

## 2. LBP

### Ultrasound good for assessment

April 2019 Volume 40, Pages 80–86

#### **Neuromuscular morphometric characteristics in low back pain with unilateral radiculopathy caused by disc herniation: An ultrasound imaging evaluation**

Hadi Sarafraz<sup>a,b</sup>, Mohammad Reza Hadian<sup>c,\*</sup>, Niloofar Ayoobi Yazdi<sup>d</sup>, olamreza Olyaei<sup>e</sup>, Hossein Bagheri<sup>e</sup>

Shohreh Jalaei<sup>e</sup>, Omid Rasouli<sup>f</sup>

DOI: <https://doi.org/10.1016/j.msksp.2019.01.016>

#### Highlights

- Ultrasonography is a promising tool to explore structural changes in the sciatic nerve.
- Echogenicity of muscle and nerve structure is questionable.
- Lumbar multifidus demonstrated a smaller thickening during contraction.

#### Abstract

**Background** Little is known about the neuromuscular morphometric characteristics in patients with sciatica.

**Objective** To evaluate the possible changes of nerve and muscle structures in patients with low back pain with unilateral radiculopathy due to lumbar disc herniation by ultrasound imaging.

**Design** A case-control observational study.

**Methods** Forty individuals were divided into case (n = 20; low back pain with unilateral radiculopathy due to disc herniation), and healthy control groups (n = 20). The thickness of lumbar multifidus at L5 level, and of lower limb muscles (i.e., biceps femoris, medial gastrocnemius, and soleus) was measured during both rest and full contraction to calculate the rest/contraction ratio of these muscles. Additionally, the sciatic nerve cross-sectional area and the echogenicity of the nerve and muscles were measured based on ultrasound imaging. The association between severity of low back pain radiculopathy (i.e., pain and patients' perceived disability) and rest/contraction ratio was assessed.

#### Results

Patients with sciatica showed sciatic nerve enlargement, and different contraction ratios for multifidus (at L5)/ankle plantar flexors compared to the controls. The rest/contraction ratio for biceps femoris was similar between the two groups.

#### Conclusion

According to these findings, ultrasound imaging can be considered a useful tool to detect changes in the sciatic nerve and muscles due to disc herniation. Furthermore, regarding the observation of significant changes in muscle rest/contraction ratio in the multifidus and gastrosoleus, one might attribute these changes to the nerve root compression.

## Theories of pain

April 2019 Volume 40, Pages 65–71

### The effect of implicit theories of pain on pain and disability in people with chronic low back pain

Simon J. Summers<sup>a,\*</sup>, Nancy C. Higgins<sup>b</sup>, Maxine Te<sup>a</sup>, Elish Byrne<sup>c</sup>, Lucy S. Chipchase<sup>a,d</sup>

DOI: <https://doi.org/10.1016/j.msksp.2019.01.013>

#### Highlights

- Implicit theories of pain were explored in people with chronic low back pain (CLBP).
- Individuals were sub-grouped into two implicit theories: entity and incremental.
- Relationship between implicit theories, pain and disability was assessed.
- Compared to entity theorists, incremental theorists had less pain and disability.
- Implicit theories of pain may be a relevant target for future treatment in CLBP.

#### Abstract

**Background** Implicit theories of pain represent a socio-cognitive mechanism linked to important coping, emotional, and expressive reactions to chronic pain. Evidence suggests that chronic low back pain (CLBP) patients who hold an incremental theory of pain (i.e., view pain as a malleable) use more active coping strategies, display less pain behavior, and report lower levels of depression than those with an entity theory of pain (i.e., view pain as a fixed). However, a link between implicit theories of pain and symptoms of pain and disability in people with CLBP has not been established.

**Objectives** This study investigated the relationship between implicit theories of pain and the level of pain and disability reported by people with CLBP.

**Design** Cross-sectional observational study.

**Methods** One hundred and two participants with CLBP completed an online survey distributed through social media channels. The online survey assessed pain intensity and pain-related disability (Chronic Pain Grade Scale), implicit theories of pain (Implicit Theory of Pain Scale), and perceived control over pain (Survey of Pain Attitudes control scale).

#### Results

Participants with an incremental theory of pain reported significantly less pain and disability compared to those with an entity theory of pain ( $p < 0.001$ ).

#### Conclusions

These findings suggest that implicit theories of pain may guide self-reported symptoms of pain and disability in a CLBP population. Prospective studies are required to confirm the relevance of these findings for risk of future low back pain, and to confirm whether this relationship changes with and without treatment.

### 5. SPINAL SURGERY

#### A relationship between anesthesia and dementia

##### **Is there a relationship between anaesthesia and dementia?**

Acta Anaesthesiologica Scandinavica

Strand AK, et al. | February 26, 2019

In this 20-year, retrospective, case-control study, researchers assessed 457 patients from a dementia registry and 420 dementia-free controls to quantify the correlation between anesthesia and dementia. Upon analysis, they found that advanced age ( $\geq 70$  years) and prior head trauma were risk factors for dementia. History of exposure to surgery with anesthesia was also calculated as a risk factor for dementia.

A correlation between exposure to general anesthetics with halogenated anesthetic gases and a greater dementia risk was also reported.

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### C section vs induction at 39 weeks

PLoS One. 2018; 13(4): e0193169. PMID: 29694344

Published online 2018 Apr 25. doi: 10.1371/journal.pone.0193169 PMCID: PMC5918610

#### **Elective induction of labor at 39 weeks among nulliparous women: The impact on maternal and neonatal risk**

Rachel G. Sinkey,

#### **Objective**

Optimal management of pregnancies at 39 weeks gestational age is unknown. Therefore, we sought to perform a comparative effectiveness analysis of elective induction of labor (eIOL) at 39 weeks among nulliparous women with non-anomalous singleton, vertex fetuses as compared to expectant management (EM) which included IOL for medical or obstetric indications or at 41 weeks in undelivered mothers.

