicities), Doppler as well as stiffness properties of the Achilles were recorded. Achilles tendon pain was evaluated using the visual analogue scale (VAS) and Victorian Institute of Sports Assessment-Achilles (VISA-A).

**RESULTS:**

Twenty-one asymptomatic runners (42 Achilles tendons) and 20 healthy controls (40 Achilles tendons) were examined. On the pre-marathon evaluation, runners showed significantly more morphological changes on B-mode ultrasound compared to the controls ( $p < 0.001$ ). Marathon running induced a significant reduction in tendon stiffness ( $p = 0.049$ ) and an increase in Doppler signals ( $p = 0.036$ ). Four runners (4/21, 19 %) reported Achilles tendon pain after the race [VAS 4.0 ( $\pm 1.9$ ), VISA 74.2 ( $\pm 10.1$ )]. Reduced tendon stiffness at baseline was associated with post-marathon Achilles tendon pain ( $p = 0.016$ ).

**CONCLUSION:**

Marathon runners demonstrate a higher prevalence of morphological alterations compared to non-runners. Marathon running caused a significant change in Achilles tendon stiffness and Doppler signals. Pre-existing soft Achilles tendon properties on sonoelastography may be a predisposing risk for development of symptoms post-running.

PMID: 25787114

**59. PAIN****Neuropathic pain and placebos**

J Pain Res. 2015 Jun 1;8:257-68. doi: 10.2147/JPR.S78303. eCollection 2015.

**Predictors of placebo response in peripheral neuropathic pain: insights from pregabalin clinical trials.**

Freeman R<sup>1</sup>, Emir B<sup>2</sup>, Parsons B<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Greater understanding of factors associated with the high placebo-response rates noted in recent neuropathic pain trials may improve trial design. This study investigated placebo response and its predictors in pregabalin trials in patients with diabetic peripheral neuropathy (DPN) or postherpetic neuralgia.

**PATIENTS AND METHODS:**

Individual patient data from 16 randomized, placebo-controlled, double-blind trials of pregabalin in 3,053 patients with DPN and 1,460 patients with postherpetic neuralgia were pooled (by condition and all together) in order to investigate the placebo response and its predictors. Univariate and multivariate analyses were performed across all 16 trials to identify predictors of change in pain score in patients. Trials with a >2-point mean reduction in pain score at endpoint with placebo were designated high placebo response and were compared with low placebo-response trials (those with a ≤2-point mean reduction) with respect to patient and study characteristics.

**RESULTS:**

Three high placebo-response studies were identified, with all in DPN patients and all conducted postapproval of pregabalin. Younger age, higher mean baseline pain score, longer study duration, higher ratio of patients on active treatment to placebo, and study conducted postapproval were all significantly associated with a higher placebo response ( $P < 0.05$ ). There was a trend towards an increased placebo response in all studies over time without any corresponding change in the response to pregabalin.

**CONCLUSION:**

Consideration of the factors identified here as contributing to a higher placebo response could help improve the sensitivity and accuracy of clinical trials in patients with neuropathic pain.

**KEYWORDS:**

diabetic peripheral neuropathy; postherpetic neuralgia

PMID: 26082659

**61. FIBROMYALGIA****Exercise**

Arthritis Res Ther. 2015 Jun 18;17(1):161.

**Resistance exercise improves muscle strength, health status and pain intensity in fibromyalgia-a randomized controlled trial.**

Larsson A<sup>1,2</sup>, Palstam A<sup>3,4</sup>, Löfgren M<sup>5</sup>, Ernberg M<sup>6</sup>, Bjersing J<sup>7</sup>, Bileviciute-Ljungar I<sup>8</sup>, Gerdle B<sup>9,10</sup>, Kosek E<sup>11</sup>, Mannerkorpi K<sup>12,13</sup>.

Author information

Abstract

**INTRODUCTION:**

Fibromyalgia (FM) is characterized by persistent widespread pain, increased pain sensitivity and tenderness. Muscle strength in women with FM is reduced compared to healthy women. The aim of this study was to examine the effects of a progressive resistance exercise program on muscle strength, health status, and current pain intensity in women with FM.

