

## ABSTRACTS

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**2. LBP****Pilates**

Spine (Phila Pa 1976). 2016 Jun;41(12):1013-21. doi: 10.1097/BRS.0000000000001398.

**Pilates for Low Back Pain: Complete Republication of a Cochrane Review.**

Yamato TP<sup>1</sup>, Maher CG, Saragiotto BT, Hancock MJ, Ostelo RW, Cabral CM, Costa LC, Costa LO.

**STUDY DESIGN:**

Systematic review.

**OBJECTIVE:**

To determine the effects of the Pilates method for patients with nonspecific acute, subacute, or chronic low back pain.

**SUMMARY OF BACKGROUND DATA:**

The Pilates method is one of the most common forms of intervention based on exercise used for treating patients with low back pain. However, its effectiveness is not well established.

**METHODS:**

We conducted searches on CENTRAL, MEDLINE, EMBASE, CINAHL, PEDro, and SPORTDiscus up to March 2014. We included randomized controlled trials examining the effectiveness of Pilates in patients with acute, subacute, or chronic nonspecific low back pain. The outcomes evaluated were pain, disability, function, and global impression of recovery. Two independent reviewers screened for potentially eligible studies, assessed risk of bias, and extracted the data. We evaluated the overall quality of evidence using the GRADE approach and treatment effect sizes were described using mean differences and 95% confidence intervals.

**RESULTS:**

Searches retrieved 126 trials, of which 10 were included in the review (n=510 participants). Seven studies were considered to have low risk of bias, and three were considered at high risk of bias. When compared to minimal intervention, Pilates reduces pain at short and intermediate term with low- to moderate-quality evidence and medium effect sizes. For disability, there is also a significant difference in favor to Pilates with low- to moderate-quality evidence and small effect size for short term and medium effect size for intermediate term compared with minimal intervention. It is unclear whether Pilates is better than other exercises for short-term pain, but there is low-quality evidence that Pilates reduces pain at intermediate term. For disability, there is moderate-quality evidence that there is no significant difference between Pilates and other exercises in either the short term or the intermediate term.

**CONCLUSION:**

There is low- to moderate-quality evidence that Pilates is more effective than minimal intervention with most of the effect sizes being considered medium. However, there is no conclusive evidence that Pilates is superior to other forms of exercises.

**LEVEL OF EVIDENCE: 1.**

PMID: [26679894](#)

**LBP from infants to adolescents**

Arthritis Care Res (Hoboken). 2016 Jun 6. doi: 10.1002/acr.22949.

**Trajectories of low-back pain from adolescence to young adulthood.**

Coenen P<sup>1</sup>, Smith A<sup>1</sup>, Paananen M<sup>2</sup>, Peter O'Sullivan P<sup>1</sup>, Beales D<sup>1</sup>, Leon Straker P<sup>1</sup>.

**OBJECTIVE:**

Despite its high prevalence and burden, understanding of the course of disabling low-back pain (LBP) during the transition from adolescence to adulthood is limited. The aim of this study was to identify and describe trajectories of LBP and its impact among a general population sample followed from adolescence to young adulthood.

**METHODS:**

Data from follow-up assessments at years 17, 20 and 22 of the Western Australian Pregnancy Cohort (Raine) Study were used (n=1,249). Self-reported LBP and its impact on daily life were assessed, and latent class analysis used to identify clusters. Resultant clusters were profiled on gender, waist circumference, diagnosed co-morbid pain and health related quality of life.

**RESULTS:**

Four clusters were identified: A cluster of participants with consistently low prevalence of LBP and its impact (53%) during the period from adolescence to young adulthood, a cluster with an increase in prevalence of LBP and its impact (22%), a cluster with a decrease in prevalence of LBP and its impact (15%); and a cluster with consistently high prevalence of LBP and its impact (10%). These clusters differed markedly on the profiling variables.

**CONCLUSION:**

The identified clusters provide unique information on LBP and its impact during the transition from adolescence to young adulthood. Consideration of these trajectories may be important for the design of early prevention and management strategies. This article is protected by copyright. All rights reserved.

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PMID: [27273901](#)

**Pain drawings**

*Pain Pract.* 2016 Jun 23. doi: 10.1111/papr.12470.

**Pain Drawings Improve Subgrouping of Low Back Pain Patients.**

Hüllemann P<sup>1</sup>, Keller T<sup>2</sup>, Kabelitz M<sup>2</sup>, Freynhagen R<sup>3,4</sup>, Tölle T<sup>5</sup>, Baron R<sup>1</sup>.

**BACKGROUND:**

Subgrouping of low back pain (LBP) patients may be improved when pain drawings are combined with the painDETECT (PD-Q) questionnaire. We hypothesized that (1) different LBP subgroups determined by their pain radiation show different clinical patterns and (2) the occurrence of neuropathic symptoms depends on pain radiation.

**METHODS:**

A total of 19,263 acute (< 6 weeks' duration), subacute (6 to 12 weeks), and chronic (> 3 months) LBP patients were allocated prospectively into 4 groups based on the location of pain drawings on a manikin and compared regarding neuropathic pain components, functionality, depression, pain intensity, and surgical interventions. All items were investigated at baseline and follow-up visits. Group I was composed of patients with axial LBP without radiating pain; group II, LBP with radiation into the thigh; group III, LBP with radiation into the shank; and group IV, LBP with radiation into the feet. Side-dependent pain radiation was assessed additionally.

**RESULTS:**

Depression, functionality, and pain intensity showed no clinically relevant differences, whereas PD-Q scores and the probability to rate positive for neuropathic pain increased with more distally radiating pain. Surgery and medication intake were most frequent in group IV. Follow-up analyses showed that only axial LBP became more neuropathic, whereas pain intensity decreased over time.

**CONCLUSIONS:**

Radicular patterns of pain drawings in LBP patients indicate severe pain conditions with the most neuropathic components, while axial LBP has the fewest. For the categorization of LBP, pain drawings help explain the underlying mechanism of pain, which might further improve mechanism-based treatment when used in clinical routines and research.

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**KEYWORDS:**

axial low back pain; mechanisms of low back pain; neuropathic pain; pain drawings; painDETECT; questionnaire; radiculopathy; screening

PMID: [27334429](https://pubmed.ncbi.nlm.nih.gov/27334429/)

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### Vestibulodynia

J Sex Med. 2015 Nov;12(11):2178-89. doi: 10.1111/jsm.13028.

#### **Active and Passive Components of Pelvic Floor Muscle Tone in Women with Provoked Vestibulodynia: A Perspective Based on a Review of the Literature.**

Thibault-Gagnon S<sup>1</sup>, Morin M<sup>2,3</sup>.

#### **AIM:**

Pelvic floor muscle (PFM) dysfunctions, especially elevated tone or tension, are suggested to play an important role in the pathophysiology of provoked vestibulodynia (PVD). However, the involvement of the PFM remains misunderstood as the assessment of muscle tone is complex and requires a thorough understanding of muscle physiology in relation to the characteristics and limitations of current PFM assessment tools. The aim of this review was to describe the structures and mechanisms involved in muscle tone in normally innervated muscle, and to discuss and relate these concepts to the PFM findings in women with PVD.

#### **METHODS:**

A narrative overview of the literature retrieved from searches of electronic databases and hand searches.

#### **RESULTS:**

Muscle tone in a normally innervated muscle comprises both active (contractile) and passive (viscoelastic) components. Current methods for evaluating PFM tone such as digital palpation, ultrasound imaging, pressure perineometry, dynamometry, and electromyography may evaluate different components. Research findings suggestive of PFM hypertonicity in women with PVD include elevated general PFM tone, changes in viscoelastic properties, and at least in some women, abnormal increases in electrogenic activity.

#### **CONCLUSION:**

There is a growing body of evidence to support the involvement of PFM hypertonicity in the pathophysiology of PVD. Limitations of the instruments as well as their properties should be considered when evaluating PFM tone in order to obtain better insight into which component of PFM tone is assessed. Future research is required for further investigating the underlying mechanisms of PFM hypertonicity, and studying the specific effects of physiotherapeutic interventions on PFM tone in women with PVD.

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#### **KEYWORDS:**

Dyspareunia; Hypertonicity; Levator Ani; Pelvic Floor Muscles; Physical Therapy; Provoked Vestibulodynia; Tension; Tone; Vulvodynia

PMID: [26745618](https://pubmed.ncbi.nlm.nih.gov/26745618/)

**Pelvic pain**

Int Urogynecol J. 2016 Jun 10.

**The role of social constraints and catastrophizing in pelvic and urogenital pain.**

Tomakowsky J<sup>1,2</sup>, Carty JN<sup>3</sup>, Lumley MA<sup>3</sup>, Peters KM<sup>4,5</sup>.

***INTRODUCTION AND HYPOTHESIS:***

Pelvic and urogenital pain is complex and highly prevalent in women, and increased attention to psychosocial influences can guide more effective treatments. This study tested the hypothesis that social constraints (the perception that close others inhibit, discourage, or dissuade a person from disclosing one's feelings or talking about one's problems) would be associated with distress, pain, and problems with functioning, beyond the influence of the widely recognized risk factor of pain catastrophizing.

***METHODS:***

A total of 122 women completed psychosocial and pain questionnaires during an initial evaluation at a multidisciplinary urology center. Correlational and multiple regression analyses examined pain catastrophizing and social constraints in association with general distress, general pain severity, urogenital pain, and pain interference with functioning.

***RESULTS:***

In zero-order correlations, pain catastrophizing and social constraints were significantly associated with all pain measures ( $p < 0.05$ ) and distress. In regressions, both pain catastrophizing and social constraints were simultaneously independent predictors of general distress ( $\beta = 0.48$  and  $0.33$ ,  $p < 0.001$  respectively), general pain severity ( $\beta = 0.55$  and  $0.21$ ,  $p < 0.001$  and  $0.01$  respectively), and pain interference with functioning ( $\beta = 0.65$ ,  $p < 0.001$ , and  $\beta = 0.16$ ,  $p < 0.05$  respectively), and together explained a moderate portion of the variance in outcome variables. Pain catastrophizing (but not social constraints) also significantly predicted urogenital pain ( $\beta = 0.43$ ,  $p < 0.001$ ).

***CONCLUSIONS:***

Both pain catastrophizing and social constraints are important to the experience of pelvic and urogenital pain, and effective pain treatment should include attention to these psychological and social factors.

***KEYWORDS:***

Catastrophizing; Pelvic/urogenital pain; Psychological; Social constraints

PMID: [27287816](https://pubmed.ncbi.nlm.nih.gov/27287816/)

**Pelvic floor PT**

Female Pelvic Med Reconstr Surg. 2016 Jul-Aug;22(4):205-13. doi: 10.1097/SPV.0000000000000255.

**Impact of Pelvic Floor Physical Therapy on Quality of Life and Function After Obstetric Anal Sphincter Injury: A Randomized Controlled Trial.**

Oakley SH<sup>1</sup>, Ghodsi VC, Crisp CC, Estanol MV, Westermann LB, Novicki KM, Kleeman SD, Pauls RN.

**OBJECTIVES:**

There is no standard of care for women sustaining an obstetric anal sphincter injury (OASIS). We sought to determine whether pelvic floor physical therapy (PFPT) would improve the quality of life and function in women 12 weeks after OASIS.

**METHODS:**

This institutional review board-approved randomized trial enrolled primiparous women 2 weeks after delivery complicated by OASIS. After informed consent, all subjects underwent vaginal electromyography and anorectal manometry and completed validated questionnaires; measures were repeated for all subjects at 12 weeks after delivery. The intervention arm completed 4 PFPT sessions. The primary outcome was a change in the Fecal Incontinence Quality of Life.

**RESULTS:**

Three hundred four women were screened; 250 were excluded, and 54 were randomized. After four were lost to follow-up, analysis included 27 in the intervention arm and 23 in the control arm. Overall, mean age was  $29.8 \pm 4.7$  years, and there were no demographic differences between groups. Fecal Incontinence Quality of Life domain scores showed improvement for both groups from baseline to 12 weeks for coping ( $P = 0.006$ ) and depression ( $P = 0.009$ ); however, there was no difference in domain scores between groups. For the secondary outcome of anorectal manometry, squeezing pressure improved for all subjects ( $P = 0.035$ ) from baseline to 12 weeks. Vaginal EMG strength (microvolts) increased for all subjects in measures of rest average ( $P < 0.000$ ), rapid peak ( $P = 0.006$ ), and work average ( $P < 0.000$ ), with no difference based on therapeutic arm.

**CONCLUSIONS:**

All women showed improvements in quality of life and function at 12 weeks after delivery, regardless of treatment allocation. Further study is needed to determine whether PFPT provides a significant benefit to women having OASIS.

PMID: [26829343](#)

**Placental syndrome**

Am J Obstet Gynecol. 2016 Jun 2. pii: S0002-9378(16)30267-8. doi: 10.1016/j.ajog.2016.05.047.

**Pregnancy as a window to future health: maternal placental syndromes and short-term cardiovascular outcomes.**

Cain MA<sup>1</sup>, Salemi JL<sup>2</sup>, Tanner JP<sup>3</sup>, Kirby RS<sup>3</sup>, Salihu HM<sup>2</sup>, Louis JM<sup>4</sup>.

**BACKGROUND:**

Cardiovascular disease is the leading cause of death among women. Identifying risk factors for future cardiovascular disease may lead to earlier lifestyle modifications and disease prevention. Additionally, interpregnancy development of cardiovascular disease can lead to increased perinatal morbidity in subsequent pregnancies. Identification and implementation of interventions in the short term (within 5 years of first pregnancy) may decrease morbidity in subsequent pregnancies.

**OBJECTIVE:**

We identified the short-term risk (within 5 years of first pregnancy) of cardiovascular disease among women who experienced a maternal placental syndrome, as well as preterm birth and/or delivered a small-for-gestational-age infant.

**STUDY DESIGN:**

We conducted a retrospective cohort study using a population-based, clinically enhanced database of women in the state of Florida. Nulliparous women and girls aged 15-49 years experiencing their first delivery during the study time period with no prepregnancy history of diabetes mellitus, hypertension, or heart or renal disease were included in the study. The risk of subsequent cardiovascular disease was compared among women who did and did not experience a placental syndrome during their first pregnancy. Risk was then reassessed among women with placental syndrome and preterm birth or delivering a small-for-gestational-age infant vs those without these adverse pregnancy outcomes.

