

## 2. LBP

### Biopsychosocial

#### **Process of Change in Pain-Related Fear: Clinical Insights From a Single Case Report of Persistent Back Pain Managed With Cognitive Functional Therapy**

**Authors:** J.P. Caneiro, PT, MSc, FACP<sup>1,2</sup>, Anne Smith, PT, PhD<sup>1</sup>, Martin Rabey, PT, PhD, FACP<sup>1</sup>, G. Lorimer Moseley, PT, PhD, FACP<sup>3</sup>, Peter O'Sullivan, PT, PhD, FACP<sup>1,2</sup>

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#### **Study Design**

Single case report with repeated measures over 18 months.

#### **Background**

Management of persistent low back pain (PLBP) associated with high pain-related fear is complex. This case report aims to provide clinicians with insight into the process of change in a person with PLBP and high bending-related fear, who was managed with an individualized behavioral approach of cognitive functional therapy.

#### **Case Description**

A retired manual worker with PLBP believed that his spine was degenerating, that bending would hurt him, and that avoidance was the only form of pain control. At baseline, he presented high levels of pain-related fear on the Tampa Scale of Kinesiophobia (score, 47/68) and a high-risk profile on the Örebro Musculoskeletal Pain Questionnaire (score, 61/100). Unhelpful beliefs and behaviors led to a vicious cycle of fear and disengagement from valued life activities. Guided behavioral experiments were used to challenge his thoughts and protective responses, indicating that his behavior was modifiable and the pain controllable. Using a multidimensional clinical-reasoning framework, cognitive functional therapy management was tailored to target key drivers of PLBP and delivered over 6 sessions in a 3-month period.

#### **Outcomes**

Over an 18-month clinical journey, he demonstrated improvements in bending-related fear, pain expectancy, and pain experience, and substantial changes in pain-related fear (Tampa Scale of Kinesiophobia: 33/68; change, –14 points) and risk profile (Örebro Musculoskeletal Pain Questionnaire: 36/100; change, –25 points). Clinical interviews at 6 and 18 months revealed positive changes in mindset, understanding of pain, perceived pain control, and behavioral responses to pain.

#### **Discussion**

This case report provides clinicians with an insight to using a multidimensional clinical-reasoning framework to identify and target the key drivers of the disorder, and to using cognitive functional therapy to address unhelpful psychological and behavioral responses to pain in a person with PLBP and high pain-related fear.

**Level of Evidence** Therapy, level 5. *J Orthop Sports Phys Ther* 2017;47(9):637–651. Epub 13 Jul 2017. doi:10.2519/jospt.2017.7371

**Twin study of sibling potential**

Spine (Phila Pa 1976). 2017 Sep 1;42(17):1295-1301. doi: 10.1097/BRS.0000000000002075.

**Does Familial Aggregation of Chronic Low Back Pain Affect Recovery?: A Population-Based Twin Study.**

Zadro JR<sup>1</sup>, Shirley D, Sánchez-Romera JF, Ordoñana JR, Ferreira PH.

**STUDY DESIGN:**

Longitudinal twin-cohort study.

**OBJECTIVE:**

To investigate the effect familial aggregation of chronic low back pain (LBP) has on the recovery from chronic LBP.

**SUMMARY OF BACKGROUND DATA:**

LBP is a worldwide problem, with pain and disability often becoming chronic. Genetics and familial behaviors could significantly affect the recovery from chronic LBP but have not been extensively investigated.

**METHODS:**

A total of 624 Spanish twins from the Murcia Twin Registry reported experiencing chronic LBP within the past 2 years during the 2009/11 data collection wave and were followed up in 2013. Familial aggregation of chronic LBP was determined by the co-twin experiencing chronic LBP within the past 2 years at baseline. Twins reporting LBP "within the past 4 weeks" at follow-up were considered to have not recovered.