**METHODS:**

A total of 130 women with FM (age 22-64 years, symptom duration 0-35 years) were included in this assessor-blinded randomized controlled multi-center trial examining the effects of progressive resistance group exercise compared with an active control group. A person-centred model of exercise was used to support the participants' self-confidence for management of exercise because of known risks of activity-induced pain in FM. The intervention was performed twice a week for 15 weeks and was supervised by experienced physiotherapists. Primary outcome measure was isometric knee-extension force (Steve Strong®), secondary outcome measures were health status (FIQ total score), current pain intensity (VAS), 6MWT, isometric elbow-flexion force, hand-grip force, health related quality of life, pain disability, pain acceptance, fear avoidance beliefs, and patient global impression of change (PGIC). Outcomes were assessed at baseline and immediately after the intervention. Long-term follow up comprised the self-reported questionnaires only and was conducted after 13-18 months. Between-group and within-group differences were calculated using non-parametric statistics.

**RESULTS:**

Significant improvements were found for isometric knee-extension force ( $p = 0.010$ ), health status ( $p = 0.038$ ), current pain intensity ( $p = 0.033$ ), 6MWT ( $p = 0.003$ ), isometric elbow flexion force ( $p = 0.02$ ), pain disability ( $p = 0.005$ ), and pain acceptance ( $p = 0.043$ ) in the resistance exercise group ( $n = 56$ ) when compared to the control group ( $n = 49$ ). PGIC differed significantly ( $p = 0.001$ ) in favor of the resistance exercise group at post-treatment examinations. No significant differences between the resistance exercise group and the active control group were found regarding change in self-reported questionnaires from baseline to 13-18 months.

**CONCLUSIONS:**

Person-centered progressive resistance exercise was found to be a feasible mode of exercise for women with FM, improving muscle strength, health status, and current pain intensity when assessed immediately after the intervention.

**TRIAL REGISTRATION:**

ClinicalTrials.gov identification number: NCT01226784 , Oct 21, 2010.

PMID: 26084281

**62 A. NUTRITION/VITAMINS****Tea and decrease in depression**

Aust N Z J Psychiatry. 2015 Apr;49(4):334-45. doi: 10.1177/0004867414567759. Epub 2015 Feb 5.

**Tea consumption and the risk of depression: a meta-analysis of observational studies.**

Dong X<sup>1</sup>, Yang C<sup>1</sup>, Cao S<sup>1</sup>, Gan Y<sup>1</sup>, Sun H<sup>1</sup>, Gong Y<sup>1</sup>, Yang H<sup>1</sup>, Yin X<sup>1</sup>, Lu Z<sup>2</sup>.

Author information

Abstract

**OBJECTIVE:**

Whether tea consumption decreases the risk of depression remains controversial. We performed a meta-analysis of findings from observational studies to evaluate the association between tea consumption and depression risk.

**METHOD:**

Embase, PubMed, and Chinese National Knowledge Infrastructure databases were searched from their inception through August 2014 for observational studies that had reported the association between tea consumption and depression risk. We used a fixed effects model when heterogeneity was negligible and a random effect model when heterogeneity was significant to calculate the summary relative risk estimates (RRs) and 95% confidence intervals (CIs).

**RESULTS:**

Eleven studies with 13 reports were eligible for inclusion in the meta-analysis (22,817 participants with 4,743 cases of depression). Compared to individuals with lower tea consumption, those with higher tea consumption had a pooled RR of depression risk at 0.69 (95% CI: 0.63-0.75). Eight reports were included in the dose-response analysis of tea consumption and depression risk (10,600 participants with 2,107 cases). There was a linear association between tea consumption and the risk of depression, with an increment of 3 cups/day in tea consumption associated with a decrease in the risk of depression of 37% (RR = 0.63, 95% CI: 0.55-0.71).

**CONCLUSION:**

Tea consumption is associated with a decreased risk of depression.

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**KEYWORDS:**

depression; depressive symptom; meta-analysis; tea consumption

PMID: 25657295

## Tea and blood pressure

**Effects of tea intake on blood pressure: A meta-analysis of 21 randomized controlled trials**

JACC - Journal of the American College of Cardiology, 10/22/2014 Gang L, et al.

The authors undertook a meta-analysis of randomized controlled trials to determine changes in systolic and diastolic BP due to the intake black and green tea. The meta-analysis showed that long-term ( $\geq 12$  weeks) ingestion of a tea (green and black tea) resulted in a significant reduction in systolic and diastolic BP.

**Methods**

- MEDLINE, EMBASE, and the Cochrane Controlled Trials Register were searched from 1966 until January 2014 for studies in parallel group or crossover design in which BP was assessed before and after receiving black or green tea for at least 1 week.
- The weighted mean difference was calculated for net changes in BP by using fixed-effects or random-effects models.
- Previously defined subgroup analyses were performed to explore the influence of study characteristics.