**RESULTS:**

The final study population was 302,686 women and girls. Median follow-up time for each patient was 4.9 years. The unadjusted rate of subsequent cardiovascular disease among women and girls with any placental syndrome (11.8 per 1000 women) was 39% higher than the rate among women and girls without a placental syndrome (8.5 per 1000 women). Even after adjusting for sociodemographic factors, preexisting conditions, and clinical and behavioral conditions associated with the current pregnancy, women and girls with any placental syndrome experienced a 19% increased risk of cardiovascular disease (hazard ratio, 1.19; 95% confidence interval, 1.07-1.32). Women and girls with >1 placental syndrome had the highest cardiovascular disease risk (hazard ratio, 1.43; 95% confidence interval, 1.20-1.70), followed by those with eclampsia/preeclampsia alone (hazard ratio, 1.42; 95% confidence interval, 1.14-1.76). When placental syndrome was combined with preterm birth and/or small for gestational age, the adjusted risk of cardiovascular disease increased 45% (95% confidence interval, 1.24-1.71). Women and girls with placental syndrome who then developed cardiovascular disease experienced a 5-fold increase in health care-related costs during follow-up, compared to those who did not develop cardiovascular disease.

**CONCLUSION:**

Women and girls experiencing placental syndromes and preterm birth or small-for-gestational-age infant are at increased risk of subsequent cardiovascular disease in short-term follow-up. Strategies to identify and improve cardiovascular disease risk in the postpartum period may improve future heart disease outcomes.



Diastasis rectus

## RESEARCH REPORT

### Behavior of the Linea Alba During a Curl-up Task in Diastasis Rectus Abdominis: An Observational Study

**Authors:** Diane Lee, PT, BSR<sup>1,2</sup>, Paul W. Hodges, PT, PhD<sup>1</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2016 **Volume:**46 **Issue:**7 **Pages:**580–589 **DOI:**10.2519/jospt.2016.6536

**Study Design** Cross-sectional repeated measures.

**Background** Rehabilitation of diastasis rectus abdominis (DRA) generally aims to reduce the inter-rectus distance (IRD). We tested the hypothesis that activation of the transversus abdominis (TrA) before a curl-up would reduce IRD narrowing, with less linea alba (LA) distortion/deformation, which may allow better force transfer between sides of the abdominal wall.

**Objectives** This study investigated behavior of the LA and IRD during curl-ups performed naturally and with preactivation of the TrA.

**Methods** Curl-ups were performed by 26 women with DRA and 17 healthy control participants using a natural strategy (automatic curl-up) and with TrA preactivation (TrA curl-up). Ultrasound images were recorded at 2 points above the umbilicus (U point and UX point). Ultrasound measures of IRD and a novel measure of LA distortion (distortion index: average deviation of the LA from the shortest path between the recti) were compared between 3 tasks (rest, automatic curl-up, TrA curl-up), between groups, and between measurement points (analysis of variance).

**Results** Automatic curl-up by women with DRA narrowed the IRD from resting values (mean U-point between-task difference,  $-1.19$  cm; 95% confidence interval [CI]:  $-1.45, -0.93$ ;  $P < .001$  and mean UX-point between-task difference,  $-0.51$  cm; 95% CI:  $-0.69, -0.34$ ;  $P < .001$ ), but LA distortion increased (mean U-point between-task difference,  $0.018$ ; 95% CI:  $0.0003, 0.041$ ;  $P = .046$  and mean UX-point between-task difference,  $0.025$ ; 95% CI:  $0.004, 0.045$ ;  $P = .02$ ). Although TrA curl-up induced no narrowing or less IRD narrowing than automatic curl-up (mean U-point difference between TrA curl-up versus rest,  $-0.56$  cm; 95% CI:  $-0.82, -0.31$ ;  $P < .001$  and mean UX-point between-task difference,  $0.02$  cm; 95% CI:  $-0.22, 0.19$ ;  $P = .86$ ), LA distortion was less (mean U-point between-task difference,  $-0.025$ ; 95% CI:  $-0.037, -0.012$ ;  $P < .001$  and mean UX-point between-task difference,  $-0.021$ ; 95% CI:  $-0.038, -0.005$ ;  $P = .01$ ). Inter-rectus distance and the distortion index did not change from rest or differ between tasks for controls ( $P \geq .55$ ).

#### Conclusion

Narrowing of the IRD during automatic curl-up in DRA distorts the LA. The distortion index requires further validation, but findings imply that less IRD narrowing with TrA preactivation might improve force transfer between sides of the abdomen. The clinical implication is that reduced IRD narrowing by TrA contraction, which has been discouraged, may positively impact abdominal mechanics. *J Orthop Sports Phys Ther* 2016;46(7):580–589.  
doi:10.2519/jospt.2016.6536

**Keyword:** diastasis rectus abdominis, inter-rectus distance, rehabilitation, transversus abdominis

**Oxytocin and depression**

Arch Womens Ment Health. 2016 Jun 20

**Oxytocin course over pregnancy and postpartum period and the association with postpartum depressive symptoms.**

Jobst A<sup>1</sup>, Krause D<sup>2</sup>, Maiwald C<sup>2</sup>, Härtl K<sup>3</sup>, Myint AM<sup>2</sup>, Kästner R<sup>4</sup>, Obermeier M<sup>2</sup>, Padberg F<sup>2</sup>, Brücklmeier B<sup>2</sup>, Weidinger E<sup>2</sup>, Kieper S<sup>2</sup>, Schwarz M<sup>5</sup>, Zill P<sup>2</sup>, Müller N<sup>2</sup>.

During the postpartum period, women are at higher risk of developing a mental disorder such as postpartum depression (PPD), a disorder that associates with mother-infant bonding and child development.

Oxytocin is considered to play a key role in mother-infant bonding and social interactions and altered oxytocin plasma concentrations were found to be associated with PPD. In the present study, we evaluated oxytocin plasma levels and depressive symptoms during pregnancy and the postpartum period in healthy women. We evaluated 100 women twice during pregnancy (weeks 35 and 38) and three times in the postpartum period (within 2 days and 7 weeks and 6 months after delivery) by measuring oxytocin plasma levels with enzyme-linked immunosorbent assay (ELISA) and assessing depressive symptoms with the Montgomery-Asberg Depression Rating Scale. Oxytocin plasma levels significantly increased from the 35th week of gestation to 6 months postpartum in all women. However, levels decreased from the 38th week of gestation to 2 days after delivery in participants with postpartum depressive symptoms, whereas they continuously increased in the group without postpartum depressive symptoms; the difference between the course of oxytocin levels in the two groups was significant ( $\Delta t_2-t_3$ :  $t = 2.14$ ;  $p = 0.036^*$ ). Previous depressive episodes and breastfeeding problems predicted postpartum depressive symptoms.

Our results indicate that alterations in the oxytocin system during pregnancy might be specific for women who develop postpartum depressive symptoms. Future studies should investigate whether oxytocin plasma levels might have predictive value in women at high risk for PPD.

**KEYWORDS:**

Breastfeeding; Mother–infant bonding; Oxytocin; Postpartum depression; Prediction of depressive symptoms

PMID: [27320943](https://pubmed.ncbi.nlm.nih.gov/27320943/)

## 8. VISCERA

### Acid reflux

#### **Gastroesophageal reflux and sleep disturbances: A bidirectional association in a population-based cohort study, the HUNT study**

SLEEP, 07/07/2016

Lindam A, et al.

This study aim to investigate the bidirectional association between gastroesophageal reflux symptoms (GERS) and insomnia disorders/sleep disturbances. Findings confirmed that sleep disturbances and GERS appear to be bidirectionally associated, and sleep disturbances appear to be a stronger risk factor for GERS than the reverse.

#### Methods

- In a population-based longitudinal cohort study (HUNT), the authors assessed the incidence of new-onset of self-reported GERS, sleep disturbances, and insomnia disorders, performed in Nord-Trøndelag County, Norway.
- They used Modified Poisson regression to estimate risk ratios (RRs) with 95% confidence intervals (CIs), adjusted for sex, age, body mass index, tobacco smoking, educational level, anxiety, and depression.

#### Results

- Included 25,844 participants of the HUNT study who responded to health questionnaires in both 1995–1997 and 2006–2009.
- In this study, new-onset GERS, sleep disturbances, and insomnia disorders was reported in 396 (2%), 2,598 (16%), and 497 (3%) participants, respectively.
- The study revealed an association between persistent sleep disturbances with new-onset GERS (RR: 2.70, 95% CI: 1.93–3.76), persistent insomnia disorders were associated with new-onset GERS (RR: 3.42; 95% CI: 1.83–6.39) and persistent GERS was associated with new-onset sleep disturbances (RR: 1.41; 95% CI: 1.14–1.75).

**Celiac's and gluten free diet**

Eur J Nutr. 2016 Jun 22.

**Celiac disease: understanding the gluten-free diet.**

Bascuñán KA<sup>1</sup>, Vespa MC<sup>2</sup>, Araya M<sup>2</sup>.

**PURPOSE:**

The only effective and safe treatment of celiac disease (CD) continues being strict exclusion of gluten for life, the so-called gluten-free diet (GFD). Although this treatment is highly successful, following strict GFD poses difficulties to patients in family, social and working contexts, deteriorating his/her quality of life. We aimed to review main characteristics of GFD with special emphasis on factors that may interfere with adherence to it.

**METHODS:**

We conducted a search of various databases, such as PubMed, Google Scholar, Embase, and Scielo, with focus on key words such as "gluten-free diet", "celiac disease", "gluten" and "gluten-free diet adherence". Available literature has not reached definitive conclusions on the exact amount of gluten that is harmless to celiac patients, although international agreements establish cutoff points for gluten-free products and advise the use of clinical assessment to tailor the diet according to individual needs. Following GFD must include eliminating gluten as ingredient as well as hidden component and potential cross contamination in foods. There are numerous grains to substitute wheat but composition of most gluten-free products tends to include only a small number of them, especially rice. The diet must be not only free of gluten but also healthy to avoid nutrient, vitamins and minerals deficiencies or excess. Overweight/obesity frequency has increased among celiac patients so weight gain deserves attention during follow up. Nutritional education by a trained nutritionist is of great relevance to achieve long-term satisfactory health status and good compliance.

**CONCLUSIONS:**

A balanced GFD should be based on a combination of naturally gluten-free foods and certified processed gluten-free products. How to measure and improve adherence to GFD is still controversial and deserves further study.

**KEYWORDS:**

Adherence to diet; Celiac disease; Gluten; Gluten-free diet

PMID: [27334430](https://pubmed.ncbi.nlm.nih.gov/27334430/)

**IBS and diet**

Nutr J. 2016 Jun 8;15(1):61. doi: 10.1186/s12937-016-0178-5.

**A cross-sectional study on nutrient intake and -status in inflammatory bowel disease patients.**

Vidarsdottir JB<sup>1</sup>, Johannsdottir SE<sup>2</sup>, Thorsdottir I<sup>1</sup>, Bjornsson E<sup>2</sup>, Ramel A<sup>3</sup>.

**BACKGROUND AND AIMS:**

Inflammatory bowel disease (IBD) can be associated with nutritional problems. The aim of this study was to investigate diet and nutritional status of IBD patients.

**METHODS:**

A total of 78 participants (35 men and 43 women aged 18-74 years) were included in this cross-sectional study. The majority (80 %) of the participant received infliximab treatment. Participants filled out disease related questionnaires and 31 participants also a 3-day food record. Body composition was measured and blood samples analysed in order to estimate nutritional status.

**RESULTS:**

The majority (87 %) claimed that diet affects digestive tract symptoms and 72 % had changed diet accordingly. The most common foods restricted were dairy products (60 %), processed meat (55 %), soft drinks (46 %), alcohol (45 %) and fast food (44 %). Body mass index was mostly in the overweight range but 46 % of the participants had been diagnosed with some nutritional deficiency since IBD diagnosis (most common was iron deficiency: 39 %). Patients who restricted meat products had lower ferritin values ( $48 \pm 39$  vs.  $95 \pm 74$   $\mu\text{g/L}$ ,  $P = 0.011$ ). Intake of vitamin D and calcium were not adequate (65 % below recommended intake for both) and 60 % had poor vitamin D status.

**CONCLUSION:**

IBD patients often change their dietary intake in order to affect digestive tract symptoms. Many patients have a history of nutrient deficiency. Restriction of dairy and meat consumption is common and is negatively associated with intake or status of micronutrients like calcium and iron. Dietary advice by a dietitian and use of potentially helpful dietary supplements is indicated.

**10 A. CERVICAL SPINE****Neck flexor strength**

J Manipulative Physiol Ther. 2016 Jun 28. pii: S0161-4754(16)30107-5. doi: 10.1016/j.jmpt.2016.05.005.

**Neck Flexor and Extensor Muscle Endurance in Subclinical Neck Pain: Intrarater Reliability, Standard Error of Measurement, Minimal Detectable Change, and Comparison With Asymptomatic Participants in a University Student Population.**

Lourenço AS<sup>1</sup>, Lameiras C<sup>1</sup>, Silva AG<sup>2</sup>.

**OBJECTIVE:**

The aims of this study were to assess intrarater reliability and to calculate the standard error of measurement (SEM) and minimal detectable change (MDC) for deep neck flexor and neck extensor muscle endurance tests, and compare the results between individuals with and without subclinical neck pain.

**METHODS:**

Participants were students of the University of Aveiro reporting subclinical neck pain and asymptomatic participants matched for sex and age to the neck pain group. Data on endurance capacity of the deep neck flexors and neck extensors were collected by a blinded assessor using the deep neck flexor endurance test and the extensor endurance test, respectively. Intraclass correlation coefficients (ICCs), SEM, and MDC were calculated for measurements taken within a session by the same assessor. Differences between groups for endurance capacity were investigated using a Mann-Whitney U test.

**RESULTS:**

The deep neck flexor endurance test (ICC = 0.71; SEM = 6.91 seconds; MDC = 19.15 seconds) and neck extensor endurance test (ICC = 0.73; SEM = 9.84 minutes; MDC = 2.34 minutes) are reliable. No significant differences were found between participants with and without neck pain for both tests of muscle endurance ( $P > .05$ ).

**CONCLUSION:**

The endurance capacity of the deep neck flexors and neck extensors can be reliably measured in participants with subclinical neck pain. However, the wide SEM and MDC might limit the sensitivity of these tests.

**10 B. CERVICAL EXERCISES****Tai Chi vs. neck ex**

J Pain. 2016 Jun 23. pii: S1526-5900(16)30105-5. doi: 10.1016/j.jpain.2016.06.004.

**The effects of Tai Chi and neck exercises in the treatment of chronic non-specific neck pain: A randomized controlled trial.**

Lauche R<sup>1</sup>, Stumpe C<sup>2</sup>, Fehr J<sup>2</sup>, Cramer H<sup>3</sup>, Cheng YW<sup>4</sup>, Wayne PM<sup>5</sup>, Rampp T<sup>2</sup>, Langhorst J<sup>2</sup>, Dobos G<sup>2</sup>.

This study aimed to test the efficacy of Tai Chi for treating chronic neck pain.