**RESULTS:**

There were 455 twins with available data on LBP at follow-up and available data on LBP from their co-twin at baseline. Twins with an affected co-twin at baseline were significantly more likely to have not recovered from chronic LBP at follow-up (odds ratio [OR]=1.6, 95% confidence interval [CI]: 1.0-2.4, P=0.046). This relationship was stronger for monozygotic twins (OR=2.5, 95% CI: 1.3-4.8, P=0.006) (n=172) but disappeared when considering only dizygotic twins (OR=1.1, 95% CI: 0.6-2.0, P=0.668) (n=283). Sibling-relative recurrence risk ( $\lambda$  s) was 1.2 for the total sample, 1.5 for monozygotic twins, and 1.1 for dizygotic twins.

**CONCLUSION:**

Having a sibling with chronic LBP at baseline increased the likelihood of LBP at follow-up by 20%, with this likelihood increasing to 50% if the sibling was an identical twin. These results are novel and highlight the important influence genetics have on people's recovery from chronic LBP. Information regarding the presence of chronic LBP within a family is easy to obtain and has the potential to inform clinicians on which patients are less likely to recover when treatment implementation is not considered.

**Lower extremity exercise helps LBP and running**

Med Sci Sports Exerc. 2017 Jul 31. doi: 10.1249/MSS.0000000000001396.

**Comparison of Lower Limb and Back Exercises for Runners with Chronic Low Back Pain.**

Cai C<sup>1</sup>, Yang Y, Kong PW.

**INTRODUCTION:**

This single-blind randomized trial was conducted to compare the treatment effect of lower limb (LL) exercises versus conventional lumbar extensor (LE) and lumbar stabilization (LS) exercises in recreational runners with chronic low back pain (cLBP), since there is currently no specific protocol for managing runners with cLBP.

**METHODS:**

84 recreational runners with cLBP were allocated to three exercise groups (LL, LE, LS) for an 8-week intervention. Outcome measures included self-rated pain and running capability, lower limb strength, back muscles function, and running gait. Participants were assessed at pre-, mid- and end-intervention; selected outcomes also followed up at three and six months. Generalized estimating equation was adopted to examine group-by-time interaction.

**RESULTS:**

LL group improved 0.949 points per time point in Patient Specific Functional Scale ( $p < .001$ ), which was higher than the LE ( $B = -0.198$ ,  $p = .001$ ) and LS groups ( $B = -0.263$ ,  $p < .001$ ). All three groups improved on average 0.746 points per time point in Numeric Pain Rating Scale for running induced pain ( $p < .001$ ). Knee extension strength increased 0.260 Nm/kg per time point ( $p < .001$ ) in the LL group, which was higher than the LE ( $B = -0.220$  Nm/kg,  $p < .001$ ) and LS groups ( $B = -0.206$ ,  $p < .001$ ). LL group also showed greater increase in running step length (2.464 cm per time point,  $p = .001$ ) than LS group ( $B = -2.213$ ,  $p = .013$ ). All three groups improved similarly in back muscles function.

**CONCLUSION:**

LL exercise therapy could be a new option for cLPB management given its superior effects in improving running capability, knee extension strength, and running gait.

**Step up test and motion**

BMC Musculoskelet Disord. 2017 Aug 25;18(1):369. doi: 10.1186/s12891-017-1721-z.

**Differences in lumbar spine and lower extremity kinematics in people with and without low back pain during a step-up task: a cross-sectional study.**

Mitchell K<sup>1</sup>, Porter M<sup>1</sup>, Anderson L<sup>1</sup>, Phillips C<sup>1</sup>, Arceo G<sup>1</sup>, Montz B<sup>1</sup>, Levy S<sup>2</sup>, Gombatto SP<sup>3</sup>.

**BACKGROUND:**

Low back pain (LBP) affects more than one third of the population at any given time, and chronic LBP is responsible for increased medical costs, functional limitations and decreased quality of life. A clear etiology is often difficult to identify, but aberrant posture and movement are considered contributing factors to chronic LBP that are addressed during physiotherapy intervention. Information about aberrant movement during functional activities in people with LBP can help inform more effective interventions. The purpose of this study was to determine if there are differences in lumbar spine and lower extremity kinematics in people with and without LBP during a step-up task.