**Results**

- 21 eligible randomized controlled trials with 1323 subjects were enrolled.
- After the tea intake, the pooled mean systolic and diastolic BP were  $-1.8$  mmHg (95% confidence interval [CI],  $-2.4$ – $-1.1$  mmHg) and  $-1.4$  mmHg (95% CI,  $-2.2$ – $-0.6$  mm Hg) lower, respectively, compared with the tea-free controls.
- Subgroup analyses showed that the BP-lowering effect was apparent in the subjects who consumed a tea over a median of 12 weeks (systolic/diastolic BP,  $-2.6$ / $-2.1$  mmHg, both  $P < 0.001$ ).
- Stratified by type of tea, green tea significantly reduced systolic and diastolic BP of  $-2.1$  (95% CI,  $-2.9$ – $-1.2$ ) and  $-1.7$  (95% CI,  $-2.9$ – $-0.5$ ) mm Hg, and black tea significantly reduced systolic and diastolic BP of  $-1.4$  (95% CI,  $-2.4$ – $-0.4$ ) and  $-1.1$  (95% CI,  $-1.9$ – $-0.2$ ) mm Hg, respectively.
- The benefits of tea intake were not influenced by ethnicity, treatment dose of tea catechins, individual health status, or caffeine intake.

## Glucosamine and helps knee pain

Ann Rheum Dis. 2015 Jan 14. pii: annrheumdis-2014-206792. doi: 10.1136/annrheumdis-2014-206792.

### **Combined chondroitin sulfate and glucosamine for painful knee osteoarthritis: a multicentre, randomised, double-blind, non-inferiority trial versus celecoxib.**

Hochberg MC<sup>1</sup>, Martel-Pelletier J<sup>2</sup>, Monfort J<sup>3</sup>, Möller I<sup>4</sup>, Castillo JR<sup>5</sup>, Arden N<sup>6</sup>, Berenbaum F<sup>7</sup>, Blanco FJ<sup>8</sup>, Conaghan PG<sup>9</sup>, Doménech G<sup>10</sup>, Henrotin Y<sup>11</sup>, Pap T<sup>12</sup>, Richette P<sup>13</sup>, Sawitzke A<sup>14</sup>, du Souich P<sup>15</sup>, Pelletier JP<sup>2</sup>; on behalf of the MOVES Investigation Group.

Author information

Abstract

#### **OBJECTIVES:**

To compare the efficacy and safety of chondroitin sulfate plus glucosamine hydrochloride (CS+GH) versus celecoxib in patients with knee osteoarthritis and severe pain.

#### **METHODS:**

Double-blind Multicentre Osteoarthritis interVENTion trial with SYSADOA (MOVES) conducted in France, Germany, Poland and Spain evaluating treatment with CS+GH versus celecoxib in 606 patients with Kellgren and Lawrence grades 2-3 knee osteoarthritis and moderate-to-severe pain (Western Ontario and McMaster osteoarthritis index (WOMAC) score  $\geq 301$ ; 0-500 scale). Patients were randomised to receive 400 mg CS plus 500 mg GH three times a day or 200 mg celecoxib every day for 6 months. The primary outcome was the mean decrease in WOMAC pain from baseline to 6 months. Secondary outcomes included WOMAC function and stiffness, visual analogue scale for pain, presence of joint swelling/effusion, rescue medication consumption, Outcome Measures in Rheumatology Clinical Trials and Osteoarthritis Research Society International (OMERACT-OARSI) criteria and EuroQoL-5D.

#### **RESULTS:**

The adjusted mean change (95% CI) in WOMAC pain was -185.7 (-200.3 to -171.1) (50.1% decrease) with CS+GH and -186.8 (-201.7 to -171.9) (50.2% decrease) with celecoxib, meeting the non-inferiority margin of -40: -1.11 (-22.0 to 19.8;  $p=0.92$ ). All sensitivity analyses were consistent with that result. At 6 months, 79.7% of patients in the combination group and 79.2% in the celecoxib group fulfilled OMERACT-OARSI criteria. Both groups elicited a reduction  $>50\%$  in the presence of joint swelling; a similar reduction was seen for effusion. No differences were observed for the other secondary outcomes. Adverse events were low and similarly distributed between groups.

#### **CONCLUSIONS:**

CS+GH has comparable efficacy to celecoxib in reducing pain, stiffness, functional limitation and joint swelling/effusion after 6 months in patients with painful knee osteoarthritis, with a good safety profile.