Subjects with chronic non-specific neck pain were randomly assigned to 12 weeks of group Tai Chi or conventional neck exercises with weekly sessions of 75-90 minutes, or a wait-list control. The primary outcome measure was pain intensity (visual analog scale, VAS). Secondary outcomes included pain on movement, functional disability, quality of life, well-being and perceived stress, postural and interoceptive awareness, satisfaction and safety. Altogether, 114 participants were included (91 females, 49.4±11.7 years). After 12 weeks Tai Chi participants reported significantly less pain compared to the wait list (average difference in mm VAS: -10.5; 95%CI:-20.3,-0.9;p=0.033). Group differences were also found for pain on movement, functional disability and quality of life compared to wait list. No differences were found for Tai Chi compared to neck exercises.

Patients' satisfaction with both exercise interventions was high, and only minor side effects were observed. Tai Chi was more effective than no treatment in improving pain in subjects with chronic non-specific neck pain. Since Tai Chi is probably as effective as neck exercises it may be considered a suitable alternative to conventional exercises for those with a preference towards Tai Chi.

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**KEYWORDS:**

Chronic pain; Neck pain; Tai Chi; efficacy; neck exercises; randomized controlled trial; spinal exercises

PMID: [27345663](#)

### 13. CRANIUM/TMJ

#### Trigeminal neuralgia

Pain. 2016 Jul;157(7):1407-14. doi: 10.1097/j.pain.0000000000000528.

#### **Quantitative sensory testing in classical trigeminal neuralgia-a blinded study in patients with and without concomitant persistent pain.**

Younis S<sup>1</sup>, Maarbjerg S, Reimer M, Wolfram F, Olesen J, Baron R, Bendtsen L.

The diagnostic criteria of the third International Classification of Headache Disorders state that there should be no neurological deficits in patients with classical trigeminal neuralgia (TN) at clinical examination.

However, studies demonstrating sensory abnormalities at bedside examination in TN patients have questioned this. Our aim was to examine whether TN patients without sensory abnormalities at neurological examination have sensory abnormalities at quantitative sensory testing (QST) and whether there were any QST differences between TN with and without concomitant persistent pain. Thirty-six TN patients were investigated with the standardized QST protocol by the German Research Network on Neuropathic Pain. The investigators were blinded to presence of concomitant persistent pain and symptomatic side. Based on comparison to the German Research Network on Neuropathic Pain controls, z scores were calculated to process frequency analyses and Z-profiles.

We found increased mechanical detection threshold on the symptomatic side (47.2% vs 0%,  $P = 0.008$ ), asymptomatic side (33.3% vs 0%,  $P = 0.011$ ), and hand (36% vs 0%,  $P < 0.001$ ) in TN compared with controls. The Z-profiles demonstrated increased mechanical detection threshold on the symptomatic side compared with the asymptomatic side (-2.980 vs -2.166,  $P = 0.040$ ). Thermal and mechanical hyperalgesia was detected bilaterally in the face and the hand. Trigeminal neuralgia patients with concomitant persistent pain tended to have higher mean z score values compared to TN with purely paroxysmal pain indicative of decreased detection thresholds.

Trigeminal neuralgia patients with no sensory abnormalities at neurological examination had generalized subclinical hypoesthesia, which was more pronounced on the symptomatic side, and thermal and mechanical hyperalgesia. This could indicate pain-induced hypoesthesia and sensitization induced by central mechanisms.

PMID: [26894914](#)



**Artificial disc**

*J Dent Res.* 2016 Jul;95(7):800-7. doi: 10.1177/0022034516642404. Epub 2016 Apr 6.

**Engineering Human TMJ Discs with Protein-Releasing 3D-Printed Scaffolds.**

Legemate K1, Tarafder S2, Jun Y2, Lee CH3.

The temporomandibular joint (TMJ) disc is a heterogeneous fibrocartilaginous tissue positioned between the mandibular condyle and glenoid fossa of the temporal bone, with important roles in TMJ functions.

Tissue engineering TMJ discs has emerged as an alternative approach to overcoming limitations of current treatments for TMJ disorders. However, the anisotropic collagen orientation and inhomogeneous fibrocartilaginous matrix distribution present challenges in the tissue engineering of functional TMJ discs. Here, we developed 3-dimensional (3D)-printed anatomically correct scaffolds with region-variant microstrand alignment, mimicking anisotropic collagen alignment in the TMJ disc and corresponding mechanical properties. Connective tissue growth factor (CTGF) and transforming growth factor beta 3 (TGF $\beta$ 3) were then delivered in the scaffolds by spatially embedding CTGF- or TGF $\beta$ 3-encapsulated microspheres ( $\mu$ S) to reconstruct the regionally variant fibrocartilaginous matrix in the native TMJ disc. When cultured with human mesenchymal stem/progenitor cells (MSCs) for 6 wk, 3D-printed scaffolds with CTGF/TGF $\beta$ 3- $\mu$ S resulted in a heterogeneous fibrocartilaginous matrix with overall distribution of collagen-rich fibrous structure in the anterior/posterior (AP) bands and fibrocartilaginous matrix in the intermediate zone, reminiscent of the native TMJ disc. High dose of CTGF/TGF $\beta$ 3- $\mu$ S (100 mg  $\mu$ S/g of scaffold) showed significantly more collagen II and aggrecan in the intermediate zone than a low dose (50 mg  $\mu$ S/g of scaffold). Similarly, a high dose of CTGF/TGF $\beta$ 3- $\mu$ S yielded significantly higher collagen I expression in the AP bands compared with the low-dose and empty  $\mu$ S. From stress relaxation tests, the ratio of relaxation modulus to instantaneous modulus was significantly smaller with CTGF/TGF $\beta$ 3- $\mu$ S than empty  $\mu$ S. Similarly, a significantly higher coefficient of viscosity was achieved with the high dose of CTGF/TGF $\beta$ 3- $\mu$ S compared with the low-dose and empty  $\mu$ S, suggesting the dose effect of CTGF and TGF $\beta$ 3 on fibrocartilage formation. Together, our findings may represent an efficient approach to engineering the TMJ disc graft with anisotropic scaffold microstructure, heterogeneous fibrocartilaginous matrix, and region-dependent viscoelastic properties.

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**KEYWORDS:**

3D printing; connective tissue growth factor; mesenchymal stromal cells; temporomandibular joint; tissue engineering; transforming growth factor beta 3

PMID: [27053116](#)

**Hyaluronic acid**

*Int J Oral Maxillofac Surg.* 2016 Jun 27. pii: S0901-5027(16)30107-2. doi: 10.1016/j.ijom.2016.06.009. [

**Is arthrocentesis plus platelet-rich plasma superior to arthrocentesis plus hyaluronic acid for the treatment of temporomandibular joint osteoarthritis: a randomized clinical trial.**

Cömert Kiliç S<sup>1</sup>, Güngörmüş M<sup>2</sup>.

A randomized clinical trial was implemented in adult patients with temporomandibular joint osteoarthritis (TMJ OA). The sample comprised 49 osteoarthritic joints in 31 consecutive patients. Patients were divided randomly into two groups according to the treatment technique applied: the platelet-rich plasma (PRP) group patients underwent initial arthrocentesis plus PRP injection and then four consecutive PRP injections; the hyaluronic acid (HA) group patients underwent one session of arthrocentesis plus HA injection. The predictor variable was the treatment technique. The outcome variables included visual analogue scale (VAS) evaluations and maximum inter-incisal opening (MIO) measurements. Outcome variables were recorded preoperatively and at 12 months postoperative. Descriptive and bivariate statistics were computed and significance was set at  $P < 0.05$ . The PRP group included 32 joints in 18 subjects, and the HA group included 17 joints in 13 subjects. No statistically significant difference was observed between the groups for any of the changes in VAS parameters or MIO measurements. Both treatment techniques resulted in significant clinical improvements in all VAS parameters and painless MIO. These findings suggest that arthrocentesis plus PRP injections is not superior to arthrocentesis plus a single HA injection; thus PRP injection should not be considered as the first line treatment. Arthrocentesis plus HA injection would appear to be more acceptable for patients.

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**KEYWORDS:**

TMJ osteoarthritis; arthrocentesis; hyaluronic acid; intra-articular injection; platelet-rich plasma

PMID:[27364372](https://pubmed.ncbi.nlm.nih.gov/27364372/)

**Myofunctional therapy**

Am J Orthod Dentofacial Orthop. 2016 Jul;150(1):167-80. doi: 10.1016/j.ajodo.2015.08.021.

Orthodontic treatment of a patient with unilateral orofacial muscle dysfunction: The efficacy of myofunctional therapy on the treatment outcome.

Sugawara Y<sup>1</sup>, Ishihara Y<sup>2</sup>, Takano-Yamamoto T<sup>3</sup>, Yamashiro T<sup>4</sup>, Kamioka H<sup>5</sup>.

The orofacial muscle is an important factor in the harmony of the occlusion, and its dysfunction significantly influences a patient's occlusion after craniofacial growth and development.

In this case report, we describe the successful orthodontic treatment of a patient with unilateral orofacial muscle dysfunction. A boy, 10 years 0 months of age, with a chief complaint of anterior open bite, was diagnosed with a Class III malocclusion with facial musculoskeletal asymmetry. His maxillomandibular relationships were unstable, and he was unable to lift the right corner of his mouth upon smiling because of weak right orofacial muscles. A satisfactory occlusion and a balanced smile were achieved after orthodontic treatment combined with orofacial myofunctional therapy, including muscle exercises.

An acceptable occlusion and facial proportion were maintained after a 2-year retention period. These results suggest that orthodontic treatment with orofacial myofunctional therapy is an effective option for a patient with orofacial muscle dysfunction.

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PMID: [27364218](#)

**Hyaluronic acid**

Int J Oral Maxillofac Surg. 2016 Jun 27. pii: S0901-5027(16)30107-2. doi: 10.1016/j.ijom.2016.06.009.

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These findings suggest that arthrocentesis plus PRP injections is not superior to arthrocentesis plus a single HA injection; thus PRP injection should not be considered as the first line treatment. Arthrocentesis plus HA injection would appear to be more acceptable for patients.

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**KEYWORDS:**

TMJ osteoarthritis; arthrocentesis; hyaluronic acid; intra-articular injection; platelet-rich plasma

PMID: [27364372](#)

**14. HEADACHES****Blood flow changes**

Cephalalgia. 2016 Jul 4. pii: 0333102416658715.

**Longitudinal changes in cerebral blood flow velocities in different clinical courses of migraine.**

Lee MJ<sup>1</sup>, Chu MK<sup>2</sup>, Choi H<sup>3</sup>, Choi HA<sup>1</sup>, Lee C<sup>1</sup>, Chung CS<sup>4</sup>.

**OBJECTIVE:**

To assess longitudinal changes in cerebral blood flow velocities ( $\Delta$ CBFVs) according to the clinical course of migraine.

**METHODS:**

We retrospectively included migraine patients with two or more attacks per month at baseline who were followed up within 2 years with transcranial Doppler in a tertiary headache clinic.  $\Delta$ CBFVs were analyzed in relation to clinical courses, defined as remission (0-1 headache days/month), persistence (2-14/month), or progression ( $\geq 15$ /month) in episodic migraine (EM), and conversion to EM ( $< 15$ /month) and persistence ( $\geq 15$ /month) in chronic migraine (CM).

**RESULTS:**

A total of 166 patients (90 EM and 76 CM) were included. In EM, the remission group (n = 30) showed a decrease in CBFV in the middle cerebral artery (MCA) and the basilar artery (BA). The progression group (n = 10) showed increasing CBFVs in the bilateral MCAs. Patients with the persistence course (n = 50) showed generally unchanged CBFVs. In CM,  $\Delta$ CBFVs decreased in the BA and increased in the posterior cerebral artery (PCA) after conversion to EM (n = 61), whereas they remained unchanged in the persistence group (n = 15). In all patients, % change in headache days was positively correlated with the % $\Delta$ CBFVs of the bilateral MCAs and the BA.

**CONCLUSIONS:**

CBFV changes are associated with the different clinical courses of migraine. The association is more prominent in EM than CM.

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**KEYWORDS:**

Migraine; cerebral hemodynamics; prognosis; transcranial Doppler

PMID: [27381854](#)

**Impaired brain stem function in Migraineurs**

Cephalalgia. 2016 Jun 29. pii: 0333102416657146.

**Impaired brainstem and thalamic high-frequency oscillatory EEG activity in migraine between attacks.**

Porcaro C<sup>1</sup>, Di Lorenzo G<sup>2</sup>, Seri S<sup>3</sup>, Pierelli F<sup>4</sup>, Tecchio F<sup>5</sup>, Coppola G<sup>6</sup>.

**INTRODUCTION:**

We investigated whether interictal thalamic dysfunction in migraine without aura (MO) patients is a primary determinant or the expression of its functional disconnection from proximal or distal areas along the somatosensory pathway.

**METHODS:**

Twenty MO patients and twenty healthy volunteers (HVs) underwent an electroencephalographic (EEG) recording during electrical stimulation of the median nerve at the wrist. We used the functional source separation algorithm to extract four functionally constrained nodes (brainstem, thalamus, primary sensory radial, and primary sensory motor tangential parietal sources) along the somatosensory pathway. Two digital filters (1-400 Hz and 450-750 Hz) were applied in order to extract low- (LFO) and high- frequency (HFO) oscillatory activity from the broadband signal.

**RESULTS:**

Compared to HVs, patients presented significantly lower brainstem (BS) and thalamic (Th) HFO activation bilaterally. No difference between the two cortical HFO as well as in LFO peak activations between the two groups was seen. The age of onset of the headache was positively correlated with HFO power in the right brainstem and thalamus.

**CONCLUSIONS:**

This study provides evidence for complex dysfunction of brainstem and thalamocortical networks under the control of genetic factors that might act by modulating the severity of migraine phenotype.

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**KEYWORDS:**

High-frequency oscillations (HFOs); brainstem; electroencephalography (EEG); functional source separation (FSS); migraine; thalamus

PMID: [27358281](#)

## CG HA

Cephalalgia. 2016 Jul 5. pii: 0333102416658713. [Epub ahead of print]

**A case of cervicogenic headache caused by C5 nerve root derived schwannoma: Case report.**

Gondo G<sup>1</sup>, Watanabe T<sup>2</sup>, Kawada J<sup>3</sup>, Tanaka M<sup>2</sup>, Yamamoto K<sup>2</sup>, Tanaka S<sup>2</sup>, Endo S<sup>2</sup>.

**INTRODUCTION:**

We report a case of cervicogenic headache caused by an intradural extramedullary tumor of the middle cervical spine, which has not previously been reported.

**CASE PRESENTATION:**

The patient was a 73-year-old male who visited a physician for a chief complaint of pain from the left lower jaw to the auricle and occipital region. The headache was induced with retroflexion of the neck. On cervical magnetic resonance imaging, an intradural extramedullary tumor was noted on the left side at the C4/5 level. The intradural tumor, which arose from the C5 nerve root, was excised and the pain was resolved. The pathological diagnosis was schwannoma.