**METHODS:**

A convenience sample of 37 participants included 19 with LBP and 18 without a history of LBP. All participants were between the ages of 18 and 65, and controls were matched to participants with LBP based on age, gender and BMI. A motion capture system was used to record spine and lower extremity kinematics during the step-up task. ANOVA tests were used to determine differences in three-dimensional kinematics between groups.

**RESULTS:**

Participants with LBP displayed less lower lumbar motion in the sagittal plane ( $P = 0.001$ ), more knee motion in the coronal plane ( $P = 0.001$ ), and more lower extremity motion in the axial plane ( $P = 0.002$ ) than controls.

**CONCLUSIONS:**

People with LBP display less lower lumbar spine motion in the sagittal plane and more out-of-plane lower extremity motion. Clinically, the step-up task can be used to identify these aberrant movements to develop more focused functional interventions for patients with LBP.

**CBT and LBP**

Spine (Phila Pa 1976). 2017 Sep 1;42(17):E1031-E1039. doi: 10.1097/BRS.0000000000002066.

**Explaining How Cognitive Behavioral Approaches Work for Low Back Pain: Mediation Analysis of the Back Skills Training Trial.**

Fordham B<sup>1</sup>, Ji C, Hansen Z, Lall R, Lamb SE.

**STUDY DESIGN:**

This is secondary research examining the longitudinal mediation effect within a structural equation model.

**OBJECTIVE:**

To identify possible mechanisms that mediate the effects of a cognitive behavioral approach upon disability and pain in low back pain patients.

**SUMMARY OF BACKGROUND DATA:**

Cognitive behavioral interventions (CBIs) can improve pain and disability in low back pain (LBP) but the mechanisms of action are unclear. We used data from a large randomized controlled trial to investigate mediators of the treatment effect of CBI.

**METHODS:**

Pain self-efficacy, fear avoidance, and physical and mental functioning were selected as candidate mediators based on the theoretical rationale of the intervention. The primary treatment outcomes were the Roland Morris Questionnaire (RMDQ) and the modified Von Korff scale (MVK pain and disability) at 12 months. We used structural equation models to estimate the contribution of mediators. All models were tested for goodness-of-fit using  $\chi^2$ , Root Mean Square Error of Approximation, Adjusted Goodness of Fit Index, and Bentler Comparative Fit Index.

**RESULTS:**

We included 701 adults with LBP. The average RMDQ score at baseline for those on the intervention arm was 8.8 (Standard Deviation 5.0). The intervention was effective in reducing disability and pain at 12 months. Change in mental functioning was not a significant mediator. Changes to pain self-efficacy, fear avoidance, and physical functioning were causal mediators of the treatment effect at 12 months (RMDQ  $b = -0.149$ ,  $P < 0.001$ ; MVK-pain  $b = -0.181$ ,  $P < 0.001$  and MVK-disability  $b = -0.180$ ,  $P < 0.001$ ). Overall, the SEM model exceeded the threshold for acceptable goodness-of-fit.

**CONCLUSION:**

Fear avoidance and self-efficacy were important causal mediators of the cognitive behavioral treatment effect. Self-assessed change in physical function was a causal mediator but mental functioning was not. This suggests people need to experience meaningful change in physical function and beliefs but not in mental functioning associated with LBP, to achieve a treatment benefit.

## 4. INJECTIONS

### Epidurals

World Neurosurg. 2017 Aug 21. pii: S1878-8750(17)31356-6. doi: 10.1016/j.wneu.2017.08.055.

#### **The Value of Short-Term Pain Relief in Predicting the Long-term Outcome of Lumbar Transforaminal Epidural Steroid Injections.**

Joswig H<sup>1</sup>, Neff A<sup>2</sup>, Ruppert C<sup>3</sup>, Hildebrandt G<sup>4</sup>, Stienen MN<sup>5</sup>.

#### **BACKGROUND:**

A previous report demonstrated the predictive power of short-term leg pain relief after lumbar transforaminal epidural steroid injection for 1-month treatment response. The question whether the long-term response could be similarly predicted remained unanswered.