#### **Materials and methods**

A Monte Carlo micro-simulation model was constructed modeling two mutually exclusive health states: eIOL at 39 weeks, or EM with IOL for standard medical or obstetrical indications or at 41 weeks if undelivered. Health state distribution probabilities included maternal and perinatal outcomes and were informed by a review of the literature and data derived from the Consortium of Safe Labor. Analyses investigating preferences for maternal versus infant health were performed using weighted utilities. Primary outcome was determining which management strategy posed less maternal and neonatal risk. Secondary outcomes were rates of cesarean deliveries, maternal morbidity and mortality, stillbirth, neonatal morbidity and mortality, and preferences regarding the importance of maternal and perinatal health.

#### **Results**

A management strategy of eIOL at 39 weeks resulted in less maternal and neonatal risk as compared to EM with IOL at 41 weeks among undelivered patients. Cesarean section rates were higher in the EM arm (35.9% versus 13.9%,  $p < 0.01$ ). When analysis was performed only on patients with an unfavorable cervix, 39 week eIOL still resulted in fewer cesarean deliveries as compared to EM (8.0% versus 26.1%,  $p < 0.01$ ). There was no statistical difference in maternal mortality (eIOL 0% versus EM 0.01%,  $p = 0.32$ ) but there was an increase in maternal morbidity among the EM arm (21.2% versus 16.5,  $p < 0.01$ ). There were more stillbirths (0.13% versus 0%,  $p < 0.0003$ ), neonatal deaths (0.25% versus 0.12%,  $p < 0.03$ ), and neonatal morbidity (12.1% versus 9.4%,  $p < 0.01$ ) in the EM arm as compared to the eIOL arm. Preference modeling revealed that 39 week eIOL was favored over EM.

#### **Conclusions and relevance**

Mathematical modeling revealed that eIOL at 39 weeks resulted in lower population risks as compared to EM with induction of labor at 41 weeks. Specifically, eIOL at 39 weeks resulted in a lower cesarean section rate, lower rates of maternal morbidity, fewer stillbirths and neonatal deaths, and lower rates of neonatal morbidity.

### Coffee and small birth weight

#### **Caffeine exposure during pregnancy, small for gestational age birth and neonatal outcome – Results from the Norwegian Mother and Child Cohort Study**

BMC Pregnancy and Childbirth

Modzelewska D, et al. | February 27, 2019

The associations between prenatal caffeine exposure and neonatal health was determined via analyzing 67,569 full-term singleton mother-infant pairs from the Norwegian Mother and Child Cohort Study.

Outcomes suggest an association of prenatal caffeine exposure with the child being born small for gestational age (SGA) and SGA with neonatal health, however, moderate prenatal caffeine exposure (< 200 mg/day) seemed not impairing neonatal health. According to the underlying cause of low birth weight, neonatal outcomes of SGA infants differed.

### Atrophy

#### **Effect of intravaginal prasterone on sexual dysfunction in postmenopausal women with vulvovaginal atrophy**

The Journal of Sexual Medicine

Labrie F, et al. | February 14, 2019

In this placebo-controlled, prospective, double-blind and randomized study, researchers assessed the benefits of daily intravaginal dehydroepiandrosterone (DHEA) for 12 weeks on sexual function using the Female Sexual Function Index (FSFI) questionnaire.

They noticed an increase in the FSFI domain desire over placebo by 0.24 unit, arousal by 0.42 unit, lubrication by 0.57 unit, orgasm by 0.32 unit, satisfaction by 0.44 unit, and pain at sexual activity by 0.62 unit. On the other hand, they noted a superiority of 2.59 units in the DHEA group over placebo or a 41.3% greater change than placebo in the total FSFI score.

## Vitamins in first trimester reduces autism

**Association of Maternal Prenatal Vitamin Use With Risk for Autism Spectrum Disorder Recurrence in Young Siblings**

Rebecca J. Schmidt, PhD<sup>1,2</sup>; Ana-Maria Iosif, PhD<sup>1,2</sup>; Elizabeth Guerrero Angel, MS<sup>1</sup>; et al Sally Ozonoff, PhD<sup>2,3</sup>

*JAMA Psychiatry*. February 27, 2019. doi:10.1001/jamapsychiatry.2018.3901

**Key Points**

**Question** Is maternal use of prenatal vitamins associated with decreased risk for autism recurrence in siblings of children with autism spectrum disorder? **Findings** In this cohort study of 241 younger siblings of children with autism, the prevalence of autism spectrum disorder was 14.1% in children whose mothers took prenatal vitamins in the first month of pregnancy compared with 32.7% in children whose mothers did not take prenatal vitamins during that time. **Meaning** Maternal daily intake of prenatal vitamins during the first month of pregnancy appears to be associated with reductions in recurrence of autism in high-risk families; additional research is needed to confirm these results, to further investigate specific nutrients, and to inform public health recommendations for autism spectrum disorder prevention.

**Importance** Maternal use of folic acid supplements has been inconsistently associated with reduced risk for autism spectrum disorder (ASD) in the child. No study to date has examined this association in the context of ASD recurrence in high-risk families. **Objective** To examine the association between maternal prenatal vitamin use and ASD recurrence risk in younger siblings of children with ASD.

**Design, Setting, and Participants** This prospective cohort study analyzed data from a sample of children (n = 332) and their mothers (n = 305) enrolled in the MARBLES (Markers of Autism Risk in Babies: Learning Early Signs) study. Participants in the MARBLES study were recruited at the MIND Institute of the University of California, Davis and were primarily from families receiving services for children with ASD in the California Department of Developmental Services. In this sample, the younger siblings at high risk for ASD were born between December 1, 2006, and June 30, 2015, and completed a final clinical assessment within 6 months of their third birthday. Prenatal vitamin use during pregnancy was reported by mothers during telephone interviews. Data analysis for this study was conducted from January 1, 2017, to December 3, 2018.