**CONCLUSION:**

Previously reported cases of spinal cord tumor-induced cervicogenic headache were due to upper cervical spinal tumors. This is the first report that a middle-lower cervical intradural extramedullary tumor caused cervicogenic headache.

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**KEYWORDS:**

Cervicogenic headache; middle-lower cervical; schwannoma; spinal tumor

PMID: [27385490](https://pubmed.ncbi.nlm.nih.gov/27385490/)

**Migraineurs**

Clin J Pain. 2016 Jul;32(7):631-5. doi: 10.1097/AJP.0000000000000301.

**Characterization of Migraineurs Having Allodynia: Results of a Large Population-based Study.**

Baykan B<sup>1</sup>, Ekizoglu E, Karli N, Kocasoy-Orhan E, Zarifoglu M, Saip S, Siva A, Ertas M.

**OBJECTIVE:**

Allodynia reflects the clinical correlate of central sensitization, but it is usually neglected in clinical headache management. We aimed to report the prevalence and previously unnoticed associations of allodynia in migraineurs by a nationwide face-to-face questionnaire-based study by physicians.

**METHODS:**

A total of 5323 households were examined for headache according to the diagnostic criteria of International Classification of Headache Disorders-II. Detailed headache features, premonitory signs, demographics, socio-economic status, and hormonal status of female individuals were analyzed with regard to the presence of allodynia in patients with definite migraine.

**RESULTS:**

Allodynia was present in 61.1% of migraineurs in the general population of Turkey. The duration and severity of attacks ( $P<0.0001$ ), photophobia ( $P=0.001$ ), phonophobia, and also osmophobia ( $P<0.0001$ ), as well as premonitory signs ( $P=0.018$ ), showed significant associations with allodynia. Migraineurs with aura or family history of migraine more often reported allodynia in comparison with those without ( $P=0.001$  and  $0.028$ , respectively). Allodynic migraineurs had a higher rate of physician consults and high levels on the Migraine Disability Assessment questionnaire, reflecting increased burden of headache. Furthermore, migraineurs with allodynia had high probability of attacks close to menses. Migraine improved during pregnancy, but it worsened after menopause or during oral contraceptive use in individuals experiencing allodynia when compared with those without allodynia.

**DISCUSSION:**

The duration, severity, and disability of migraine attacks, photophobia, phonophobia, and osmophobia, as well as premonitory signs, showed significant associations with allodynia in the general population. Moreover, migraineurs with aura or family history of migraine more often reported allodynia, and allodynic migraineurs were more sensitive to hormonal changes. Allodynia, which seems to indicate higher tendency to central sensitization, should be implemented in daily headache practice to predict the prognosis and high levels of migraineous involvement.

PMID: [26379076](#)



**17. SHOULDER GIRDLE****Push ups**

J Sport Rehabil. 2016 Jun 14.

**Shoulder Muscle Activation Levels During the Push-Up Plus Exercise on Stable and Unstable Surfaces.**

Torres RJ<sup>1</sup>, Pirauá AL, Nascimento VY, Santos PS, Beltrão NB, Oliveira VM, Pitangui AC, de Araújo RC.

The aim of this study was to evaluate the acute effect of the use of stable and unstable surfaces on EMG activity and coactivation of the scapular and upper limb muscles during performing push-up plus (with full protraction of the scapula).

Muscle activation of anterior deltoid (AD), posterior deltoid (PD), pectoralis major (PM), biceps brachii (BB), triceps brachii (TB), upper trapezius (UT), middle trapezius (MT), lower trapezius (LT) and serratus anterior (SA) levels and coactivation index were determined by surface electromyography in 20 young men during push-up plus performed on a stable and unstable condition (two unstable devices applied to hands and feet). The paired t-test and Cohen's d were used for statistical analysis. The results showed that during the execution of the push-up plus on the unstable surface an increased EMG activity of the scapular stabilizing muscles (SA, MT and LT) was observed, while AD and PD muscles showed a decrease. During exercise execution on the unstable surface there was a higher index of coactivation of the scapular muscles (SA-MT and UT-LT pairs). No significant differences were observed in TB-BB and AD-PD pairs.

These results suggest that the push-up plus exercise associated with unstable surfaces produced greater EMG activity levels and coactivation index of the scapular stabilizing muscle. On the other hand, the use of unstable surface does not promote the same effect for the shoulder muscles.

**19. GLENOHUMERAL/SHOULDER****Risk stratification in PT practice**

J Eval Clin Pract. 2016 Jun 29. doi: 10.1111/jep.12591.

**Risk stratification of patients with shoulder pain seen in physical therapy practice.**

Rodeghero JR<sup>1</sup>, Cleland JA<sup>2</sup>, Mintken PE<sup>3</sup>, Cook CE<sup>4</sup>.

***RATIONALE, AIMS AND OBJECTIVES:***

Musculoskeletal shoulder pain is commonly treated in physical therapy. There is inconsistency in the literature regarding patient characteristics related to prognosis. Having prognostic information could be useful for improving clinical efficiency and decreasing the cost of associated care. The objective of this study was to identify predictive characteristics related to patients with shoulder pain who have a high-risk of a bad prognosis (lowest functional recovery compared with visit utilization) as well as those who are at low-risk of a bad prognosis (highest functional recovery compared with visit utilization).

***METHODS:***

We completed a secondary analysis of a retrospective cohort using data obtained from an existing commercial outcomes database. Data from 5214 patients with shoulder pain were analysed to determine predictive characteristics that identify patients who either have a low-risk or a high-risk of a bad prognosis to physical therapy care. Multinomial regression was used to identify significant patient characteristics predictive of treatment response.

***RESULTS:***

Statistically significant predictors of high-risk categorization included older age, no surgical history, insurance designated as worker's compensation, litigation or automotive and three or more co-morbidities. Predictors of low risk categorization were younger age, shorter duration of symptoms, no surgical history and payer type.

***CONCLUSION:***

Selected variables were associated with both poor and good recovery. Further research on prognosis, efficacy of physical therapy care and cost appear warranted for patients with shoulder pain.

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***KEYWORDS:***

cost; outcomes; rehabilitation

PMID: [27357623](#)

**24. ELBOW****Ulnar collateral ligament**

Arch Orthop Trauma Surg. 2016 Jul;136(7):1031-7. doi: 10.1007/s00402-016-2479-8. Epub 2016 May 31.

**Functional anatomy of the lateral collateral ligament of the elbow.**

Hackl M<sup>1,2</sup>, Bercher M<sup>3</sup>, Wegmann K<sup>3,4</sup>, Müller LP<sup>3,4</sup>, Dargel J<sup>3,4</sup>.

**INTRODUCTION:**

The aim of this study was to analyze the functional anatomy of the lateral collateral ligament complex (LCLC) and the surrounding forearm extensors.

**MATERIALS AND METHODS:**

Using 81 human cadaveric upper extremities, the anatomy of the forearm extensors-especially the anconeus, supinator and extensor carpi ulnaris (ECU)-was analyzed. After removal of aforementioned extensors the functional anatomy of the LCLC was analyzed. The origin of the LCLC was evaluated for isometry. The insertion types of the lateral ulnar collateral ligament (LUCL) were analyzed and classified.

**RESULTS:**

The ECU runs parallel to the RCL to dynamically preserve varus stability. The supinator and anconeus muscle fibers coalesce with the LCLC and lengthen during pronation. The anconeus fibers run parallel to the LUCL in full flexion. The LCLC consists of the annular ligament (AL) and the isometric radial collateral ligament (RCL). During elbow flexion, its posterior branches (LUCL) tighten while the anterior branches loosen. When performing a pivot shift test, the loosened LUCL fibers do not fully tighten in full extension. The LUCL inserts along with the AL at the supinator crest. Three different insertion types could be observed.

**CONCLUSIONS:**

The LUCL represents the posterior branch of the RCL rather than a distinct ligament. It is non-isometric and lengthens during elbow flexion. The RCL was found to be of vital importance for neutralization of posterolateral rotatory forces. Pronation of the forearm actively stabilizes the elbow joint as the supinator, anconeus and biceps muscle work in unison to increase posterolateral rotatory stability.

**KEYWORDS:**

Elbow; Functional anatomy; LCL; LUCL; Lateral collateral ligament; RCL

PMID: [27245451](#)

**27. HIP****Hip fx and Med. Diet**

J Bone Miner Res. 2016 Jun 27. doi: 10.1002/jbmr.2896.

**Mediterranean Diet and Hip Fracture in Swedish Men and Women.**

Byberg L<sup>1</sup>, Bellavia A<sup>2</sup>, Larsson SC<sup>2</sup>, Orsini N<sup>3</sup>, Wolk A<sup>2</sup>, Michaëlsson K<sup>1</sup>.

A Mediterranean diet, known to have beneficial effects on cardiovascular health, may also influence the risk of hip fracture although previous studies present discrepant results.

We therefore aimed to determine whether the rate of hip fracture was associated with degree of adherence to a Mediterranean diet. We combined two Swedish cohort studies consisting of 37,903 men and 33,403 women (total n = 71,333, mean age 60 years) free of previous cardiovascular disease and cancer who answered a medical and a food-frequency questionnaire in 1997. A modified Mediterranean diet score (mMED; range 0-8 points) was created based on high consumption of fruits and vegetables, legumes and nuts, whole grains, fermented dairy products, fish, and olive/rapeseed oil, moderate intake of alcohol, and low intake of red and processed meat. Incident hip fractures between 1 January 1998 and 31 December 2012 were retrieved from the National Patient Register. Hazard ratios (HR) and 95% confidence intervals (CI) adjusted for potential confounders were calculated using Cox proportional hazards regression. Differences in age at hip fracture were calculated using multivariable Laplace regression. During follow-up, 3,175 hip fractures occurred at a median age of 73.3 years. One unit increase in the mMED was associated with 6% lower hip fracture rate (adjusted HR = 0.94; 95% CI 0.92-0.96) and with a three months higher median age at hip fracture (50<sup>th</sup> percentile difference = 2.8 months; 95% CI 1.4-4.2). Comparing the highest quintile of adherence to the mMED (6-8 points) with the lowest (0-2 points) conferred an adjusted HR of hip fracture of 0.78 (95% CI 0.69-0.89) and a 12 months higher median age of hip fracture (50<sup>th</sup> percentile difference = 11.6 months; 95% CI 4.2-19.0).

Results were similar in men and women. We conclude that higher adherence to a Mediterranean-like diet is associated with lower risk of future hip fracture. This article is protected by copyright. All rights reserved.

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**KEYWORDS:**

Cohort study; Hip fracture; Laplace regression; Mediterranean diet; Nutrition

PMID: [27345330](#)

**31. KNEE****Risk stratifications with PT**

Musculoskeletal Care. 2016 Jul 4. doi: 10.1002/msc.1150.

**Risk Stratification for 4,837 Individuals with Knee Pain Who Receive Physical Therapy Treatment.**

Salamh PA<sup>1</sup>, Reiman M<sup>1</sup>, Cleland J<sup>2</sup>, Mintken P<sup>3</sup>, Rodeghero J<sup>4</sup>, Cook CE<sup>1</sup>.

Risk stratification is a modelling method that is designed to target interventions toward patients with specific needs. The objective of the present study was to identify predictive characteristics related to patients with knee impairments who had a high risk of a bad prognosis (exceptional non-responders) as well as those who were at low risk of a bad prognosis (exceptional responders).

A cohort of 4,837 patients with knee pain seen for physical therapy was retrospective analysed using univariate and multivariate multinomial regression analyses. Modelling was used to identify characteristics associated with those who were exceptional responders and those who were exceptional non-responders.

Exceptional non-responders were significantly associated with older age, female gender, longer duration of symptoms, surgical history, lower functional status at baseline and a payer type.

Exceptional responders were significantly associated with younger age, no previous surgical history, higher functional status at baseline and a payer type. Findings may be used for managing processes involving intensity of care service and in understanding probable prognoses for each patient. Future research should continue to examine variables predictive of treatment response in patients with knee pain.

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**KEYWORDS:**

Knee pain; physical therapy; risk stratification

PMID: [27374889](https://pubmed.ncbi.nlm.nih.gov/27374889/)

**32 A. KNEE/ACL****ACL sex difference**

Am J Sports Med. 2016 Jun;44(6):1565-72. doi: 10.1177/0363546516630927. Epub 2016 Mar 3.

**Sex Differences in the Incidence of Anterior Cruciate Ligament, Medial Collateral Ligament, and Meniscal Injuries in Collegiate and High School Sports: 2009-2010 Through 2013-2014.**

Stanley LE<sup>1</sup>, Kerr ZY<sup>2</sup>, Dompier TP<sup>3</sup>, Padua DA<sup>4</sup>.

**BACKGROUND:**

Previous research has noted sex-based differences in anterior cruciate ligament (ACL) injury rates in young athletes, while little is known about medial collateral ligament (MCL) and meniscal injury rates in this population. The objective of this study was to compare injury rates for traumatic knee injuries (ie, ACL, MCL, and meniscal injuries) in collegiate and high school (HS) varsity student-athletes across multiple sports.

**HYPOTHESIS:**

Knee injury rates vary by sex and across different sports and levels of competition.

**STUDY DESIGN:**

Descriptive epidemiology study.

**METHODS:**

Injury and athlete-exposure data were utilized from the National Athletic Treatment, Injury and Outcomes Network (NATION) and National Collegiate Athletic Association (NCAA) Injury Surveillance Program (ISP) during the 2009-2010 to 2013-2014 academic years. Analyses focused on ACL, MCL, and meniscal injuries. Injury rates and injury rate ratios (IRRs) with 95% CIs were calculated for basketball, ice hockey, lacrosse, soccer, and baseball/softball.

**RESULTS:**

The ACL injury rate was higher for female than male athletes at the collegiate (IRR, 2.49; 95% CI, 1.81-3.41) and HS (IRR, 2.30; 95% CI, 1.67-3.18) levels. At the collegiate level, the highest ACL IRR comparing female to male athletes was reported in softball/baseball (IRR, 6.61; 95% CI, 1.48-29.55). At the HS level, the highest ACL IRR was reported in basketball (IRR, 3.68; 95% CI, 1.91-7.10). The MCL injury rate was higher for female than male athletes at the HS level (IRR, 2.11; 95% CI, 1.25-3.56) but lower for female than male athletes at the collegiate level (IRR, 0.73; 95% CI, 0.59-0.92). The meniscal injury rate was lower for female than male athletes at the HS level (IRR, 0.47; 95% CI, 0.31-0.71), while no differences by sex were seen at the collegiate level (IRR, 1.35; 95% CI, 0.90-2.02).

**CONCLUSION:**

Knee injury rates varied by sex across 5 different sports in the HS and collegiate settings. Female athletes sustained ACL injuries at a higher rate than male athletes at both the HS and collegiate levels in these 5 sports; however, there was not a distinct sex disparity in MCL and meniscal injuries. Future studies should examine the rates of concomitant and recurrent injuries to inform injury prevention and rehabilitation programs.