#### **METHODS:**

A prospective cohort of n=57 patients who underwent transforaminal epidural steroid injection for sciatica secondary to a lumbar disc herniation was followed for 24 months. Leg and back pain on the visual analog scale, health-related quality of life with the Short Form-12 and functional outcome with the Oswestry Disability Index were assessed. Responders were defined as not receiving any additional invasive treatment after a single injection. Patients who underwent a second injection or surgery were defined as treatment failures (=nonresponders).

#### **RESULTS:**

At 24 months, n=31 (54.4%) patients were responders and n=26 (45.6%) were nonresponders. Nonresponders exited the follow-up at 1 month (n=9), at 3 months (n=9), at 6 months (n=6) and at 12 months (n=2). No patients were injected again or operated on between the 12- and 24-month follow-up. Responders at 24 months had significantly lower visual analog scale leg pain (p<0.05) than nonresponders, starting from the second week after TFESI, as well as better Short Form-12 scores and less disability on the Oswestry Disability Index.

#### **CONCLUSIONS:**

Most patients with a symptomatic lumbar disc herniation who opt for a second injection or surgery after a transforaminal epidural steroid injection, do so within the first 6 months. A reliable prediction of the long-term treatment response based on short-term pain relief is not possible.

**Epidurals**

Am J Phys Med Rehabil. 2017 Sep;96(9):654-662. doi: 10.1097/PHM.0000000000000730.

**The 1-Year Results of Lumbar Transforaminal Epidural Steroid Injection in Patients with Chronic Unilateral Radicular Pain: The Relation to MRI Findings and Clinical Features.**

Ekedahl H<sup>1</sup>, Jönsson B, Annertz M, Frobell RB.

**OBJECTIVE:**

In patients with chronic radicular pain, we aimed to evaluate subgroup differences in 1-yr response to transforaminal epidural steroid injection.

**DESIGN:**

In this longitudinal cohort study of 100 subjects, 170 transforaminal epidural steroid injections were performed for 1 yr. The sample was stratified by type of disc herniation (protrusion n = 57, extrusion n = 27), by location of disc herniation (central/subarticular n = 60, foraminal n = 24), by grade of nerve root compression (low-grade compression n = 61, high-grade subarticular nerve compression n = 14, high-grade foraminal nerve compression n = 25), and by positive Slump test (n = 67). Treatment response was evaluated by visual analogue scale leg pain and self-reported disability (Oswestry Disability Index). Logistic regression was used to analyze the predictive value of baseline characteristics including the stratified subgroups.

**RESULTS:**

High-grade subarticular nerve compression predicted the 1-yr improvement in both visual analogue scale leg pain (P = 0.046) and Oswestry Disability Index (P = 0.027). Low age (P < 0.001), short duration of leg pain (P = 0.015), and central/subarticular disc herniation (P = 0.017) predicted improvement in Oswestry Disability Index.

**CONCLUSIONS:**

In patients treated with one or several transforaminal epidural steroid injections due to chronic lumbar radicular pain, clinical findings failed to predict the 1-yr treatment response. Low age, short duration of leg pain, central/subarticular disc herniation, and high-grade subarticular nerve compression predicted a favorable 1-yr response to transforaminal epidural steroid injection.

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### TA in pregnancy

BMC Musculoskelet Disord. 2017 Aug 25;18(1):372. doi: 10.1186/s12891-017-1732-9.

#### **The transverse abdominal muscle is excessively active during active straight leg raising in pregnancy-related posterior pelvic girdle pain: an observational study.**

Mens JMA<sup>1,2</sup>, Pool-Goudzwaard A<sup>3</sup>.