**Main Outcomes and Measures** Autism spectrum disorder, other nontypical development (non-TD), and typical development (TD) were algorithmically defined according to Autism Diagnostic Observation Schedule and Mullen Scales of Early Learning subscale scores.

**Results** After exclusions, the final sample comprised 241 younger siblings, of which 140 (58.1%) were male and 101 (41.9%) were female, with a mean (SD) age of 36.5 (1.6) months. Most mothers (231 [95.9%]) reported taking prenatal vitamins during pregnancy, but only 87 mothers (36.1%) met the recommendations to take prenatal vitamins in the 6 months before pregnancy. The prevalence of ASD was 14.1% (18) in children whose mothers took prenatal vitamins in the first month of pregnancy compared with 32.7% (37) in children whose mothers did not take prenatal vitamins during that time. Children whose mothers reported taking prenatal vitamins during the first month of pregnancy were less likely to receive an ASD diagnosis (adjusted relative risk [RR], 0.50; 95% CI, 0.30-0.81) but not a non-TD 36-month outcome (adjusted RR, 1.14; 95% CI, 0.75-1.75) compared with children whose mothers reported not taking prenatal vitamins. Children in the former maternal prenatal vitamin group also had statistically significantly lower autism symptom severity (adjusted estimated difference, -0.60; 95% CI, -0.97 to -0.23) and higher cognitive scores (adjusted estimated difference, 7.1; 95% CI, 1.2-13.1).

**Conclusions and Relevance** Maternal prenatal vitamin intake during the first month of pregnancy may reduce ASD recurrence in siblings of children with ASD in high-risk families. Additional research is needed to confirm these results; to investigate dose thresholds, contributing nutrients, and biologic mechanisms of prenatal vitamins; and to inform public health recommendations for ASD prevention in affected families.

**Pregnancy complications****Hypertensive disorders of pregnancy and peripartum cardiomyopathy: A nationwide cohort study**

Ida Behrens, Saima Basit, Jacob A. Lykke, Mattis F. Ranthe, Jan Wohlfahrt, Henning Bundgaard, Mads Melbye, Heather A. Boyd

Published: February 20, 2019

<https://doi.org/10.1371/journal.pone.0211857>

**Background**

Peripartum cardiomyopathy (PPCM) is a serious cardiac disorder occurring late in pregnancy or early in the postpartum period. We examined associations between hypertensive disorders of pregnancy (HDP: preeclampsia and gestational hypertension) and PPCM, accounting for other pregnancy-related risk factors for PPCM.

**Methods**

Using nationwide Danish register data, we constructed a cohort of all women with  $\geq 1$  live birth or stillbirth in Denmark between 1978 and 2012. Using log-linear binomial regression and generalized estimating equations, we estimated risk ratios (RRs) for PPCM associated with HDP of varying severity.

**Results**

In a cohort of 1,088,063 women with 2,078,822 eligible pregnancies, 126 women developed PPCM (39 in connection with an HDP-complicated pregnancy). The risks of PPCM were significantly higher in women with HDP-complicated pregnancies than in women with normotensive pregnancies (severe preeclampsia, RR 21.2, 95% confidence interval [CI] 12.0–37.4; moderate preeclampsia, RR 10.2, 95% CI 6.18–16.9; gestational hypertension, RR 5.16, 95% CI 2.11–12.6). The RRs for moderate preeclampsia and gestational hypertension were not significantly different from one another ( $p = 0.18$ ); the RR for severe preeclampsia was significantly different from the RR for moderate preeclampsia and gestational hypertension combined ( $p = 0.02$ ).

**Conclusions**

Although 70% of PPCM occurred in women with normotensive pregnancies, HDPs were associated with substantial increases in PPCM risk that depended on HDP severity. The heart's capacity to adapt to a normal pregnancy may be exceeded in some women already susceptible to cardiac insult, contributing to PPCM. HDPs, severe preeclampsia in particular, probably represent an additional cardiac stressor during pregnancy.



## 8. VISCERA

## 9. THORACIC SPINE

### 10 A. CERVICAL SPINE

### 10 B. CERVICAL EXERCISES

## 11. UPPER C SPINE

### 12 A. WHIPLASH

#### Auto accidents overweight has more chronic pain

Pain. 2019 Mar;160(3):670-675. doi: 10.1097/j.pain.0000000000001446.

#### **Obesity increases the risk of chronic pain development after motor vehicle collision.**

Mauck MC<sup>1</sup>, Hu J<sup>1</sup>, Sefton C<sup>1</sup>, Swor RA<sup>2</sup>, Peak DA<sup>3</sup>, Jones JS<sup>4</sup>, Rathlev NK<sup>5</sup>, Lee DC<sup>6</sup>, Domeier RM<sup>7</sup>, Hendry PL<sup>8</sup>, McLean SA<sup>1</sup>.

Obesity has been found to increase the risk of musculoskeletal pain (MSP) in other settings, but to our knowledge, the influence of increased body mass index on pain outcomes after common trauma exposures such as motor vehicle collision (MVC) has not been assessed. In addition, obesity results in biomechanical changes, as well as physiologic changes including reduced hypothalamic pituitary adrenal axis negative feedback inhibition, but mechanisms by which obesity may result in worse post-traumatic outcomes remain poorly understood. In this study, we evaluated the influence of body mass index on axial and overall MSP severity (0-10 numeric rating scale) 6 weeks, 6 months, and 1 year after MVC among 917 European Americans who presented to the emergency department for initial evaluation.

After adjusting for an array of sociodemographic factors, obesity (particularly morbid obesity) was an independent risk factor for worse MSP after MVC (eg, RR 1.41 [95% CI 1.11, 1.80] for moderate or severe MSP 6 months after MVC among morbidly obese vs normal weight MVC survivors). Interestingly, substantial effect modification was observed between obesity risk and a genetic variant known to reduce hypothalamic pituitary adrenal axis negative feedback inhibition (FKBP5 rs9380526). (eg, 41% vs 16% increased risk of moderate or severe MSP at 6 months among obese individuals with and without the risk allele.)