**Peak strength and injury**

Med Sci Sports Exerc. 2016 Jun 20

**Association between Lower Extremity Muscle Strength and Noncontact ACL Injuries.**

Steffen K<sup>1</sup>, Nilstad A, Kristianslund EK, Myklebust G, Bahr R, Krosshaug T.

**PURPOSE:**

To prospectively investigate the association between isolated and functional lower extremity muscle strength, and the risk for non-contact ACL injury in Norwegian female elite handball and football players.

**METHODS:**

From 2007 through 2015, premier league players participated in strength testing and were prospectively followed for ACL injury risk. At baseline, we recorded player demographics, playing and ACL injury history, and measured peak concentric isokinetic quadriceps and hamstrings torques (60°/s), HQ-ratio, isometric hip abduction strength and 1RM in a seated leg press. We followed a pre-defined statistical protocol where we generated 5 separate logistic regression models, one for each of the proposed strength risk factors and adjusted for confounding factors. New ACL injury was the outcome, using the leg as the unit of analysis.

**RESULTS:**

A total of 57 (6.6%) out of 867 players (age: 21±4 yrs; height: 170±6 cm; body mass: 66±8 kg) suffered from a non-contact ACL injury after baseline testing (1.8±1.8 yrs). The OR of sustaining a new injury among those with an ACL injury history was 3.1 (95% CI 1.6 to 6.1). None of the 5 strength variables selected were statistically associated with an increased risk of ACL rupture when adjusted for sport, dominant leg, ACL injury history, and height.

**CONCLUSION:**

Peak lower extremity strength was not associated with an increased ACL injury risk among female elite handball and football players. Hence, peak strength, as measured in the present study, cannot be used to screen elite female athletes to predict injury risk.

PMID: [27327027](#)

## ACL and OA

Am J Sports Med. 2016 Jun;44(6):1524-33. doi: 10.1177/0363546516631936. Epub 2016 Mar 10.

**Degenerative Changes in the Knee 2 Years After Anterior Cruciate Ligament Rupture and Related Risk Factors: A Prospective Observational Follow-up Study.**

van Meer BL<sup>1</sup>, Oei EH<sup>2</sup>, Meuffels DE<sup>3</sup>, van Arkel ER<sup>4</sup>, Verhaar JA<sup>3</sup>, Bierma-Zeinstra SM<sup>5</sup>, Reijman M<sup>3</sup>.

**BACKGROUND:** Anterior cruciate ligament (ACL) rupture is a well-known risk factor for development of knee osteoarthritis. Early identification of those patients at risk and early identification of the process of ACL rupture leading to osteoarthritis may aid in preventing the onset or progression of osteoarthritis.

**PURPOSE:** To identify early degenerative changes as assessed on magnetic resonance imaging (MRI) after 2-year follow-up in patients with a recent ACL rupture and to evaluate which determinants are related to these changes.

**STUDY DESIGN:** Cohort study; Level of evidence, 2.

**METHODS:** Included in this study were 154 adults aged between 18 and 45 years with acute ACL rupture diagnosed by physical examination and MRI, without previous knee trauma or surgery, and without osteoarthritic changes on radiographs. A total of 143 patients completed the 2-year follow-up, and the results in this study apply to these 143 patients. All patients were treated according to the Dutch guideline on ACL injury. Of the 143 patients, 50 patients were treated nonoperatively during the 2-year follow-up period. Main outcome was early degenerative changes assessed on MRI defined as progression of cartilage defects and osteophytes in tibiofemoral and patellofemoral compartments. Patient characteristics, activity level, functional instability, treatment type, and trauma-related variables were evaluated as determinants.

**RESULTS:**

The median time between MRI at baseline and MRI at 2-year follow-up was 25.9 months (interquartile range, 24.7-26.9 months). Progression of cartilage defects in the medial and lateral tibiofemoral compartments was present in 12% and 27% of patients, and progression of osteophytes in tibiofemoral and patellofemoral compartments was present in 10% and 8% of patients, respectively. The following determinants were positively significantly associated with early degenerative changes: male sex (odds ratio [OR], 4.43; 95% CI, 1.43-13.66;  $P = .010$ ), cartilage defect in the medial tibiofemoral compartment at baseline (OR, 3.66; 95% CI, 1.04-12.95;  $P = .044$ ), presence of bone marrow lesions in the medial tibiofemoral compartment 1 year after trauma (OR, 5.19; 95% CI, 1.56-17.25;  $P = .007$ ), joint effusion 1 year after trauma (OR, 4.19; 95% CI, 1.05-16.72;  $P = .042$ ), and presence of meniscal tears (OR, 6.37; 95% CI, 1.94-20.88;  $P = .002$ ). When the patients were categorized into 3 treatment groups (nonoperative, reconstruction <6 months after ACL rupture, and reconstruction  $\geq$ 6 months after ACL rupture), there was no significant relationship between the treatment options and the development of early degenerative changes.

**CONCLUSION:**

Two years after ACL rupture, early degenerative changes were assessed on MRI. Concomitant medial cartilage defect and meniscal injury, male sex, persistent bone marrow lesions in the medial tibiofemoral compartment, and joint effusion are risk factors for degenerative changes.



### 33. MENISCUS

#### ACL cartilage djd

*Osteoarthritis Cartilage*. 2016 Jun 24. pii: S1063-4584(16)30146-7. doi: 10.1016/j.joca.2016.06.013

#### **Articular Cartilage Degeneration following Anterior Cruciate Ligament Injury: A Comparison of Surgical Transection and Noninvasive Rupture as Preclinical Models of Post-Traumatic Osteoarthritis.**

Maerz T<sup>1</sup>, Newton MD<sup>2</sup>, Kurdziel MD<sup>3</sup>, Altman P<sup>4</sup>, Anderson K<sup>5</sup>, Matthew HW<sup>6</sup>, Baker KC<sup>7</sup>.

#### **OBJECTIVE:**

Post-traumatic osteoarthritis is commonly studied using animal models. Surgical ACL transection is an established model, but noninvasive models may mimic human injury more closely. The purpose of this study was to quantify and compare changes in 3D articular cartilage (AC) morphology following noninvasive ACL rupture and surgical ACL transection.

#### **METHODS:**

Thirty-six rats were randomized to uninjured control, noninvasive ACL rupture (Rupture), and surgical ACL transection (Transection), and 4 and 10 week time points (n=6 per group). Contrast-enhanced micro-computed tomography (CE- $\mu$ CT) was employed for AC imaging. Femoral and tibial AC were segmented and converted into thickness maps. Compartmental and sub-compartmental AC thickness and surface roughness ( $S_a$ ) were computed. OARSI histologic scoring was performed.

#### **RESULTS:**

In both injury groups, zones of adjacent thickening and thinning were evident on the medial femoral condyle, along with general thickening and roughening of femoral and tibial AC. The posterior tibia exhibited drastic thickening and surface degeneration, and this was worse in Transection. Both injury groups had increased AC thickness and  $S_a$  compared to Control at both time points, and Transection exhibited significantly higher  $S_a$  in every tibial compartment compared to Rupture. Histologic score was elevated in both groups, and the medial femur exhibited the most severe histologic degeneration.

#### **CONCLUSIONS:**

This is the first 3D quantification of preclinical AC remodeling after ACL injury. Both injury models induced similar changes in AC morphology, but Transection exhibited higher tibial  $S_a$  and a greater degree of posterior tibial degeneration. We conclude that AC degeneration is a time-, compartment-, and injury-dependent cascade.

## Cartilage volume

**Pain at sites outside the knee predicts knee cartilage volume loss in elderly people without knee osteoarthritis: A prospective study**

Arthritis Care & Research , 07/08/2016

Pan F, et al.

The physicians intended to find out if pain at multiple sites predicts knee cartilage volume loss amongst community-dwelling older adults, and provided that this is true, to explore potential mechanisms. The findings recommend that especially in people without knee osteoarthritis, number of painful sites independently predicts knee cartilage volume loss, suggesting that in those without radiographic knee osteoarthritis widespread pain may be an early marker of more rapid knee cartilage loss.

**Methods**

- Tasmanian Older Adult Cohort study was used for the data (n=394; mean age, 63 years; range 52 to 79).
- By using a questionnaire at baseline, pain experience at multiple sites was evaluated.
- In order to evaluate the cartilage volume at baseline and after 2.6 years, T1-weighted fat saturated MRI of the right knee was performed.
- Furthermore, linear regression modelling was used with adjustment for potential confounders.

**Results**

- The median number of painful sites was found to 3 (range 0-7), as per the findings.
- It was reported that there was a dose-response relationship between number of painful sites and knee cartilage volume loss at the lateral and total tibiofemoral compartments (Lateral:  $\beta=-0.28\%$  per annum; Total:  $\beta=-0.25\%$  per annum, both P for trend $<0.05$ ), and not at the medial compartment.
- In participants without radiographic knee osteoarthritis (P $<0.05$ ) these associations were stronger and independent of age, sex, body mass index, physical activity, pain medication and knee structural abnormalities

**OA progression**

Arthroscopy. 2016 Jun 10. pii: S0749-8063(16)30197-9. doi: 10.1016/j.arthro.2016.04.023.

**Risk Factors for Radiographic Progression of Osteoarthritis After Meniscus Allograft Transplantation.**

Ahn JH<sup>1</sup>, Kang HW<sup>2</sup>, Yang TY<sup>2</sup>, Lee JY<sup>2</sup>.

**PURPOSE:**

To identify risk factors that predict radiographic progression of osteoarthritis after meniscus allograft transplantation (MAT) using multivariate logistic regression.

**METHODS:**

Inclusion criteria were consecutive patients who underwent medial or lateral MATs from January 2005 to September 2012 by one surgeon. Exclusion criteria were lack of postoperative magnetic resonance image, loss to follow-up for a minimum of 3 years, and simultaneous surgery on articular cartilage or the anterior cruciate ligament. According to the change of Kellgren-Lawrence (KL) grade at the mean final follow-up of 56.2 months, the enrolled MATs were sorted into the no progression of osteoarthritis (NOA) and progression of osteoarthritis (POA) groups. Multivariate logistic regression was used to analyze risk factors, including age, sex, body mass index, time from previous meniscectomy to MAT, extent of previous meniscectomy, previous anterior cruciate ligament reconstruction, knee alignment angle, KL grade, side of transplanted meniscus, Outerbridge grade, posterior repair technique, and relative percentage of extrusion.

**RESULTS:**

In comparison between the NOA (n = 38) and the POA (n = 31) groups, a significant risk factor for radiographic progression of osteoarthritis after MAT was medial MAT compared with lateral MAT. Medial MAT compared with lateral MAT was also a significant risk factor (adjusted odds ratio, 3.763; 95% confidence interval, 1.212-11.683).

**CONCLUSIONS:**

Patients need to be counseled about the increased risk of osteoarthritis progression after MAT over time, particularly for medial MAT.

**LEVEL OF EVIDENCE:**

Level III, retrospective case control study.

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**37. OSTEOARTHRITIS/KNEE****Exercise and risk of falls**

Knee. 2016 Jun 14. pii: S0968-0160(16)30049-7. doi: 10.1016/j.knee.2016.05.006.

**The effectiveness of an exercise programme on dynamic balance in patients with medial knee osteoarthritis: A pilot study.**

Al-Khlaifat L<sup>1</sup>, Herrington LC<sup>2</sup>, Tyson SF<sup>3</sup>, Hammond A<sup>2</sup>, Jones RK<sup>2</sup>.

**BACKGROUND:**

Dynamic balance and quiet standing balance are decreased in knee osteoarthritis (OA), with dynamic balance being more affected. This study aimed to investigate the effectiveness of a group exercise programme of lower extremity muscles integrated with education on dynamic balance using the Star Excursion Balance test (SEBT) in knee OA.

**METHODS:**

Experimental before-and-after pilot study design. Nineteen participants with knee OA attended the exercise sessions once a week for six weeks, in addition to home exercises. Before and after the exercise programme, dynamic balance was assessed using the SEBT in the anterior and medial directions in addition to hip and knee muscle strength, pain, and function.

**RESULTS:**

Fourteen participants completed the study. Dynamic balance on the affected side demonstrated significant improvements in the anterior and medial directions ( $p=0.02$  and  $p=0.01$ , respectively). The contralateral side demonstrated significant improvements in dynamic balance in the anterior direction ( $p<0.001$ ). However, balance in the medial direction did not change significantly ( $p=0.07$ ). Hip and knee muscle strength, pain, and function significantly improved ( $p<0.05$ ) after the exercise programme.

**CONCLUSIONS:**

This is the first study to explore the effect of an exercise programme on dynamic balance using the SEBT in knee OA. The exercise programme was effective in improving dynamic balance which is required in different activities of daily living where the patients might experience the risk of falling. This might be attributed to the improvement in muscle strength and pain after the exercise programme.

**38 A. FOOT AND ANKLE****Foot and ankle measurements**

**J Foot Ankle Surg. 2016 Jun 16. pii: S1067-2516(16)30078-3. doi: 10.1053/j.jfas.2016.05.005.**

**Normal Foot and Ankle Radiographic Angles, Measurements, and Reference Points.**

Lamm BM<sup>1</sup>, Stasko PA<sup>2</sup>, Gesheff MG<sup>3</sup>, Bhave A<sup>4</sup>.

The limb deformity-based principles originate from a standard set of lower extremity radiographic angles and reference points. Objective radiographic measures are the building blocks for surgical planning. Critical preoperative planning and intraoperative and postoperative evaluation of radiographs are essential for proper deformity planning and correction of all foot and ankle cases. A total of 33 angles and reference points were measured on 24 healthy feet. The radiographic measurements were performed on standard weightbearing anteroposterior, lateral, and axial views of the right foot. A total of 4 measurements were made from the axial view, 12 from the lateral view, and 17 from the anteroposterior view. All angles were measured by both senior authors twice, independent of each other. The radiographic angles and measurements presented in the present study demonstrate a comprehensive and useful set of standard angles, measures, and reference points that can be used in clinical and perioperative evaluation of the foot and ankle. The standard radiographic measures presented in the present study provide the foundation for understanding the osseous foot and ankle position in a normal population.

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**KEYWORDS:**

ankle; foot; normal ankle angles; normal foot angles; radiographic angles

PMID: [27320694](#)

**39 B. SHOES****Minimalist running shoes**

Am J Sports Med. 2016 Jun;44(6):1439-46. doi: 10.1177/0363546516630926. Epub 2016 Mar 7.

**Minimalist Running Shoes and Injury Risk Among United States Army Soldiers.**

Grier T<sup>1</sup>, Canham-Chervak M<sup>2</sup>, Bushman T<sup>2</sup>, Anderson M<sup>2</sup>, North W<sup>3</sup>, Jones BH<sup>2</sup>.

**BACKGROUND:**

Minimalist running shoes (MRS) are lightweight, are extremely flexible, and have little to no cushioning. It has been thought that MRS will enhance running performance and decrease injury risk.