#### **TRIAL REGISTRATION NUMBER:**

NCT01425853.

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#### **KEYWORDS: Analgesics; NSAIDs; Osteoarthritis**

PMID: 25589511



**63. PHARMACOLOGY****Pharmacology and knee pain**

Ann Intern Med. 2015 Jan 6;162(1):46-54. doi: 10.7326/M14-1231.

**Comparative effectiveness of pharmacologic interventions for knee osteoarthritis: a systematic review and network meta-analysis.**

Bannuru RR, Schmid CH, Kent DM, Vaysbrot EE, Wong JB, McAlindon TE.

Abstract

**BACKGROUND:**

The relative efficacy of available treatments of knee osteoarthritis (OA) must be determined for rational treatment algorithms to be formulated.

**PURPOSE:**

To examine the efficacy of treatments of primary knee OA using a network meta-analysis design, which estimates relative effects of all treatments against each other.

**DATA SOURCES:**

MEDLINE, EMBASE, Web of Science, Google Scholar, Cochrane Central Register of Controlled Trials from inception through 15 August 2014, and unpublished data.

**STUDY SELECTION:**

Randomized trials of adults with knee OA comparing 2 or more of the following: acetaminophen, diclofenac, ibuprofen, naproxen, celecoxib, intra-articular (IA) corticosteroids, IA hyaluronic acid, oral placebo, and IA placebo.

**DATA EXTRACTION:**

Two reviewers independently abstracted study data and assessed study quality. Standardized mean differences were calculated for pain, function, and stiffness at 3-month follow-up.

**DATA SYNTHESIS:**

Network meta-analysis was performed using a Bayesian random-effects model; 137 studies comprising 33,243 participants were identified. For pain, all interventions significantly outperformed oral placebo, with effect sizes from 0.63 (95% credible interval [CrI], 0.39 to 0.88) for the most efficacious treatment (hyaluronic acid) to 0.18 (CrI, 0.04 to 0.33) for the least efficacious treatment (acetaminophen). For function, all interventions except IA corticosteroids were significantly superior to oral placebo. For stiffness, most of the treatments did not significantly differ from one another.

**LIMITATION:**

Lack of long-term data, inadequate reporting of safety data, possible publication bias, and few head-to-head comparisons.

**CONCLUSION:**

This method allowed comparison of common treatments of knee OA according to their relative efficacy. Intra-articular treatments were superior to nonsteroidal anti-inflammatory drugs, possibly because of the integrated IA placebo effect. Small but robust differences were observed between active treatments. All treatments except acetaminophen showed clinically significant improvement from baseline pain. This information, along with the safety profiles and relative costs of included treatments, will be helpful for individualized patient care decisions.

**PRIMARY FUNDING SOURCE:**

Agency for Healthcare Research and Quality. PMID: 25560713

**CS injections and articular djd**

Clin Orthop Relat Res. 2015 Mar;473(3):1155-64. doi: 10.1007/s11999-014-3925-y. Epub 2014 Sep 4.

**Differential cytotoxicity of corticosteroids on human mesenchymal stem cells.**

Wyles CC<sup>1</sup>, Houdek MT, Wyles SP, Wagner ER, Behfar A, Sierra RJ.

**BACKGROUND:** Corticosteroids are a common, short-term, local antiinflammatory and analgesic for treating patients with musculoskeletal disorders. Studies have shown the deleterious effects of corticosteroids on chondrocytes, suggesting a potentiation of degenerative joint disease. Mesenchymal stem cells (MSCs) are the direct progenitors of chondrocytes and other musculoskeletal tissue. Additionally, they serve an important antiinflammatory role, which can combat the chronic inflammatory state that mediates degenerative joint disease. Little is known about how corticosteroids interact with this regenerative and reparative cell population.

**METHODS:** Human MSCs were isolated and cultured from periarticular adipose tissue obtained from 20 patients undergoing primary THA. MSCs were exposed for 60 minutes to one of four commonly used corticosteroid preparations: betamethasone sodium phosphate-betamethasone acetate (6 mg/mL), dexamethasone sodium phosphate (4 mg/mL), methylprednisolone (40 mg/mL), or triamcinolone acetonide (40 mg/mL). Among the four preparations (treatment groups), cells were exposed to increasing concentrations of drugs according to the following titrations of the commercially available preparation: 0.0 (control solution of 1X phosphate buffered saline), 3.125, 6.25, 12.5, 25, 50, 75, and 100 % (undiluted commercial product). Cells were allowed to recover in standard culture media for 24 hours. After the recovery period, cell viability was measured using -(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) tetrazolium dye-based cellular viability assay and live-dead cell fluorescent staining. For the MTS assay, measurements were quantified in units of optical density (OD). ANOVA was performed at every experimental steroid concentration. When this global test was statistically significant, all pairwise comparisons were performed at that concentration with p values adjusted by the Tukey method to guard against Type I error.