#### **BACKGROUND:**

Many studies suggest that impairment of motor control is the mechanical component of the pathogenesis of painful disorders in the lumbo-sacral region; however, this theory is still unproven and the results and recommendations for intervention remain questionable. The need for a force to compress both innominate bones against the sacrum is the basis for treatment of pregnancy-related pelvic girdle pain (PGP). Therefore, it is advised to use a pelvic belt and do exercises to enhance contraction of the muscles which provide this compression. However, our clinical experience is that contraction of those muscles appears to be excessive in PGP. Therefore, in patients with long-lasting pregnancy-related posterior PGP, there is a need to investigate the contraction pattern of an important muscle that provides a compressive force, i.e. the transverse abdominal muscle (TrA), during a load transfer test, such as active straight leg raising (ASLR).

#### **METHODS:**

TrA thickness was measured by means of ultrasound imaging at rest and during ASLR in 43 non-pregnant women with ongoing posterior PGP that started during a pregnancy or delivery, and in 39 women of the same age group who had delivered at least once and had no current PGP (healthy controls).

#### **RESULTS:**

In participants with PGP, the median TrA thickness increase with respect to rest during ipsilateral and contralateral ASLR was 31% (SD 46%) and 31% (SD 57%), respectively. In healthy controls, these values were 11% (SD 25%) and 13% (SD 22%), respectively.

#### **CONCLUSIONS:**

Significant excessive contraction of the TrA is present during ASLR in patients with long-lasting pregnancy-related posterior PGP. The present findings do not support the idea that contraction of the TrA is decreased in long-lasting pregnancy-related PGP. This implies that there is no rationale for the prescription of exercises to enhance contraction of TrA in patients with long-lasting pregnancy-related PGP.

## 8. VISCERA

### Gluten free options in the UK

J Hum Nutr Diet. 2017 Aug 29. doi: 10.1111/jhn.12502.

#### **An investigation into the nutritional composition and cost of gluten-free versus regular food products in the UK.**

Fry L<sup>1</sup>, Madden AM<sup>1</sup>, Fallaize R<sup>1,2</sup>.

#### **BACKGROUND:**

The gluten-free (GF) food market has expanded considerably, although there is limited comparative evidence for the nutritional quality and cost of GF food products. The present study aims to compare the nutrient composition and cost of GF and gluten-containing (regular) foods across 10 food categories in the UK.

#### **METHODS:**

Nutritional information and the cost of GF foods available in the UK (n = 679) and comparable regular foods (n = 1045) were systematically collected from manufacturer and supermarket websites. Foods were classified using UK front-of-pack labelling for content of fat, saturated fat, sugar and salt and nutrient content, and cost per 100 g were identified and compared between GF and regular foods.

#### **RESULTS:**

Overall, more GF foods were classified as containing high and medium fat, saturated fat, sugar and salt than regular foods, although this was not universally consistent. More GF bread and flour products contained high fat and sugar, whereas fewer GF crackers contained high fat and sugar compared to regular foods. High salt content was found more frequently in GF than regular products. On average, GF products were 159% more expensive than regular (£0.44/100 g versus £1.14/100 g). GF items were also more likely to be lower in fibre and protein content than regular foods.

#### **CONCLUSIONS:**

Differences exist in the nutritional composition of GF and regular food. GF food is unlikely to offer healthier alternatives to regular foods, except for those who require a GF diet for medically diagnosed conditions, and it is associated with higher costs.

**Gluten and Celiac's disease**

Gut. 2017 Aug 4. pii: gutjnl-2017-314461. doi: 10.1136/gutjnl-2017-314461.

**HLA-DQ:gluten tetramer test in blood gives better detection of coeliac patients than biopsy after 14-day gluten challenge.**

Sarna VK<sup>1,2</sup>, Skodje GI<sup>2,3</sup>, Reims HM<sup>4</sup>, Risnes LF<sup>1,5</sup>, Dahal-Koirala S<sup>1,5</sup>, Sollid LM<sup>1,2,5</sup>, Lundin KEA<sup>2,5,6</sup>.

**OBJECTIVE:**

Initiation of a gluten-free diet without proper diagnostic work-up of coeliac disease is a frequent and demanding problem. Recent diagnostic guidelines suggest a gluten challenge of at least 14 days followed by duodenal biopsy in such patients. The rate of false-negative outcome of this approach remains unclear. We studied responses to 14-day gluten challenge in subjects with treated coeliac disease.