**PURPOSE:**

To compare physical characteristics, fitness performance, and injury risks associated with soldiers wearing MRS and those wearing traditional running shoes (TRS).

**STUDY DESIGN:**

Case series; Level of evidence, 4.

**METHODS:**

Participants were men in a United States Army brigade (N = 1332). Physical characteristics and Army Physical Fitness Test data were obtained by survey. Fitness performance testing was administered at the brigade, and the types of footwear worn were identified by visual inspection. Shoe types were categorized into 2 groups: TRS (stability, cushioning, and motion control) and MRS. Injuries from the previous 12 months were obtained from the Defense Medical Surveillance System. A t test was used to determine mean differences between personal characteristics, training, and fitness performance metrics by shoe type. Hazard ratios and 95% CIs were calculated to determine injury risk by shoe type, controlling for other risk factors.

**RESULTS:**

A majority of soldiers wore cushioning shoes (57%), followed by stability shoes (24%), MRS (17%), and motion control shoes (2%). Soldiers wearing MRS were slightly younger than those wearing TRS (P < .01); performed more push-ups, sit-ups, and pull-ups (P < .01); and ran faster during the 2-mile run (P = .01). When other risk factors were controlled, there was no difference in injury risk for running shoe type between soldiers wearing MRS compared with TRS.

**CONCLUSIONS:**

Soldiers who chose to wear MRS were younger and had higher physical performance scores compared with soldiers wearing TRS. When these differences are controlled, use of MRS does not appear to be associated with higher or lower injury risk in this population.

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**KEYWORDS:**

exercise; footwear; performance; shod

PMID: [26951073](#)

**40. ANKLE SPRAINS AND INSTABILITY****Ankle instability and diaphragm inhibition go together**

Med Sci Sports Exerc. 2016 May 26.

**Diaphragm Contractility in Individuals with Chronic Ankle Instability.**

Terada M<sup>1</sup>, Kosik KB, McCann RS, Gribble PA.

***INTRODUCTION/PURPOSE:***

Previous investigations have identified impaired trunk and postural stability in individuals with chronic ankle instability (CAI). The diaphragm muscle contributes to trunk and postural stability by modulating the intra-abdominal pressure. A potential mechanism that could help to explain trunk and postural stability deficits may be related to altered diaphragm function due to supraspinal sensorimotor changes with CAI. The purpose of this study was to examine the diaphragm contractility in individuals with CAI and healthy controls.

***METHODS:***

Twenty-seven participants with self-reported CAI and 28 healthy control participants volunteered. A portable ultrasound unit was used to visualize and measure the right and left hemi-diaphragm thickness at the end of resting inspiration and expiration in supine while breathing quietly. The diaphragm movement was imaged and recorded on B-mode ultrasonography. The degree of diaphragm contractility was calculated from the mean of three images from the end of resting inspiration and expiration. Independent t-tests were utilized to compare the degree of diaphragm thickness of right and left sides between the CAI and control groups.

***RESULTS:***

The CAI group had a smaller degree of left hemi-diaphragm contractility compared to the control group ( $p=0.03$ ). There was no between-group difference in other diaphragm variables.

***CONCLUSION:***

Individuals with CAI appear to have altered diaphragm contractility, which may be an illustration of diaphragm dysfunction and central nervous system changes in CAI population. The association between CAI and altered diaphragm contractility provides clinicians a more comprehensive awareness of proximal impairments associated with CAI. Future investigation is needed to determine if altered contractility of the diaphragm contributes to functional impairments, activity limitations, and participant restrictions commonly observed in patients with CAI.

PMID: [27232242](https://pubmed.ncbi.nlm.nih.gov/27232242/)

### 43. HALLUX VALGUS

#### Bunion

#### PERSPECTIVES FOR PATIENTS

#### **Bunion: Strengthening Foot Muscles to Reduce Pain and Improve Mobility**

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**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2016 **Volume:**46 **Issue:**7 **Pages:**606–606 **DOI:**10.2519/jospt.2016.0504

Foot pain discourages physical activity, and less activity harms overall health. Bunion, extra bone and tissue at the base of the big toe, is a frequent cause of foot pain.

More than 64 million Americans have bunions that can lead to painful walking. Bunions affect some 35% of women over the age of 65. Bunions can be removed by surgery, which can reduce pain and improve your ability to walk and exercise, but up to 15% of bunions return. Weak muscles may play a role in bunion-related pain and movement problems.

In a review of prior research and commentary on this topic published in the July 2016 issue of *JOSPT*, the author identifies muscle-strengthening exercises that may help people with bunions.

*J Orthop Sports Phys Ther* 2016;46(7):606. doi:10.2519/jospt.2016.0504

Keyword: bunion, foot, muscle-strengthening exercises



Exercise improve

### CLINICAL COMMENTARY

## Treatment of Progressive First Metatarsophalangeal Hallux Valgus Deformity: A Biomechanically Based Muscle-Strengthening Approach

**Authors:** Ward M. Glasoe, PT, PhD, ATC<sup>1</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2016 **Volume:**46 **Issue:**7 **Pages:**596–605 **DOI:**10.2519/jospt.2016.6704

### Synopsis

Hallux valgus is a progressive deformity of the first metatarsophalangeal joint that changes the anatomy and biomechanics of the foot.

To date, surgery is the only treatment to correct this deformity, though the recurrence rate is as high as 15%. This clinical commentary provides instruction in a strengthening approach for treatment of hallux valgus deformity, by addressing the moment actions of 5 muscles identified as having the ability to counter the hallux valgus process. Unlike surgery, muscle strengthening does not correct the deformity, but, instead, reduces the pain and associated gait impairments that affect the mobility of people who live with the disorder. This review is organized in 4 parts. Part 1 defines the terms of foot motion and posture.

Part 2 details the anatomy and biomechanics, and describes how the foot is changed with deformity.

Part 3 details the muscles targeted for strengthening; the intrinsic being the abductor hallucis, adductor hallucis, and the flexor hallucis brevis; the extrinsic being the tibialis posterior and fibularis longus. Part 4 instructs the exercise and reviews the related literature. Instructions are given for the short-foot, the toe-spread-out, and the heel-raise exercises.

The routine may be performed by almost anyone at home and may be adopted into physical therapist practice, with intent to strengthen the foot muscles as an adjunct to almost any protocol of care, but especially for the treatment of hallux valgus deformity.

*J Orthop Sports Phys Ther* 2016;46(7):596–605. Epub 6 Jun 2016. doi:10.2519/jospt.2016.6704

**Keyword:** first ray, foot bunion, hallux, therapeutic exercise

## 44. RHUMATOID ARTHRITIS

### Smoking and RA

#### **Incidence of chronic persistent rheumatoid arthritis and the impact of smoking**

Arthritis Care & Research , 07/08/2016

**S**vendsen AJ, et al.

In a population based cohort of twins, the expectation is to gauge the incidence of chronic persistent rheumatoid arthritis (RA) and in addition to assess the impact of smoking. Further exploration reveal that the when compared to the the incidence figures reported in inception cohort, it is reported that incidence of chronic persistent RA is lower. After 20 years of smoking in both sexes, it is smoking duration not the intensity, which doubled the risk of RA.

#### Methods

- The clinicians characterized 157 cases of RA among 45,280 responders (response rate 80%), in a historical cohort study on twins born 1920 to 1982.
- By using questionnaire and interview, information on smoking was obtained.
- With the purpose to estimate incidence rate ratios with age, sex, smoking duration and smoking intensity as covariates, a mixed effect Poisson regression model was used.
- To study a possible effect of period or cohort in addition to age on the variation of the incidence, SplitLexis procedure in the Epi R package have been utilized.

#### Results

- As per the outcomes 18.8 per 100,000 person years aged 15-73 years (females 25.2, males 12.0) was the annual incidence of chronic persistent RA, increasing with age to a maximum at sixty years in females and seventy years in males.
- After 30 pack-years, the incidence rate ratio among ever smoking patients was 1.96 (95% CI: 1.43 – 3.76), 1.93 (95% CI: 1.00 – 3.7), and 1.034 ( $p < 0.001$ ) per year of smoking implying a doubling of risk after 20 years regardless of sex and smoking intensity.
- Significant period or cohort effects were not detected.

## Subgrouping arthritis

**Three subgroups of pain profiles identified in 227 women with arthritis: A latent class analysis**

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Clinical Rheumatology, 07/07/2016

**d**e Luca K, et al.

A latent class analysis based upon the multi-dimensional nature of their pain experience, was conducted with the focus to determine subgroups of women with arthritis and to compare health and socio-demographic variables between subgroups. Further to this a stronger understanding of profiles of pain and may contribute to the development of treatment options in arthritis are provided by the the preliminary findings.

**Methods**

- In this work to identify clusters of women based upon the sensory, affective, and cognitive dimensions of the pain experience, a latent class analysis of 227 women with self-reported arthritis was utilized.
- With the focus to determine the relationship between cluster membership and health and sociodemographic characteristics, multivariate multinomial logistic regression analysis was used.
- It was found that a three-class cluster model was most parsimonious.
- Reportedly, 38.6 % of women had moderate multidimensional pain profile that included additional pain symptomatology such as sensory qualities and pain catastrophizing; and 21.9 % of women had severe multidimensional pain profile that included prominent pain symptomatology such as sensory and affective qualities of pain, pain catastrophizing, and neuropathic pain; 39.5 % of women had a unidimensional pain profile.

**Results**

- Results revealed that women with severe multidimensional pain profile have a 30.5 % higher risk of poorer quality of life and a 7.3 % higher risk of suffering depression, and when compared to women with unidimensional pain, women with moderate multidimensional pain profile have a 6.4 % higher risk of poorer quality of life.
- In older women with arthritis, this study identified three distinct subgroups of pain profiles.
- Women reported very different experiences of pain, and cluster membership impacted on health-related quality of life.

**Pneumonia**

Rheumatol Int. 2016 Jul 2.

**Influenza and pneumococcal vaccination in patients with rheumatoid arthritis in comparison with age- and sex-matched controls: results of a claims data analysis.**

Luque Ramos A<sup>1</sup>, Hoffmann F<sup>2</sup>, Callhoff J<sup>3</sup>, Zink A<sup>3,4</sup>, Albrecht K<sup>3</sup>.

The aim of this study was to assess the vaccination status for influenza and pneumonia and the prevalence of hospitalised pneumonia in rheumatoid arthritis (RA) patients and population controls in Germany.

Members of a large statutory health insurance fund in Germany who were continuously insured between 2009 and 2013 and had a diagnosis of RA in 2013 were age and sex matched 1:5 to members without RA. Pneumococcal and influenza vaccinations were evaluated with regard to age, sex and region of residence. Logistic regression models were used to determine predictors for influenza vaccination in RA patients. Prevalences of pneumonia that required hospitalisation were compared to regional vaccination rates. The data of 111,482 RA patients and 557,410 matched controls were available for analysis. Compared to controls, RA patients were vaccinated more frequently against influenza (40.8 vs. 32.2 %) and pneumonia (15.0 vs. 10.0 %). Vaccination rates increased with older age and differed between the federal states (highest in East Germany, lowest in South Germany). The region of residence, comorbidities, rheumatologic care and biologic treatment was associated with a higher probability of an influenza vaccination.

Prevalences of pneumonia that required hospitalisation were 2-3 times higher in patients compared to controls and tended to be higher in regions with low vaccination rates. The increased pneumonia prevalence in RA patients confirms their status as a risk group. RA patients are vaccinated more frequently than controls, but vaccination rates are still low. The lower pneumonia prevalence in East Germany indicates that vaccination may help to reduce pneumonia in RA.

**KEYWORDS:**

Influenza; Pneumonia; Rheumatoid arthritis; Vaccination

PMID: [27372078](#)

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Kinesio taping****RESEARCH REPORT****Kinesio Taping Does Not Provide Additional Benefits in Patients With Chronic Low Back Pain Who Receive Exercise and Manual Therapy: A Randomized Controlled Trial**

**Authors:** Marco Aurélio Nemitalla Added, PT, MSc<sup>1</sup>, Leonardo Oliveira Pena Costa, PT, PhD<sup>1,2</sup>, Diego Galace de Freitas, PT, PhD<sup>3</sup>, Thiago Yukio Fukuda, PT, PhD<sup>3</sup>, Renan Lima Monteiro, PT, MSc<sup>3</sup>, Evelyn Cassia Salomão, PT, MSc<sup>1</sup>, Flávia Cordeiro de Medeiros, PT<sup>1</sup>, Lucíola da Cunha Menezes Costa, PT, PhD<sup>1</sup>

**Study Design** Randomized controlled trial.

**Background**

Many clinical practice guidelines endorse both manual therapy and exercise as effective treatment options for patients with low back pain. To optimize the effects of the treatments recommended by the guidelines, a new intervention known as Kinesio Taping is being widely used in these patients.

**Objectives**

To determine the effectiveness of Kinesio Taping in patients with chronic nonspecific low back pain when added to a physical therapy program consisting of exercise and manual therapy.

**Methods**

One hundred forty-eight patients with chronic nonspecific low back pain were randomly allocated to receive 10 (twice weekly) sessions of physical therapy, consisting of exercise and manual therapy, or the same treatment with the addition of Kinesio Taping applied to the lower back. The primary outcomes were pain intensity and disability (5 weeks after randomization) and the secondary outcomes were pain intensity, disability (3 months and 6 months after randomization), global perceived effect, and satisfaction with care (5 weeks after treatment). Data were collected by a blinded assessor.

**Results**

No between-group differences were observed in the primary outcomes of pain intensity (mean difference, -0.01 points; 95% confidence interval [CI]: -0.88, 0.85) or disability (mean difference, 1.14 points; 95% CI: -0.85, 3.13) at 5 weeks' follow-up. In addition, no between-group differences were observed for any of the other outcomes evaluated, except for disability 6 months after randomization (mean difference, 2.01 points; 95% CI: 0.03, 4.00) in favor of the control group.

**Conclusion**

Patients who received a physical therapy program consisting of exercise and manual therapy did not get additional benefit from the use of Kinesio Taping.

**Level of Evidence** therapy, level 1b. Prospectively registered May 28, 2013 at [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov) (NCT01866332). *J Orthop Sports Phys Ther* 2016;46(7):506–513. *Epub* 6 Jun 2016. doi:10.2519/jospt.2016.6590 Keyword: exercise, manual therapy, tape

## Lumbar extension

**RESEARCH REPORT****Spine Kinematics During Prone Extension in People With and Without Low Back Pain and Among Classification-Specific Low Back Pain Subgroups**

**Authors:** Brittney Mazzone, DPT<sup>1</sup>, Ron Wood, DPT, OCS, GCS<sup>1,2</sup>, Sara Gombatto, PT, PhD<sup>3</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2016 **Volume:**46 **Issue:**7 **Pages:**571–579 **DOI:**10.2519/jospt.2016.6159

**Study Design**

Cross-sectional observational design.