Further studies are needed to elucidate mechanisms underlying chronic pain development in obese trauma survivors and to develop interventions that will reduce chronic pain severity among this common, at-risk group

### 12 B. CERVICAL SURGERIES

### 13 A. CRANIUM

### 13 B. TMJ/ORAL

#### Vit D for periodontal disease

### **Activation of vitamin D in the gingival epithelium and its role in gingival inflammation and alveolar bone loss**

Journal of Periodontal Research

Menzel LP, et al. | February 27, 2019

Researchers analyzed the data to examine the significance of vitamin D in innate defense against the development of periodontal disease (PD). They noticed an association of lack of vitamin D with alveolar bone loss and enhanced inflammation in the gingiva. They noted inhibition of intracellular growth of *P. gingivalis* with human gingival epithelial cells (GECs) with 1,25(OH)<sub>2</sub>D<sub>3</sub> therapy.

They confirmed the hypothesis that vitamin D could be implemented directly to the gingiva for periodontal disease prevention/treatment as GEC was able to convert inactive vitamin D to the active form in situ.

## **13 C. AIRWAYS/SWALLOWING/SPEECH**

### **Maxillary sinus**

Int J Periodontics Restorative Dent. 2019 Mar/Apr;39(2):187-193. doi: 10.11607/prd.3722.

### **A Retrospective Evaluation of Factors Influencing the Volume of Healthy Maxillary Sinuses Based on CBCT Imaging.**

Bornstein MM, Ho JKC, Yeung AWK, Tanaka R, Li JQ, Jacobs R.

The aim of this study was to evaluate the factors influencing the volume of healthy maxillary sinuses by means of cone beam computed tomography (CBCT).

The sinus volumes in bilateral CBCT images of healthy maxillary sinuses of patients aged 18 years or older were evaluated using dedicated 3D volumetric software. Differences in volume based on gender, age, sinus side, and dental status were analyzed statistically. The study included 174 healthy maxillary sinuses in 87 patients (60 women and 27 men) aged between 18 to 82 years with a mean age of 29.5 years. There were 73 dentate sinuses and 101 partially dentate or edentulous sinuses. Males had significantly larger maxillary sinus volumes compared to females. Subjects below the median age of 24.3 years had a significantly larger sinus volume than older subjects. There was no difference in sinus volume between left and right sides. When partially dentate and edentulous cases were pooled together and compared to dentate cases, there was no difference in sinus volume. Gender and age influence healthy maxillary sinus volume, while sinus side and dental status do not. Neither tooth loss nor increasing age could be correlated with ongoing pneumatization of the maxillary sinus in the present population.

Thus, the reported increase of the maxillary sinus volume over life and following extraction of posterior teeth in the upper jaw might be considered a misconception. To prove this hypothesis, prospective studies comparing sinus volumes using standardized time intervals before and after tooth extraction in the posterior maxilla are needed.

## **13 D. SLEEP**

### **Apnea and total hip complications**

## Sleep Apnea Increases Ninety-Day Complications and Cost Following Primary Total Joint Arthroplasty

Rushabh M. Vakharia, MD<sup>a,\*</sup> Wayne B. Cohen-Levy, MD, MS<sup>b</sup> Ajit M. Vakharia, BS<sup>c</sup>,  
Chester J. Donnally III, MD<sup>b</sup> Tsun Yee Law, MD, MBA<sup>a</sup> Martin W. Roche, MD<sup>a\</sup>

DOI: <https://doi.org/10.1016/j.arth.2018.12.018>

### Background

Sleep apnea (SA) negatively affects bone mineralization, cognition, and immunity. There is paucity in the literature regarding the impact of SA on total joint arthroplasty (TJA). The purpose of this study is to compare complications in patients with and without SA undergoing either total knee (TKA) or total hip arthroplasty (THA).

### Methods

A retrospective review from 2005 to 2014 was conducted using the Medicare Standard Analytical Files. Patients with and without SA on the day of the primary TJA were queried using the International Classification of Diseases, ninth revision codes. Patients were matched by age, gender, Charlson Comorbidity Index), and body mass index. Patients were followed for 2 years after their surgery. Ninety-day medical complications, complications related to implant, readmission rates, length of stay, and 1-year mortality were quantified and compared. Logistic regression was used to calculate odds ratios (OR) with their respective 95% confidence interval and *P* values.

### Results

After the random matching process there were 529,240 patients (female = 271,656, male = 252,106, unknown = 5478) with (TKA = 189,968, THA = 74,652) and without (TKA = 189,968, THA = 74,652) SA who underwent primary TJA between 2005 and 2014. Patients with SA had greater odds of developing medical complications following TKA (OR 3.71) or THA (OR 2.48).

### Conclusion

The study illustrates an increased risk of developing postoperative complications in patients with SA following primary TJA. Surgeons should educate patients on these adverse effects and encourage the use of continuous positive airway pressure which has been shown to mitigate many postoperative complications.

## Sleep deprivation and chronic pain

### The pain of sleep loss: A brain characterization in humans

Adam J. Krause, Aric A. Prather, Tor D. Wager, Martin A. Lindquist and Matthew P. Walker  
Journal of Neuroscience 28 January 2019, 2408-18; DOI:

<https://doi.org/10.1523/JNEUROSCI.2408-18.2018>

Sleep loss increases the experience of pain. However, the brain mechanisms underlying altered pain processing following sleep deprivation are unknown. Moreover, it remains unclear whether ecologically modest night-to-night changes in sleep, within an individual, confer consequential day-to-day changes in experienced pain. Here, we demonstrate that acute sleep-deprivation amplifies pain reactivity within human (male and female) primary somatosensory cortex yet

blunts pain-reactivity in higher-order valuation and decision-making regions of the striatum and insula cortex. Consistent with this altered neural signature, we further show that sleep deprivation expands the temperature range for classifying a stimulus as painful, specifically through a lowering of pain thresholds. Moreover, the degree of amplified reactivity within somatosensory cortex following sleep deprivation significantly predicts this expansion of experienced pain across individuals. Finally, outside of the laboratory setting, we similarly show that even modest nightly changes in sleep quality (increases and decreases) *within* an individual determine consequential day-to-day changes in experienced pain (decreases and increases, respectively).