**DESIGN:**

We challenged 20 subjects with biopsy-verified coeliac disease, all in confirmed mucosal remission, for 14 days with 5.7 grams per oral gluten daily. Duodenal biopsies were collected. Blood was analysed by multiplex assay for cytokine detection, and by flow cytometry using HLA-DQ:gluten tetramers.

**RESULTS:**

Nineteen participants completed the challenge. Villous blunting appeared at end of challenge in 5 of 19 subjects. Villous height to crypt depth ratio reduced with at least 0.4 concomitantly with an increase in intraepithelial lymphocyte count of at least 50% in 9 of 19 subjects. Interleukin-8 plasma concentration increased by more than 100% after 4 hours in 7 of 19 subjects. Frequency of blood CD4<sup>+</sup> effector-memory gut-homing HLA-DQ:gluten tetramer-binding T cells increased by more than 100% on day 6 in 12 of 15 evaluated participants.

**CONCLUSION:**

A 14-day gluten challenge was not enough to establish significant mucosal architectural changes in majority of patients with coeliac disease (sensitivity ≈25%-50%). Increase in CD4<sup>+</sup> effector-memory gut-homing HLA-DQ:gluten tetramer-binding T cells in blood 6 days after gluten challenge is a more sensitive and less invasive biomarker that should be validated in a larger study.

### Inflammation and CV risk

#### **Association between chronic immune-mediated inflammatory diseases and cardiovascular risk**

Heart

BaenaDiez1 JM, et al.

This study assessed the cardiovascular risk ( 6-year coronary artery disease, stroke, cardiovascular disease incidence and overall mortality) in chronic immune-mediated diseases (rheumatoid arthritis, systemic lupus erythematosus or the following chronic immune-mediated inflammatory diagnoses groups: inflammatory bowel diseases, inflammatory polyarthropathies, systemic connective tissue disorders and spondylopathies); and estimated the population attributable fractions for all four end-points for each chronic immune-mediated inflammatory disease.

The estimated cardiovascular risk and population impact were highest in systemic connective tissue disorders and rheumatoid arthritis, followed by inflammatory bowel diseases.

**10 A. CERVICAL SPINE****Neck and shoulder pain problems**

Occup Environ Med. 2017 Aug 23. pii: oemed-2017-104422. doi: 10.1136/oemed-2017-104422.

**Long-term prognosis for neck-shoulder pain and disorders: a 14-year follow-up study.**

Jakobsen EL<sup>1</sup>, Biering K<sup>1</sup>, Kærgaard A<sup>1</sup>, Dalbøge A<sup>1,2</sup>, Andersen JH<sup>1</sup>.

**OBJECTIVES:**

The long-term prognosis for neck-shoulder pain and disorders and the impact of shoulder exposure among former sewing machine operators were investigated in a 14-year follow-up study.

**METHODS:**

Information on neck-shoulder pain and disorders was collected by questionnaire and clinical examination at baseline in 243 female sewing machine operators and by questionnaire 14 years later. During follow-up, information on comorbidity and job exposures was obtained from registers and by linking register-based D-ISCO 88 codes with a job exposure matrix. Logistic regression analyses were performed to examine associations between neck-shoulder pain and disorders at baseline and neck-shoulder pain and physical functioning at follow-up.

**RESULTS:**

We found an association between neck-shoulder disorders at baseline and neck-shoulder pain at follow-up (OR 5.9;95% CI 1.9 to 17.7), and between neck-shoulder pain at baseline and neck-shoulder pain at follow-up (OR 8.2;95% CI 3.5 to 19.2). Associations between neck-shoulder disorders and pain at baseline and limited physical functioning at follow-up had ORs of 5.0 (95% CI 1.5 to 16.1) and 2.2 (95% CI 1.1 to 4.6), respectively. In women still working in 2008, the association between neck-shoulder pain in 1994 and in 2008 seemed to be stronger for those in jobs with high job shoulder exposure.