**RESULTS:** Exposure to corticosteroids decreased MSC viability in a curvilinear dose-response pattern. For betamethasone, the mean MTS OD at 0% steroid concentration was 1.03 (SD, 0.12) and decreased to 0.00 (SD, 0.00) at 25% steroid concentration. For dexamethasone, the mean MTS OD at 0% steroid concentration was 1.00 (SD, 0.07) and decreased to 0.00 (SD, 0.01) at 100% steroid concentration. For methylprednisolone, the mean MTS OD at 0% steroid concentration was 1.03 (SD, 0.09) and decreased to 0.00 (SD, 0.00) at 100% steroid concentration. For triamcinolone, the mean MTS OD at 0% steroid concentration was 1.02 (SD, 0.09) and decreased to 0.00 (SD, 0.00) at 75% steroid concentration. There were large differences among commercially available preparations, and these differences were present at every concentration.

**CONCLUSIONS:** Commonly used intraarticular corticosteroids had a dose-dependent, profound, and differential effect on MSCs in this in vitro model, with betamethasone being the most toxic. Further studies are needed to assess if the in vitro effects of these agents translate into similar in vivo outcomes.

**CLINICAL RELEVANCE:** Corticosteroids frequently are used by physicians to reduce inflammation in patients with musculoskeletal disorders, but these agents may hinder MSCs' innate regenerative capacity in exchange for temporary analgesia. Our study suggests that choosing dexamethasone may result in less harmful effects when compared with other injectable steroids. PMID: 25187334

**Opioid use and depression**

J Pain. 2015 Jun 12. pii: S1526-5900(15)00702-6. doi: 10.1016/j.jpain.2015.05.010.

**Symptoms of depression are associated with opioid use regardless of pain severity and physical functioning among treatment-seeking chronic pain patients.**

Goesling J<sup>1</sup>, Henry MJ<sup>2</sup>, Moser SE<sup>3</sup>, Rastogi M<sup>3</sup>, Hassett AL<sup>3</sup>, Clauw DJ<sup>3</sup>, Brummett CM<sup>3</sup>.

Author information

**Abstract**

Recently it has been posited that depression may be a critical factor in the initiation and maintenance of opioids. This study investigated the association between opioid use, pain, and depression in patients evaluated at a university-based outpatient pain clinic. Of the 2,104 new patients included, 55.89% reported current opioid use and demonstrated a worse phenotypic profile (e.g. higher pain severity, worse physical functioning) compared to non-opioid users. Additionally, more opioid users reported symptoms suggestive of depression than those not taking opioids (43.6% vs. 26.8%,  $p < 0.001$ ). In a multivariate logistic regression model, increased pain severity was associated with increased probability of taking opioids; however, this was moderated by depression (Estimate = -0.212,  $p < 0.001$ ). For non-depressed patients, the predicted probabilities of opioid use increased as pain severity increased. In contrast, among patients with symptoms of depression, the probability of taking opioids did not change based on pain severity. Similarly, although increased physical function was associated with increased probability of opioid use, this was moderated by depression (Estimate = 0.033,  $p = 0.034$ ). Patients with symptoms of depression were more likely to be taking opioids at higher levels of functioning ( $ps < 0.03$ ).

**PERSPECTIVE:**

This study investigated the association between opioid use, pain and depression at a university-based outpatient pain clinic. Depression emerged as a moderator of the relationship between opioid use and pain severity and physical functioning. These findings lend support to the hypothesis that patients may be self-medicating affective pain with opioids.

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**KEYWORDS:**

Opioid therapy; chronic pain; depression; pain interference; pain severity

PMID: 26080041

**64. ELECTROTHERAPY****US and myofascial pain**

Am J Phys Med Rehabil. 2015 Jul;94(7):547-554.

**Efficacy of Pulsed and Continuous Therapeutic Ultrasound in Myofascial Pain Syndrome: A Randomized Controlled Study.**

Ilter L<sup>1</sup>, Dilek B, Batmaz I, Ulu MA, Sariyildiz MA, Nas K, Cevik R.