Together, these data provide a central brain framework underlying the impact of sleep loss on pain, and furthermore, establish that the association between sleep and pain is expressed in a night-to-day, bidirectional relationship within a sample of the general population. More broadly, our findings highlight sleep as a novel therapeutic target for pain management within and outside the clinic, including circumstances where sleep is frequently short yet pain is abundant (e.g. the hospital setting).

**SIGNIFICANCE STATEMENT**

Are you experiencing pain? Did you have a bad night of sleep? This study provides underlying brain and behavioral mechanisms explaining this common co-occurrence. We show that sleep deprivation enhances pain responsivity within the primary sensing regions of the brain's cortex yet blunts activity in other regions that modulate pain processing-the striatum and insula. We further establish that even subtle night-to-night changes in sleep in a sample of the general population predict consequential day-to-day changes in pain (bidirectionally). Considering the societal rise in chronic pain conditions in lock-step with the decline in sleep time through the industrial world, our data support the hypothesis that these two trends may not simply be co-occurring but are significantly inter-related.

**14. HEADACHES**

**15. VESTIBULAR**

**16. CONCUSSIONS**

**Headers in women soccer players**

April 2019 Volume 40, Pages 53–57

**Head impact magnitudes that occur from purposeful soccer heading depend on the game scenario and head impact location**

Alexandra Harriss<sup>a</sup> Andrew M. Johnson<sup>a,b</sup> David M. Walton<sup>b,c</sup> James P. Dickey<sup>d,\*</sup>

DOI: <https://doi.org/10.1016/j.msksp.2019.01.009>

Highlights

- Purposeful soccer heading in female youth players is a common activity.
- Heading occurs from various game scenarios, but mostly from passes in the air (41%).
- Game scenario and head impact location affect linear and rotational head kinematics.
- Most headers were performed using the front of the head.
- The top of the head is used about one-third of the time (improper technique).

Abstract

Purpose

This study quantified the linear and angular kinematics that result from purposeful heading during youth soccer games, and the influence of game scenario and head impact location on these magnitudes.

### Method

This observational study recruited thirty-six female soccer players ( $13.4 \pm 0.9$  years old) from three elite youth soccer teams (U13, U14, U15) and followed for an entire soccer season. Players wore wireless sensors during each game to quantify head impact magnitudes. A total of 60 regular season games (20 games per team) were video recorded, and purposeful heading events were categorized by game scenario (e.g. throw in), and head impact location (e.g. front of head).

### Results

Game scenario had a statistically significant effect on the linear head acceleration, and rotational head velocity, that resulted from purposeful headers. Rotational velocity from purposeful headers varied significantly between head impact locations, with impacts to the top of the head (improper technique) resulting in larger peak rotational velocities than impacts to the front of the head (proper technique); this was also the case for the linear acceleration for punts.

### Conclusion

Our findings suggest that the magnitude for both linear and angular head impact kinematics depend on the game scenario and head impact location. Headers performed with the top of the head (improper technique) result in larger rotational velocities compared to the front of the head (proper technique). Accordingly, youth players should be educated on how to execute proper heading technique to reduce head impact accelerations.

## 17. SHOULDER GIRDLE

### Impact of breast CA surgery

April 2019 Volume 40, Pages 72–79

#### **Three-dimensional scapular kinematics, shoulder outcome measures and quality of life following treatment for breast cancer – A case control study**

Ivana Leão Ribeiro<sup>a,b</sup> Paula Rezende Camargo<sup>b</sup> Francisco Albuquerque-Sendín<sup>b,c,d</sup>

Angélica Viana Ferrari<sup>b</sup> Cristina Lima Arrais<sup>b</sup> Tania Fátima Salvini<sup>b,\*</sup>

DOI: <https://doi.org/10.1016/j.msksp.2019.01.012>

#### Highlights

- Decreased scapular upward rotation at 120° of arm elevation is present after breast cancer treatment (BCT).
- Decreased range of shoulder external rotation (ER) and strength of shoulder abduction and ER are present after BCT.
- Pain, disabilities, and poor quality of life are present among women after BCT.

#### Background

There are no conclusive results concerning changes in scapular kinematics associated with upper limb dysfunctions after breast cancer surgery.

### Objective

To compare the three-dimensional (3-D) scapular kinematics during elevation of the arm between women after breast cancer surgery and controls. Shoulder range of motion (ROM), muscle strength, pain intensity, upper limb function, and quality of life were also assessed.

### Methods

Forty-two women were assigned to two groups (surgery group,  $n = 21$ ; control group,  $n = 21$ ). 3-D scapular kinematics was collected during elevation of the arm in the scapular plane. ROM was assessed using a digital inclinometer, muscle strength using a manual dynamometer, pain with the Visual Analogue Scale (VAS), upper limb function with the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and quality of life with the 36-item Short-Form Health Survey (SF36).

### Results

The surgery group presented decreased scapular upward rotation at  $120^\circ$  of arm elevation in the scapular plane ( $p < .05$ ;  $d = -0.88$ ), decreased shoulder external rotation ROM and strength of shoulder abduction and external rotation when the affected side was compared to the non-affected side and control group. Moreover, the surgery group also reported higher pain, increased upper limb disability and poorer quality of life compared with healthy controls.