**CONCLUSIONS:**

The results suggest a long-term adverse prognosis for neck-shoulder pain. High job shoulder exposure can worsen this prognosis for those who continue working. This knowledge could influence the counselling given to similar workers and emphasises the need to prevent neck-shoulder pain.

**13 B. TMJ/ORAL****Posture and chewing**

J Oral Rehabil. 2017 Aug 29. doi: 10.1111/joor.12555.

**Effect of body posture on chewing behaviors in healthy volunteers.**

Iizumi T<sup>1,2</sup>, Magara J<sup>1</sup>, Tsujimura T<sup>1</sup>, Inoue M<sup>1</sup>.

Mastication is essential to the eating process, and forms an important part of feeding behavior.

Many factors related to the food bolus, such as bolus texture and size, are known to influence mastication. The aim of the present study was to determine the effects of body posture on (1) chewing duration prior to the first swallow and (2) patterns of mastication-related EMG activity.

We asked 10 healthy adults to chew 8 g of steamed rice with barium sulfate while we recorded masseter, suprahyoid, and infrahyoid muscle activity and simultaneously collected videofluorographic images. Participants chewed in either an upright or reclining position. Chewing duration, which was defined as the time from the start of mastication to the first swallow, was not different between the positions. However, the variability of chewing duration was larger in the upright vs. reclining position, and the chewing duration in the reclining position was distributed around 15 s. Masseter activity gradually decreased in a time dependent manner and was significantly larger at the early vs. late stage of mastication. Suprahyoid activity was significantly larger at the early vs. middle stage of mastication in the upright position only. Finally, masseter activity per second was negatively correlated with changes in chewing duration, i.e., the larger the increase in chewing duration in the reclining position, the more the decrease in masseter activity per second.

These results suggest that position-dependent changes in chewing behaviors, as described by chewing duration and EMG activity, may vary among participants. This article is protected by copyright. All rights reserved.

**13 C. AIRWAYS/SWALLOWING/SPEECH****Treatment impact on airways****September 2017** Volume 152, Issue 3, Pages 364–370**Assessment of upper airway size after orthopedic treatment for maxillary protrusion or mandibular retrusion**

Muge Aksu Hande Gorucu-Coskuner Tulin Taner

Department of Orthodontics, Faculty of Dentistry, Hacettepe University, Ankara, Turkey

DOI: <http://dx.doi.org/10.1016/j.ajodo.2016.12.027>**Introduction**

The aim of this retrospective study was to find out whether different Class II treatments would affect the airway sizes of patients having maxillary protrusion or mandibular retrusion.

**Methods**

The study sample comprised 57 Class II patients whose upper airway sizes were not significantly different at the start of treatment and whose sagittal skeletal jaw relationships showed that they had maxillary protrusion or mandibular retrusion. Twenty-two of them were treated with cervical headgear, 16 with activator, and 19 were selected as a control. Lateral cephalograms at the start of treatment and the end of orthopedic treatment were assessed. The intragroup comparisons were performed by using the paired-samples *t* test, and intergroup comparisons of the skeletal features and upper airways were performed with 1-way analysis of variance, with the Tukey test as a second step, at  $P < 0.05$ .

**Results**

The ANB angle decreased significantly in the treatment groups. The middle airway space and the SNB angle were significantly increased after the activator therapy ( $P < 0.05$ ). The SNB angle increased and SN-1 decreased in the mandibular retrusion group when compared with both maxillary protrusion and control groups. No statistically significant difference between the maxillary protrusion and the mandibular retrusion groups was found regarding the upper airway sizes after cervical headgear or activator treatments, respectively ( $P > 0.05$ ). The only significant differences observed in airway variables were at the middle airway space of the activator and control groups with an increase of  $1.6 \pm 2.5$  mm and a decrease of  $1.5 \pm 2.3$  mm, respectively.

**Conclusions**

Orthopedic treatment with either cervical headgear or activator did not result in different upper airway changes, but activator treatment resulted in increased middle airway space with regard to the Class II control group.

**Depression and sleep**

J Oral Rehabil. 2017 Aug 29. doi: 10.1111/joor.12552.