Author information

Abstract

**OBJECTIVES:**

This study aimed to compare continuous and pulsed ultrasound therapy with sham ultrasound in terms of pain, severity of muscle spasm, function, depression, and quality of life in patients with myofascial pain syndrome.

**DESIGN:**

Patients were randomly divided into three groups, including the continuous ultrasound group (3 MHz, 1 W/cm, n = 20), the pulsed ultrasound group (3 MHz, 1 W/cm, 1:1 ratio, n = 20), and control group (sham, n = 20). The primary outcome measures were severity of pain at rest and during activity (visual analog scale, 0-10 cm). The secondary outcome measures were function (Neck Pain and Disability Scale), depressive mood (Beck Depression Scale), and quality of life (Nottingham Health Profile). All evaluations were performed at baseline, after treatment, and at the 6th and 12th wks.

**RESULTS:**

All three groups had significant improvements in all of the pain scores, the severity of muscle spasms, function assessments, and certain subparameters of the quality of life scale ( $P < 0.05$ ). The continuous ultrasound group had significantly greater improvements in pain at rest ( $P < 0.05$ ). However, no statistically significant differences were observed in the other parameters ( $P > 0.05$ ).

**CONCLUSIONS:**

Continuous ultrasound therapy is more efficient in reducing pain at rest for myofascial pain syndrome patients than is sham or pulsed ultrasound therapy.

PMID: 25299534

**65. NEUROLOGICAL CONDITIONS****MS and pain**

Pain Med. 2015 Jun 18. doi: 10.1111/pme.12731.

**The Prevalence of Pain in Adults with Multiple Sclerosis: A Multicenter Cross-Sectional Survey.**

Drulovic J<sup>1</sup>, Basic-Kes V<sup>2</sup>, Grgic S<sup>3</sup>, Vojinovic S<sup>3</sup>, Dincic E<sup>4</sup>, Toncev G<sup>5</sup>, Kezic MG<sup>6</sup>, Kistic-Tepavcevic D<sup>7</sup>, Dujmovic I<sup>1</sup>, Mesaros S<sup>1</sup>, Miletic-Drakulic S<sup>6</sup>, Pekmezovic T<sup>8</sup>.

Author information

Abstract

**OBJECTIVE:**

Examination of prevalence, intensity and associations of pain in persons with multiple sclerosis (MS).

**DESIGN:**

Multicenter, international cross-sectional survey.

**SETTING:**

Patients were recruited from seven MS centers: in Serbia (Clinic of Neurology, Clinical Center of Serbia, Belgrade; Clinic of Neurology, Military Medical Academy, Belgrade; Clinic of Neurology, Clinical Center Kragujevac; Clinic of Neurology, Clinical Center Nis; Department of Neurology, General Hospital-Uzice), in Republic of Srpska-Bosnia and Herzegovina (Clinic of Neurology, Clinical Center Banja Luka) and in Croatia (University Department of Neurology, Sestre Milosrdnice University Hospital Center, Zagreb).

**SUBJECTS:**

Six hundred and fifty consecutive MS patients diagnosed according to the Revised McDonald criteria (2005), from the aforementioned centers, over the period of 6 months.

**METHODS:**

A semistructured questionnaire was administered during a face-to-face interview with neurologists who also performed Expanded Disability Status Scale (EDSS), the Hamilton Rating Scale for Depression (HDRS) and Hamilton Rating Scale for Anxiety (HARS). To recognize predictive factors for the presence of pain, the linear regression analysis was used.

**RESULTS:**

Lifetime prevalence of pain was 66.5% (point prevalence = 44.3%). The prevalence of the comorbidity of pain and depression was 29.1%. Older age ( $P < 0.001$ ), primary-progressive MS ( $P = 0.034$ ), higher EDSS score ( $P = 0.008$ ), higher scores of HDRS ( $P < 0.001$ ), and HARS ( $P < 0.001$ ) were significantly associated with pain. Finally, in our multivariate linear regression analysis, anxiety ( $P < 0.001$ ) was the independent predictor of pain.

**CONCLUSIONS:**

We confirmed high prevalence of pain, affecting approximately more than half of patients during the course of MS. Pain in MS is associated with disability, depression and, especially with anxiety, which has significant implications for treatment.

Wiley Periodicals, Inc.

**KEYWORDS:**

Neurology; Pain Disorder PMID: 26087108