### Conclusion

Scapular upward rotation seems to be decreased at  $120^\circ$  of arm elevation in women following breast cancer surgery. In addition, shoulder external rotation ROM, abduction strength, external rotation strength, function, and quality of life are also impaired in these women. They also experienced pain during the studied movements

## 28. HIP REPLACEMENTS

### Anterior approach best

#### Direct anterior versus lateral approaches for clinical outcomes after total hip arthroplasty: a meta-analysis

- Zhao Wang, Hong-wei Bao and Jing-zhao Hou

*Journal of Orthopaedic Surgery and Research* 2019;14:63

<https://doi.org/10.1186/s13018-019-1095-z>

#### Objective

To compare the outcomes of the direct anterior approach (DAA) with the lateral approach (LA) for total hip arthroplasty (THA) patients.

#### Methods

Three English databases, PubMed, Embase, and the Cochrane Library, were searched for randomized controlled trials (RCTs) comparing the DAA with LA for THA. Information on the country, sample size, intervention, outcomes, and follow-up were extracted. Meta-analysis was performed using Stata 12.0.

#### Results

Five RCTs totaling 475 patients (DAA = 236, LA = 239) were included in this meta-analysis. Compared with the LA, the DAA was associated with a reduction in the VAS at 6 weeks (weighted mean difference (WMD) = -0.41, 95% confidence interval (CI) -0.63 to -0.19,  $P = 0.000$ ) and total blood loss for THA patients (WMD = -45.73, 95% CI -84.72 to -6.02,  $P = 0.024$ ). Moreover, the DAA was associated with an increase in walking velocity (WMD = 5.01, 95% CI 2.32 to 7.70,  $P = 0.000$ ), stride length (WMD = 3.12, 95% CI 2.42 to 3.82,  $P = 0.000$ ), and step length (WMD = 4.09, 95% CI 1.03 to 7.14,  $P = 0.009$ ) compared with the LA group. There was no significant difference between groups in the Harris hip score, operation time, transfusion rate, length of hospital stay, and the occurrence of complications.

#### Conclusion

Current evidence demonstrated a trend showing that the DAA had a better effect on pain relief and blood-saving effects for THA patients. However, considering the number and sample size of the included trials, more large-scale RCTs with high quality are needed to confirm our conclusion.

### 34. PATELLA

#### Females anterior knee pain

Clin Orthop Relat Res. 2000 Mar;(372):69-73.

#### **Anterior knee pain in females.**

Fulkerson JP<sup>1</sup>, Arendt EA.

There are clear differences between men and women regarding anterior knee pain. Anatomic factors including increased pelvic width and resulting excessive lateral thrust on the patella are primary factors that predispose females to anterior knee pain. Effects of estrogen on connective tissue synthesis have been reported, but there is no clear mechanism by which this would affect anterior knee pain. Postural and sociologic factors such as wearing high heels and sitting with legs adducted can influence the incidence and severity of anterior knee pain in women.

PMID:10738416



## 40. ANKLE SPRAINS AND INSTABILITY

## MT helps

April 2019 Volume 40, Pages 87–95

**Does treatment duration of manual therapy influence functional outcomes for individuals with chronic ankle instability: A systematic review with meta-analysis?**

Xiaojian Shi<sup>a</sup>, Jia Han<sup>a,b,\*</sup>, Jeremy Witchalls<sup>b</sup>, Gordon Waddington<sup>b</sup>, Roger Adams<sup>b</sup>  
DOI: <https://doi.org/10.1016/j.msksp.2019.01.015>

**Highlights**

- Individuals with chronic ankle instability can benefit from manual therapy(MT).
- One session of treatment is insufficient to achieve significant changes in function.
- Six sessions of treatment significantly improves range of motion and function.
- Effects of MT on neuromuscular control of the ankle should be specifically assessed.

**Question** Can manual therapy improve functional outcomes for individuals with chronic ankle instability?

**Design** Systematic review with meta-analysis of randomized controlled trials.

**Participants** Individuals with chronic ankle instability.

**Intervention** Manual therapy is defined as an intervention that involves joint mobilization, and mobilization with movement.

**Outcome measure** The primary outcome is patient reported function (PRF) questionnaires scores, the secondary outcomes are ankle dorsiflexion range of motion (DFROM) and balance control.

**Results** Four studies were included (n = 208, mean age = 24.4) in the meta-analysis, with moderate to high quality on the PEDro scale (range 6–8). For patient reported function (PRF) questionnaires, two studies reported significant improvement after six-session manual therapy measured by foot and ankle ability measures sport subscale (FAAMS) and Cumberland ankle instability tool (CAIT), respectively. For DFROM, one session manual therapy had no significant effect on the weight-bearing lunge test (WBLT) (3 studies, n = 147, SMD = 1.24 (95%CI -0.87 to 3.36), I<sup>2</sup> = 96%) or non-weight-bearing inclinometer test (2 studies, n = 47, MD = 3.41° (95%CI -0.26 to 7.09), I<sup>2</sup> = 43%), while six-sessions manual therapy showed, a significantly positive effect on WBLT(2 studies, n = 80, SMD = 2.39, (95% CI 0.55, to 4.23), I<sup>2</sup> = 93%). For the SEBT, one-session manual therapy had no significant effect on overall star excursion balance test (SEBT) score (3 studies, n = 137, MD = 2.05, 95%CI (-0.96, 5.05), I<sup>2</sup> = 75%), while qualitative analysis of 2 included studies showed significant improvement both on the SEBT score and single limb balance test (SLBT).

**Conclusions**

Six sessions rather than one session of manual therapy improves ankle functional performance for individuals with CAI.

**41 A. ACHILLES TENDON AND CALF****Achilles stiffness****Transverse tendon stiffness is reduced in people with achilles tendinopathy: A cross-sectional study**

PLoS Neglected Tropical Diseases  
nnamore E, et al. | February 22, 2019

Researchers examined Achilles tendon transverse stiffness in a group of recreational runners with Achilles tendinopathy, in comparison to an asymptomatic group of runners with similar training history in the current cross-sectional study. Further, they examined this measurement technique for the between-week intra-individual reliability. Using a hand-held dynamometer, the transverse stiffness of the Achilles tendon (AT) was assessed in 25 recreational runners. Measurements were taken directly over the most symptomatic location in ten people with midportion Achilles tendinopathy (5 men, 5 women). They performed measurements at an equivalent location on the tendon in 15 people who were free of AT symptoms (7 men, 8 women). Measurement reliability was assessed when the participants returned after one week (intra-class correlation coefficient/ICC and minimum detectable change/MDC95). In people with midportion Achilles tendinopathy, transverse Achilles tendon stiffness can be reliably measured. People who are older, more symptomatic, and with more extensive tendon thickening showed lower stiffness.