**Background**

Spine extension is used in physical therapy during examination and treatment for low back pain (LBP). However, kinematics during prone extension have not been examined using 3-D motion capture.

**Objectives**

The primary purpose was to determine differences in spine kinematics during prone extension between subjects with and without LBP. An exploratory analysis was conducted to examine kinematic differences among LBP subgroups.

**Methods**

Kinematics of the thoracic and lumbar spine were examined during prone extension, using optical motion capture, in 18 subjects with LBP and 17 subjects without LBP (control group). Excursion of each spinal region was calculated for the entire movement and during 25% increments of extension movement duration. Subjects with LBP were examined and assigned to subgroups using 3 different classification systems for LBP. Repeated-measures analysis-of-variance tests were used to examine effects of group (LBP, control), spine region, and increment of movement duration, and to explore effects of LBP subgroup.

**Results**

For spine kinematics, there was a significant group-by-region interaction effect ( $P < .05$ ). Subjects with LBP displayed less lower lumbar extension ( $13.3^\circ \pm 4.9^\circ$ ) than control subjects ( $21.4^\circ \pm 9.2^\circ$ ). The majority of lower lumbar extension occurred during the first 50% of the motion for subjects with LBP. Subgroup-by-region interaction effects were significant for 2 of 3 LBP classification systems ( $P < .05$ ).

**Conclusion**

Subjects with LBP displayed less lower lumbar extension than control subjects during prone extension. These differences should be considered when evaluating and prescribing prone extension. The interpretation of subgroup differences with prone extension kinematics is limited in the current study by the small sample size, but may need to be considered in future studies of spine kinematics.

**Level of Evidence** Diagnosis, level 4. *J Orthop Sports Phys Ther* 2016;46(7):571–579. Epub 12 May 2016. doi:10.2519/jospt.2016.6159 **Keyword:** lumbar spine, movement, press-up

**45 B. MANUAL THERAPY CERVICAL****Effectiveness of cervical manip.**

Spine J. 2016 Jun 23. pii: S1529-9430(16)30272-8. doi: 10.1016/j.spinee.2016.06.014.

**Cost-effectiveness of spinal manipulative therapy, supervised exercise, and home exercise for older adults with chronic neck pain.**

Leininger B<sup>1</sup>, McDonough C<sup>2</sup>, Evans R<sup>3</sup>, Tosteson T<sup>4</sup>, Tosteson AN<sup>5</sup>, Bronfort G<sup>3</sup>.

**BACKGROUND CONTEXT:**

Chronic neck pain is a prevalent and disabling condition among older adults. Despite the large burden of neck pain, little is known regarding the cost-effectiveness of commonly used treatments.

**PURPOSE:** To estimate the cost-effectiveness of home exercise and advice (HEA), spinal manipulative therapy (SMT) plus HEA, and supervised rehabilitative exercise (SRE) plus HEA.

**STUDY DESIGN/SETTING:**

Cost-effectiveness analysis conducted alongside a randomized clinical trial (RCT).

**PATIENT SAMPLE:**

241 older adults ( $\geq 65$  years) with chronic mechanical neck pain.

**OUTCOME MEASURES:**

Direct and indirect costs, neck pain, neck disability, SF-6D-derived quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios over a one-year time horizon.

**METHODS:**

This work was supported by grants from the National Center for Complementary and Integrative Health (#F32AT007507), National Institute of Arthritis and Musculoskeletal and Skin Diseases (#P60AR062799), and Health Resources and Services Administration (#R18HP01425). The RCT is registered at ClinicalTrials.gov (#NCT00269308). The primary analysis adopted a societal perspective, a healthcare perspective was adopted as a sensitivity analysis. Cost-effectiveness was a secondary aim of the RCT which was not powered for differences in costs or QALYs. Differences in costs and clinical outcomes were estimated using generalized estimating equations and linear mixed models, respectively. Cost-effectiveness acceptability curves were calculated to assess the uncertainty surrounding cost-effectiveness estimates.

**RESULTS:**

Total costs for SMT+HEA were 5% lower than HEA (mean difference: -\$111; 95%CI -\$1,354 to \$899) and 47% lower than SRE+HEA (mean difference: -\$1,932; 95%CI -\$2,796 to -\$1,097). SMT+HEA also resulted in a greater reduction of neck pain over the year relative to HEA (0.57; 95%CI 0.23 to 0.92) and SRE+HEA (0.41; 95%CI 0.05 to 0.76). Differences in disability and QALYs favored SMT+HEA. The probability that adding SMT to HEA is cost-effective at willingness to pay thresholds of \$50,000 to \$200,000 per QALY gained ranges from 0.75 to 0.81. If adopting a healthcare perspective, costs for SMT+HEA were 66% higher than HEA (mean difference: \$515; 95%CI \$225 to \$1,094), resulting in an ICER of \$55,975 per QALY gained.

**CONCLUSIONS:**

On average, SMT+HEA resulted in better clinical outcomes and lower total societal costs relative to SRE+HEA and HEA alone, with a 0.75 to 0.81 probability of cost-effectiveness for willingness to pay thresholds of \$50,000 to \$200,000 per QALY

**45 D. MANUAL THERAPY EXTREMITIES****Manip corticospinal impact****RESEARCH REPORT****The Effect of Velocity of Joint Mobilization on Corticospinal Excitability in Individuals With a History of Ankle Sprain**

**Authors:** Beth E. Fisher, PT, PhD, FAPTA<sup>1</sup>, Andrew Piraino, DPT, OCS, CSCS<sup>1,2</sup>, Ya-Yun Lee, PT, PhD<sup>1,3</sup>, Jo Armour Smith, PT, PhD<sup>1,4</sup>, Sean Johnson, DPT, OCS<sup>1</sup>, Todd E. Davenport, DPT, MPH, OCS<sup>5</sup>, Kornelia Kulig, PT, PhD, FAPTA<sup>1</sup>

**AFFILIATIONS:**

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2016 **Volume:**46 **Issue:**7 **Pages:**562–570 **DOI:**10.2519/jospt.2016.6602

**Study Design** Controlled laboratory study.

**Background**

Joint mobilization and manipulation decrease pain and improve patient function. Yet, the processes underlying these changes are not well understood. Measures of corticospinal excitability provide insight into potential mechanisms mediated by the central nervous system.

**Objectives**

To investigate the differential effects of joint mobilization and manipulation at the talocrural joint on corticospinal excitability in individuals with resolved symptoms following ankle sprain.

**Methods**

Twenty-seven participants with a history of ankle sprain were randomly assigned to the control, joint mobilization, or thrust manipulation group. The motor-evoked potential (MEP) and cortical silent period (CSP) of the tibialis anterior and gastrocnemius were obtained with transcranial magnetic stimulation at rest and during active contraction of the tibialis anterior. The slopes of MEP/CSP input/output curves and the maximal MEP/CSP values were calculated to indicate corticospinal excitability. Behavioral measures, including ankle dorsiflexion and dynamic balance, were evaluated.

**Results**

A repeated-measures analysis of variance of the MEP slope showed a significant group-by-time interaction for the tibialis anterior at rest ( $P = .002$ ) and during active contraction ( $P = .042$ ). After intervention, the thrust manipulation group had an increase in corticospinal excitability, while the corticospinal excitability decreased in the mobilization group. The thrust manipulation group, but not other groups, also demonstrated a significant increase in the maximal MEP amplitude of the tibialis anterior after intervention.

**Conclusion**

The findings suggest that joint manipulation and mobilization have different effects on corticospinal excitability. The increased corticospinal excitability following thrust manipulation may provide a window for physical therapists to optimize muscle recruitment and subsequently movement. The trial was registered at [ClinicalTrials.gov](http://ClinicalTrials.gov) (NCT00847769). *J Orthop Sports Phys Ther* 2016;46(7):562-570. Epub 6 Jun 2016. doi:10.2519/jospt.2016.6602

**Keyword:** ankle sprain, corticospinal excitability, manipulation, manual therapy, mobilization



## 55. SCOLIOSIS

### Avoid surgery

#### Look-back study suggests some major scoliosis surgeries can be avoided

Johns Hopkins Medicine, 07/07/2016

In a look-back study of medical records, researchers at Johns Hopkins Medicine concluded that a major operation to fuse the spines of children with a rare form of severe, early-onset scoliosis can be eliminated in many cases. “We have long thought this big final fusion surgery, after years of spine straightening treatment, was always necessary, and now we have found that that’s not true,” says Paul Sponseller, M.D., a pediatric orthopaedic surgeon at the Johns Hopkins University School of Medicine and an author of a report on the study appeared on July 6 in *The Journal of Bone & Joint Surgery*.

Sponseller and his colleagues combed through an international database and picked out the records of 167 children who received growing rod treatments between 1995 and 2010. Some 137 of those patients underwent the final fusion, but Sponseller focused on the outcomes of the 30 who, in consultation with their doctors, opted out of that procedure. Half of those 30 patients were female; their mean age at first surgery was 7.1 years. They underwent an average of 5.4 lengthening procedures, and there was a mean of 3.7 years of follow-up after their last surgery. The team found that in the three to seven years following their last growing rod surgery, the spines of 26 stayed straight. The remaining four patients were considered special cases because their rods got infected and had to be removed. Sponseller cautions that the study was small and based on records from a variety of institutions, and that children who forgo the final fusion will require “continued observation” over the long haul. Moreover, he says, further research is needed to determine if similar results will be found for children receiving newer rod implants that can be lengthened magnetically without multiple operations.

Nonetheless, he says, the Johns Hopkins findings suggest that the hundreds of early-onset scoliosis patients currently reaching their mature height in the U.S. can likely forgo a “grueling” final procedure.

**56. ATHLETICS****Mechanism of knee injury**

Scand J Med Sci Sports. 2016 Jun 10. doi: 10.1111/sms.12705.

**Muscular and neuromuscular control following soccer-specific exercise in male youth: Changes in injury risk mechanisms.**

Lehnert M<sup>1</sup>, De Ste Croix M<sup>2</sup>, Zaatar A<sup>1</sup>, Hughes J<sup>2</sup>, Varekova R<sup>1</sup>, Lastovicka O<sup>1</sup>.

Poor neuromuscular control has been proposed as a risk factor for non-contact injuries, thus this study aimed to explore the effects of soccer-specific fatigue on leg muscle activation, reactive strength, leg stiffness, and functional hamstring/quadriceps ratio ( $H/Q_{\text{FUNC}}$ ) in elite male youth soccer players.

Outcome measures were determined in 18 youth players (age  $14.4 \pm 0.5$  years; stature  $169.4 \pm 9.9$  cm; mass  $59.3 \pm 8.9$  kg; maturity offset  $0.86 \pm 0.88$  years) pre and post simulated soccer match play (SAFT<sup>90</sup>). There was no fatigue-related change in the  $H/Q_{\text{FUNC}}$ ; however, reactive strength and leg stiffness were both compromised ( $P < 0.001$ ) after soccer-specific fatigue. Muscle activation was also locally compromised ( $P < 0.001$ ) in the medial hamstring and quadriceps but not in the lateral muscles. Where statistically significant changes were observed, the effect sizes ranged from small to large (0.33-0.97).

Compromised stiffness when fatigue is present suggests an increased yielding action, greater ground contact times, greater center of mass displacement, and less efficient movement when the limb comes into contact with the ground. This combined with a reduction in medial quadriceps muscle activation may reflect poor kinetic chain control at the hip and an increase in knee injury risk.

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**KEYWORDS:**

EMG ; Fatigue; isokinetic; leg stiffness; reactive strength

PMID:[27283749](#)

**Little league shoulder**

Am J Sports Med. 2016 Jun;44(6):1431-8. doi: 10.1177/0363546516632744. Epub 2016 Mar 16.

**Trends in the Presentation, Management, and Outcomes of Little League Shoulder.**

Heyworth BE<sup>1</sup>, Kramer DE<sup>2</sup>, Martin DJ<sup>2</sup>, Micheli LJ<sup>2</sup>, Kocher MS<sup>2</sup>, Bae DS<sup>2</sup>.

**BACKGROUND:**

With rising participation in youth sports such as baseball, proximal humeral epiphysiolysis, or Little League shoulder (LLS), is being seen with increasing frequency. However, there remains a paucity of literature regarding the causes, natural history, or treatment outcomes of LLS.

**PURPOSE:**

To analyze the demographic, clinical, and diagnostic features of a population of LLS patients, with an emphasis on identifying underlying risk factors for the development and recurrence of LLS after nonoperative treatment.

**STUDY DESIGN:**

Case series; Level of evidence, 4.

**METHODS:**

A departmental database at a high-volume regional children's hospital was queried to identify cases of LLS between 1999 and 2013. Medical records were reviewed to allow for analysis of age, sex, athletic information, physical examination and radiologic findings, treatment details, clinical course, and rates of recurrence.

**RESULTS:**

Ninety-five patients (93 males, 2 females; mean age, 13.1 years; range, 8-16 years) were diagnosed with LLS. The number of diagnosed cases increased annually over the study period. All patients had shoulder pain with overhead athletics; secondary symptoms included elbow pain in 13%, shoulder fatigue or weakness in 10%, and mechanical symptoms in 8%. While the majority of patients (97%) were baseball players (86% pitchers, 8% catchers, 7% other positions), a small subset (3%) were tennis players. On physical examination, 30% were reported to have glenohumeral internal rotation deficit (GIRD), defined as a decreased arc of rotational range of motion of the shoulder. Treatment recommendations included rest in 99% of cases, physical therapy in 79% (including 100% of patients with GIRD), and position change upon return to play in 26%. Average time to full resolution of symptoms was 2.6 months, while average time to return to competition was 4.2 months. Recurrent symptoms were reported in 7% of the overall cohort at a mean of 7.6 months after initial diagnosis. The odds of recurrence in the group with diagnosed GIRD (14%) were 3.6 times greater than those without GIRD (5%; 95% CI: 0.7-17.1), but this difference was not statistically significant ( $P = .11$ ).

**CONCLUSION:**

Little League shoulder is being diagnosed with increasing frequency. While most common in male baseball pitchers, the condition can occur in females, youth catchers, other baseball positions players, and tennis players. Concomitant elbow pain may be seen in up to 13%. After rest and physical therapy, recurrent symptoms may occur in a small subset of patients (7%), generally 3 to 6 months after return to sports. Almost one-third of LLS patients had GIRD, and this group had approximately three times higher probability of recurrence compared with those without GIRD.

**59. PAIN****Chronic pain and performance**

Clin J Pain. 2016 Jul;32(7):609-16. doi: 10.1097/AJP.0000000000000239.

**Attention and Working Memory in Female Adolescents With Chronic Pain and Pain-free Female Adolescents: A Preliminary Pilot Study.**

Mifflin K<sup>1</sup>, Chorney J, Dick B.