**46 A. UPPER LIMB NEUROMOBILIZATION****Accuracy of ULNT for Carpel tunnel**

April 2019 Volume 40, Pages 21–33

**Diagnostic accuracy of upper limb neurodynamic tests for the assessment of peripheral neuropathic pain: A systematic review**Konstantinos Koulidis<sup>a</sup>, Yannis Veremis<sup>a</sup>, Christina Anderson<sup>a</sup>, Nicola R. Heneghan<sup>b,\*\*</sup>DOI: <https://doi.org/10.1016/j.msksp.2019.01.001>**Highlights**

- Diagnostic accuracy of ULNT in carpal tunnel syndrome is limited.
- Evidence supports ULNTs in cervical radiculopathy only as a “ruling out” strategy.
- NCS may not be adequate to determine diagnostic accuracy of ULNTs.
- Integrating QST with ULNT may enhance classification of patients with PNP.

**Abstract**

**Background** Upper limb neurodynamic tests (ULNTs) are used to identify a neuropathic pain component in patients' presenting with arm and/or neck pain. Clinical tests with established diagnostic accuracy are required to not only to inform clinical management but also minimise costs associated with expensive medical investigations.

**Objective** To evaluate the role of ULNTs in assessment of peripheral neuropathic pain and to inform their value in clinical practice when assessing patients with arm and/or neck symptoms.

**Design** Systematic review was undertaken according to published guidelines, and reported in line with PRISMA-DTA.

**Method** Key databases were searched up to 21/11/2017. Inclusion criteria: Patient population experiencing arm and/or neck symptoms with suspected peripheral neuropathic involvement, studies that compared ULNT to a reference standard, any study design using primary diagnostic accuracy data. Two reviewers independently assessed risk of bias (ROB) using QUADAS-2. The overall quality of evidence was evaluated using GRADE.

**Results**

Of eight included studies (n = 579), four were assessed as low ROB, although all had concerns regarding applicability. For carpal tunnel syndrome, ULNT1 sensitivity values ranged 0.4–0.93, specificity 0.13–0.93, positive likelihood ratio 0.86–3.67 and negative likelihood ratio 0.5–1.9. For cervical radiculopathy ULNT1 and the combined use of four ULNTs had sensitivity of 0.97 (95%CI 0.85–1.00) whereas the ULNT3 was the most specific (0.87, 95%CI 0.62–0.98). Positive likelihood ratio ranged 0.58–5.68 and negative likelihood ratio 0.12–1.62.

**Conclusion**

Based on the available evidence ULNTs cannot be utilised as a stand-alone test for the diagnosis of CTS. Limited evidence suggests that ULNTs may be clinically relevant for the diagnosis of CR, but only as a “ruling out” strategy. However, the overall quality of the body of evidence after applying the GRADE approach was low to very low across studies. Further higher quality research is needed to establish firm conclusions.

### 52. EXERCISE

#### High intensity in obesity

#### **Effect of high-intensity interval training on body composition and inflammatory markers in obese postmenopausal women: A randomized controlled trial**

Menopause

Nunes PRP, et al. | February 27, 2019

Researchers investigated if high-intensity [interval](#) training improves visceral adiposity tissue and inflammatory markers in a time-efficient manner in obese postmenopausal women when compared with combined training. In addition, they examined the association between change in visceral adiposity tissue and alterations in these inflammatory markers. They randomized postmenopausal women in two groups: combined training (n=13) and high-intensity interval training (n=13).

Overall, high-intensity interval training was found to be a time-efficient strategy for improving visceral adiposity tissue and inflammatory markers in these women. Furthermore, visceral adiposity tissue alterations were identified to be influenced by serum cytokine changes, at least in part.

### 55. SCOLIOSIS

#### Loss of pulmonary function

##### **Progressive decline in pulmonary function 5 years postoperatively in patients who underwent anterior instrumentation for surgical correction of adolescent idiopathic scoliosis**

European Spine Journal

Yaszay B, et al. | February 25, 2019

A sum of 262 individuals were estimated to analyze the alterations in pulmonary function tests (PFT) at 5 years postoperatively in subjects with adolescent idiopathic scoliosis (AIS) and also to ascertain the impact of such differences after 2 years. They observed 42% normal, 41% with mild impairment, and 17% with a moderate-severe impairment at 5 years. They recorded a decline in percentage predicted forced vital capacity (FVC) with stable forced expiratory volume (FEV).

They found a decrease between pre-operative PFT and 5 years postoperative PFT (FEV: - 10% open, - 6% thoracoscopic; FVC: - 13% open, - 8% thoracoscopic).

**58. RUNNING****Young and old runners****Influence of Aging on Lower Extremity Sagittal Plane Variability During 5 Essential Subphases of Stance in Male Recreational Runners**

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2018 **Volume:**49 **Issue:**3 **Pages:**171–179 **DOI:**10.2519/jospt.2019.8419

**Abstract**

Choose sectionChoose sectionTop of pageAbstract <<MethodsResultsDiscussionConclusionKey PointsReferences

**Background**

Interjoint coordination variability is a measure of the ability of the human system to regulate multiple movement strategies. Normal aging may reduce variability, resulting in a less adaptive system. Additionally, when older runners are asked to run at speeds greater than preferred, this added constraint may place older runners at greater risk for injury.

**Objectives**

To examine the influence of normal aging on coordination variability across 5 distinct subphases of stance in runners during preferred and fixed speeds.

**Methods**

Twelve older (60 years of age or older) and 12 younger (30 years of age or younger) male recreational runners volunteered for this cross-sectional study. Three-dimensional gait analyses were collected at preferred and fixed speeds. Stance phase was divided into 5 subphases: (SP1) loading response, (SP2) peak braking, (SP3) peak compression, (SP4) midstance, and (SP5) peak propulsion. Continuous relative phase variability for sagittal plane joint pairs—hip-knee, knee-ankle, and hip-ankle—was calculated. Repeated-measures linear mixed models were employed to compare variability for each joint pair.

**Results**

An age-by-stance subphase interaction was found for knee-ankle ( $P<.01$ ) and hip-ankle ( $P<.01$ ) pairs, while main effects for age and stance subphase were found for the hip-knee pair ( $P<.05$ ). Specifically, loading response and peak braking variability were lower in older runners and greater across stance for knee-ankle and hip-ankle pairs, while midstance was lowest in the hip-knee pair for older and younger runners. No effects for running pace were found.

**Conclusion**

Less adaptive movement strategies seen in older runners may partially contribute to the increased eccentric stresses during periods of high load. *J Orthop Sports Phys Ther* 2019;49(3):171–179. Epub 30 Nov 2018. doi:10.2519/jospt.2019.8419

**59. PAIN****Corticosteroids volume****Effect of dose of the corticosteroid injected locally on inflammatory diseases**Ahmadzadeh Heshmati, Afshin, MD<sup>a</sup>; Ilka, Shahab, MD<sup>b</sup>

Current Orthopaedic Practice: March/April 2019 - Volume 30 - Issue 2 - p 160–163

doi: 10.1097/BCO.0000000000000734

**Background:** Local injection of corticosteroid medication is one of the most common therapeutic treatments in inflammatory diseases, yet there are still many controversies surrounding its use.

**Methods:** One hundred and seventy patients with de Quervain disease, lateral epicondylitis, or plantar fasciitis were entered into the study and divided into two groups (groups 1 and 2) according to doses of the steroids (20 mg and 40 mg methylprednisolone acetate, respectively). Patients were evaluated before injection and at 3 wk and 6 wk after injection using a visual analogue scale, quick Disabilities of the Arm, Shoulder and Hand score, the American Orthopedic Foot and Ankle Society Score, and grip strength. Complications were recorded at each visit.

**Results:** All outcome parameters significantly improved 3 wk after injection in all patients. Improvement between weeks 3 and 6 was not significant. There was no significant difference between patients in group 1 and 2 except patients in group 1 with plantar fasciitis had better outcome than those in group 2 at 6 wk. The only encountered complication was change in color of the skin in three patients.

**Conclusions:** A 20-mg injection of methylprednisolone acetate locally was sufficient for improvement of symptoms in patients with de Quervain disease, lateral epicondylitis, and plantar fasciitis. More doses of the steroid had no more beneficial effect.

**62 A. NUTRITION/VITAMINS****Fast food offerings****Fast-Food Offerings in the United States in 1986, 1991, and 2016 Show Large Increases in Food Variety, Portion Size, Dietary Energy, and Selected Micronutrients**

Megan A. McCrory, PhD\* Allen G. Harbaugh, PhD Sarah Appeadu, MS

Susan B. Roberts, PhD

DOI: <https://doi.org/10.1016/j.jand.2018.12.004>

Abstract

Background

US national survey data shows fast food accounted for 11% of daily caloric intake in 2007-2010.

Objective

To provide a detailed assessment of changes over time in fast-food menu offerings over 30 years, including food variety (number of items as a proxy), portion size, energy, energy density, and selected micronutrients (sodium, calcium, and iron as percent daily value [%DV]), and to compare changes over time across menu categories (entrées, sides, and desserts).

Design

Fast-food entrées, sides, and dessert menu item data for 1986, 1991, and 2016 were compiled from primary and secondary sources for 10 popular fast-food restaurants.

Statistical Analysis

Descriptive statistics were calculated. Linear mixed-effects analysis of variance was performed to examine changes over time by menu category.

Results

From 1986 to 2016, the number of entrées, sides, and desserts for all restaurants combined increased by 226%. Portion sizes of entrées (13 g/decade) and desserts (24 g/decade), but not sides, increased significantly, and the energy (kilocalories) and sodium of items in all three menu categories increased significantly. Desserts showed the largest increase in energy (62 kcal/decade), and entrées had the largest increase in sodium (4.6% DV/decade). Calcium increased significantly in entrées (1.2%DV/decade) and to a greater extent in desserts (3.9% DV/decade), but not sides, and iron increased significantly only in desserts (1.4% DV/decade).

Conclusions

These results demonstrate broadly detrimental changes in fast-food restaurant offerings over a 30-year span including increasing variety, portion size, energy, and sodium content. Research is needed to identify effective strategies that may help consumers reduce energy intake from fast-food restaurants as part of measures to improve dietary-related health issues in the United States.



**DASH reduces****DASH dietary pattern, mediation by mineral intakes, and the risk of coronary artery disease and stroke mortality**

Journal of the American Heart Association

Talaie M, et al. | February 28, 2019

In Asian populations, researchers assessed the association of the Dietary Approaches to Stop Hypertension (DASH) dietary pattern with stroke and coronary artery disease (CAD) mortality. They also sought to clarify the role of mineral intakes as potential mediators. Data were collected from 57,078 individuals in the Singapore Chinese Health Study (aged 45-74 years at baseline; 1993–1998) for analysis. Using a validated 165-item food frequency questionnaire at recruitment, usual diet was determined, and information on mortality was extracted via registry linkage up to December 31, 2014.

Based on quintiles of intake of seven predefined food items and sodium, DASH scores were constructed and hazard ratios and corresponding 95% CIs were computed via Cox proportional hazard models. The investigators noted a substantially lower risk of CAD and stroke mortality in association with adherence to the DASH dietary pattern. No substantial mediation of this inverse association by intakes of sodium, potassium, magnesium, and calcium, however, was evident.