**OBJECTIVES:**

Adolescents with chronic pain often report inattention and poor memory. There has been little research on cognitive function in this population. The goal of this preliminary pilot study was to examine differences in cognitive function between adolescents with chronic pain to pain-free adolescents.

**MATERIALS AND METHODS:**

All participants completed baseline assessments of pain, school absences, depression, anxiety, and sleep habits. Standardized neurocognitive tests were used to examine cognitive function with a focus on working memory and attention.

**RESULTS:**

Recruitment from the chronic pain clinic resulted in a female sample of 13 individuals (largely reflective of the clinical population). Pain-free age-matched and sex-matched individuals (n=12) were therefore also recruited as controls. Individuals with chronic pain had significantly lower working memory scores than controls. Differences were found between groups on the most difficult selective attention task and not on tests of sustained attention, divided attention, or attentional switching. In a stepwise regression with baseline characteristics entered in the first step, pain accounted for approximately 15% of the variance in working memory and medication score counted for 49% of the variance.

**DISCUSSION:**

This pilot study is the first study to examine differences in working memory and attention between participants with chronic pain and pain-free adolescents. Our findings suggest that chronic pain may negatively affect adolescents' working memory function and highlights the risk for cognitive difficulties and problems with educational progression in addition to negative health and social effects associated with chronic pain. The study provides a starting point for more research and has the potential to direct better identification and treatment of these cognitive deficits.

PMID: [27275532](https://pubmed.ncbi.nlm.nih.gov/27275532/)

**Cognitive fusion**

Clin J Pain. 2016 Jul;32(7):602-8. doi: 10.1097/AJP.0000000000000227.

**Cognitive Fusion and Pain Experience in Young People.**

Solé E<sup>1</sup>, Tomé-Pires C, de la Vega R, Racine M, Castarlenas E, Jensen MP, Miró J.

Abstract

**OBJECTIVES:**

Acceptance and Commitment Therapy (ACT) has been shown to be an effective treatment for chronic pain in young people. Cognitive fusion is a key concept of ACT that is hypothesized to contribute to distress and suffering. In this study, we sought to: (1) test hypothesized associations between cognitive fusion and pain intensity, disability, and catastrophizing; and (2) examine the function of cognitive fusion as a possible mediator between catastrophizing and disability.

**METHODS:**

A community sample of 281 young people (11 to 20 y) completed measures assessing cognitive fusion, pain intensity, disability, and pain catastrophizing.

**RESULTS:**

Cognitive fusion was positively related to pain intensity ( $r=0.24$ ,  $P<0.01$ ), disability ( $r=0.32$ ,  $P<0.001$ ), and pain catastrophizing ( $r=0.47$ ,  $P<0.001$ ). Moreover, cognitive fusion was found to mediate the association between pain catastrophizing and disability ( $\beta=0.01$ , 95% confidence interval=0.002-0.024, 5000 bootstrap resamples).

**DISCUSSION:**

The findings indicate that cognitive fusion is moderately to strongly associated with pain-related outcomes, which support the need for further research to (1) better understand the relationship between cognitive fusion and adjustment to chronic pain, and (2) determine whether the benefits of treatments such as ACT are mediated, at least in part, by reductions in cognitive fusion.

PMID:25803755

**Chronic pain does not impact mortality**

Pain. 2016 Jul;157(7):1443-7. doi: 10.1097/j.pain.0000000000000537.

**Chronic musculoskeletal complaints as a predictor of mortality-The HUNT study.**

Åsberg AN<sup>1</sup>, Stovner LJ, Zwart JA, Winsvold BS, Heuch I, Hagen K.

The impact of chronic musculoskeletal complaints (CMSC) and chronic widespread chronic musculoskeletal complaints (CWMSC) on mortality is controversial.

The aim of this study was to investigate the relationship between these conditions and mortality. In this prospective population-based cohort study from Norway, baseline data from the second Nord-Trøndelag Health Survey (HUNT2, performed 1995-1997) were linked to the comprehensive National Cause of Death Registry in Norway with follow-up through the year 2011. A total of 65,026 individuals (70%) participated and were categorized based on their response to CMSC questions in HUNT2 (no CMSC, CMSC, or CWMSC). Hazard ratios (HRs) of mortality during a mean of 14.1 years of follow-up were estimated using Cox regression. During the follow-up period, 12,521 subjects died, 5162 from cardiovascular diseases, 3478 from cancer, and 3881 from all other causes. In the multivariate-adjusted analyses, there was no difference in all-cause mortality between individuals with or without CMSC (HR 1.01, confidence interval, 0.97-1.05) and CWMSC (HR 1.01, confidence interval, 0.96-1.05).

Similarly, there was no association between CMSC or CWMSC and cardiovascular mortality, mortality from cancer, or mortality from all other causes. Therefore, from this study, we conclude that there is no evidence for a higher mortality rate among individuals with CMSC or CWMSC.

PMID: [26919487](#)

**Memory in chronic pain**

Clin J Pain. 2016 Jul;32(7):609-16. doi: 10.1097/AJP.0000000000000239.

**Attention and Working Memory in Female Adolescents With Chronic Pain and Pain-free Female Adolescents: A Preliminary Pilot Study.**

Mifflin K<sup>1</sup>, Chorney J, Dick B.

**OBJECTIVES:**

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**MATERIALS AND METHODS:**

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**RESULTS:**

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**DISCUSSION:**

This pilot study is the first study to examine differences in working memory and attention between participants with chronic pain and pain-free adolescents. Our findings suggest that chronic pain may negatively affect adolescents' working memory function and highlights the risk for cognitive difficulties and problems with educational progression in addition to negative health and social effects associated with chronic pain. The study provides a starting point for more research and has the potential to direct better identification and treatment of these cognitive deficits.

PMID: [27275532](https://pubmed.ncbi.nlm.nih.gov/27275532/)

**Adaptions to pain**

Eur J Pain. 2016 Jun 28. doi: 10.1002/ejp.908.

**Attentional bias modification for acute experimental pain: A randomized controlled trial of retraining early versus later attention on pain severity, threshold and tolerance.**

Bowler JO<sup>1</sup>, Bartholomew KJ<sup>1</sup>, Kellar I<sup>2</sup>, Mackintosh B<sup>3</sup>, Hoppitt L<sup>4</sup>, Bayliss AP<sup>1</sup>.

**BACKGROUND:**

Noxious attentional bias is thought to confer vulnerability to pain, suggesting that modifying the bias could reduce pain outcomes. Herein is presented a randomized controlled trial to test the effects of retraining the dot probe attentional bias at short versus long stimulus durations towards neutral stimuli, and away from threat stimuli, on acute pain experience, in comparison with a placebo control group.

**METHODS:**

Eighty-one pain-free volunteers, blinded to condition, were randomized to complete either one of two neutral bias modification programs in which words were presented for 500 ms (ABM-500; n = 28) or 1250 ms (ABM-1250; n = 26), or to a sham training program that included both stimulus durations (ABM-Placebo; n = 27). Testing took place in a university laboratory. At post-training, participants completed the pain-inducing 'cold pressor task', and measures of pain severity, threshold and tolerance were taken. Attentional bias was also measured at pre- and post-training.

**RESULTS:**

Findings indicated that ABM-500 reliably increased pain threshold and tolerance, in comparison with the control group. In contrast, ABM-1250 did not affect any of the pain outcomes. Expected ABM effects on attentional bias were not evident at the group level, but nevertheless ABM-500 bias reduction was significantly associated with increased pain tolerance.

**CONCLUSIONS:**

These findings suggest that retraining attention at short stimulus exposure durations is relatively more efficacious in promoting transfer of attentional retraining effects to real-world acute pain stressors, in comparison with both the longer stimulus duration and ABM-Placebo.

**SIGNIFICANCE:**

Testing of the impact of modifying maintained attentional bias on vulnerability to an acute pain stressor. Findings suggested that retraining rapid attentional bias using short exposure durations conferred greater analgesic benefit, in comparison with both the slower bias and sham-training.

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PMID: [27351896](#)



**Cortisol and pain****Exploring the relationship between disease-related pain and cortisol levels in women with osteoarthritis**

Osteoarthritis and Cartilage , 07/01/2016

**C**arlesso LS, et al.

The clinicians plans to find out whether osteoarthritis (OA)–related pain is associated with the diurnal cortisol pattern and cortisol levels; and the diurnal pattern of cortisol varies with severity of OA pain additionally, the association between OA pain and cortisol is mediated by daily experience variables (DEV). Findings suggest that disease–related pain is positively associated with cortisol production, particularly with greater pain severity, in women with OA.

**Methods**

- In order to get the better results participants (n=31) completed daily diaries and collected three saliva samples daily for 7 days, in a community-based study of changes in regional and widespread pain among women with OA.
- With the use of the validated Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain subscale, severity of OA-related pain was evaluated.
- Associations between OA pain and diurnal cortisol levels and slopes, controlling for body mass index, medication use, time and day, were identified by the multilevel regression analyses.
- DEV observed as potential mediators of the association between OA pain and cortisol, as per the mediation analyses.

**Results**

- Result revealed that the mean age was 57 years and average BMI 31kg/m<sup>2</sup>.
- 8.8 was the mean WOMAC pain subscale score.
- It was reported that women with higher WOMAC pain scores had higher cortisol throughout the day.
- Further to this the estimated association of WOMAC with cortisol [ $\beta$  0.083(0.02, 0.15) p =0.009] represents a ~ 9% increase in cortisol for every unit increase in WOMAC pain score.
- When compared to those with scores <9, women with WOMAC pain scores > 9 had higher cortisol levels.
- At the daily level, examination of DEV revealed no significant mediated associations between these relationships.

**62 A. NUTRITION/VITAMINS****Fruits and vegetables helps hypertension**

J Hum Hypertens. 2016 Jun 16. doi: 10.1038/jhh.2016.44.

**Fruit and vegetables consumption and incident hypertension: dose-response meta-analysis of prospective cohort studies.**

Wu L<sup>1,2</sup>, Sun D<sup>3,4</sup>, He Y<sup>1,5</sup>.

The role of dietary factors on chronic diseases seems essential in the potentially adverse or preventive effects. However, no evidence of dose-response meta-analysis of prospective cohort studies has verified the association between the intake of fruit and/or vegetables and the risk of developing hypertension. The PubMed and Embase were searched for prospective cohort studies. A generic inverse-variance method with random effects model was used to calculate the pooled relative risks (RRs) and 95% confidence intervals (CIs). Generalized least squares trend estimation model was used to calculate the study-specific slopes for the dose-response analyses. Seven articles comprised nine cohorts involving 185 676 participants were assessed. The highest intake of fruit or vegetables separately, and total fruit and vegetables were inversely associated with the incident risk of hypertension compared with the lowest level, and the pooled RRs and 95% CIs were 0.87 (0.79, 0.95), 0.88 (0.79, 0.99) and 0.90 (0.84, 0.98), respectively. We also found an inverse dose-response relation between the risk of developing hypertension and fruit intake, and total fruit and vegetables consumption. The incident risk of hypertension was decreased by 1.9% for each serving per day of fruit consumption, and decreased by 1.2% for each serving per day of total fruit and vegetables consumption.

Our results support the recommendation to increase the consumption of fruit and vegetables with respect to preventing the risk of developing hypertension. However, further large prospective studies and long-term high-quality randomized controlled trials are still needed to confirm the observed association.

Journal of Human Hypertension advance online publication, 16 June 2016;  
doi:10.1038/jhh.2016.44.

**Meats and Rectal CA**

J Hum Nutr Diet. 2016 Jun 14. doi: 10.1111/jhn.12391.

**Meats, milk and fat consumption in colorectal cancer.**

Tayyem RF<sup>1</sup>, Bawadi HA<sup>2</sup>, Shehadah I<sup>3</sup>, AbuMweis SS<sup>4</sup>, Agraib LM<sup>4</sup>, Al-Jaberi T<sup>5</sup>, Al-Nusairr M<sup>6</sup>, Heath DD<sup>7</sup>, Bani-Hani KE<sup>8</sup>.

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**BACKGROUND:**

Data from several studies suggest that a diet high in meat, including processed meat and fat, may have an association with the development of colorectal cancer (CRC).

**METHODS:**

The present study aimed to investigate the relationship between meats, dairy products, fat consumption and the risk of CRC in Jordanians. A case-control study was performed at the five largest hospitals in Jordan. Dietary data were collected from 220 diagnosed cases of CRC and 281 healthy disease-free controls. The CRC cases were matched as closely as possible to controls using age, sex, occupation and marital status.

**RESULTS:**

The consumption of different levels and frequencies of several food types, including meats, chicken, milk and fish, was found to be associated with the risk of developing CRC. Added fats and oils were inversely associated with CRC risk with odds ratio = 0.33 (95% confidence interval = 0.13-0.83,  $P_{\text{trend}} = 0.005$ ). The predominant fat added by cases and controls was olive oil, followed by corn oil.

**CONCLUSIONS:**

The results of the study suggest that the consumption of some types of meat, processed meats and Labaneh (strained yogurt) may be associated with the risk of developing CRC.

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**KEYWORDS:**

Case-control study; colorectal cancer; fat; meat; milk; oils; processed meat

PMID: [27302247](#)

**65. NEUROLOGICAL CONDITIONS****Parkinson's mitochondrial cause**

Cell Death Dis. 2016 Jun 23;7(6):e2271. doi: 10.1038/cddis.2016.173.

**Mitofusin-mediated ER stress triggers neurodegeneration in pink1/parkin models of Parkinson's disease.**

Celardo I<sup>1</sup>, Costa AC<sup>1</sup>, Lehmann S<sup>1</sup>, Jones C<sup>1</sup>, Wood N<sup>2</sup>, Mencacci NE<sup>2</sup>, Mallucci GR<sup>1,3</sup>, Loh SH<sup>1</sup>, Martins LM<sup>1</sup>.

Mutations in PINK1 and PARKIN cause early-onset Parkinson's disease (PD), thought to be due to mitochondrial toxicity. Here, we show that in *Drosophila* pink1 and parkin mutants, defective mitochondria also give rise to endoplasmic reticulum (ER) stress signalling, specifically to the activation of the protein kinase R-like endoplasmic reticulum kinase (PERK) branch of the unfolded protein response (UPR). We show that enhanced ER stress signalling in pink1 and parkin mutants is mediated by mitofusin bridges, which occur between defective mitochondria and the ER. Reducing mitofusin contacts with the ER is neuroprotective, through suppression of PERK signalling, while mitochondrial dysfunction remains unchanged. Further, both genetic inhibition of dPerk-dependent ER stress signalling and pharmacological inhibition using the PERK inhibitor GSK2606414 were neuroprotective in both pink1 and parkin mutants.

We conclude that activation of ER stress by defective mitochondria is neurotoxic in pink1 and parkin flies and that the reduction of this signalling is neuroprotective, independently of defective mitochondria. A video abstract for this article is available online in the supplementary information.

PMID: [27336715](#)