**Depressive Symptoms Account for Differences between Self-reported Versus Polysomnographic Assessment of Sleep Quality in Women with Myofascial TMD.**

Dubrovsky B<sup>1,2</sup>, Janal MN<sup>3</sup>, Lavigne GJ<sup>4</sup>, Sirois DA<sup>1</sup>, Wigren PE<sup>1,5</sup>, Nemelivsky L<sup>6</sup>, Krieger AC<sup>6</sup>, Raphael KG<sup>1</sup>.

**BACKGROUND:**

Temporomandibular disorder (TMD) patients report poor sleep quality on the Pittsburgh Sleep Quality Index (PSQI). However, polysomnographic (PSG) studies show meager evidence of sleep disturbance on standard physiological measures.

**OBJECTIVE:**

The present aim was to analyze self-reported sleep quality in TMD as a function of myofascial pain, PSG parameters, and depressive symptomatology.

**METHODS:**

PSQI scores from 124 women with myofascial TMD and 46 matched controls were hierarchically regressed onto TMD presence, ratings of pain intensity and pain-related disability, in-lab PSG variables, and depressive symptoms (Symptoms Checklist-90).

**RESULTS:**

Relative to controls, TMD cases had higher PSQI scores, representing poorer subjective sleep, and more depressive symptoms (both  $P < 0.001$ ). Higher PSQI scores were strongly predicted by more depressive symptoms ( $P < 0.001$ ,  $R^2 = 26\%$ ). Of 19 PSG variables, two had modest contributions to higher PSQI scores: longer REM latency in TMD cases ( $P = 0.01$ ,  $R^2 = 3\%$ ) and more awakenings in all participants ( $P = 0.03$ ,  $R^2 = 2\%$ ). After accounting for these factors, TMD presence and pain ratings were not significantly related to PSQI scores.

**CONCLUSION:**

These results show that reported poor sleep quality in TMD is better explained by depressive symptoms than by PSG-assessed sleep disturbances or myofascial pain. As TMD cases lacked typical PSG features of clinical depression, the results suggest a negative cognitive bias in TMD and caution against interpreting self-report sleep measures as accurate indicators of PSG sleep disturbance. Future investigations should take account of depressive symptomatology when interpreting reports of poor sleep. This article is protected by copyright. All rights reserved.

### 16. CONCUSSIONS

#### New test for

#### **King-Devick test identifies real-time concussion and asymptomatic concussion in youth athletes**

Neurology® Clinical Practice

Dhawan PS, et al.

This study was designed not only to assess the utility of the King–Devick (K–D) test in real time for identification of symptomatic concussion in youth athletes but also to determine if similar impairment (subclinical concussion) exists in youth athletes without an obvious head injury or symptoms.

Findings revealed that rapid number naming using the K–D test accurately identified real–time, symptomatic concussion in youth athletes. However, scores in concussed players could remain abnormal over time. The outcomes suggested that athletes should undergo preseason and postseason K–D testing, with additional evaluation real time to inform the assessment of suspected concussion.

**24. ELBOW****Kinesiotaping helps epicondylitis**

Knee Surgery, Sports Traumatology, Arthroscopy  
pp 1–8

**Does Kinesiotaping improve pain and functionality in patients with newly diagnosed lateral epicondylitis?**

Leyla Eraslan Deniz Yuce Arzu Erbilici Gul Baltaci

**Purpose**

This study aimed to compare the short-term effects of kinesiotaping and extracorporeal shock wave therapy (ESWT) along with physiotherapy on pain, functionality, and grip strength in patients with newly diagnosed lateral epicondylitis undergoing rehabilitation.

**Methods**

Forty-five voluntary patients (mean age 48 years) were randomly assigned to three groups. Patients in all groups received physiotherapy consisting of a cold pack and transcutaneous electrical nerve stimulation five times per week for a total of 15 sessions and a home exercise programme including stretching and eccentric strength exercises. In the second group, patients received kinesiotaping 5 days a week for 3 weeks. In the third group, ESWT was applied three times for 3 weeks. Patients were assessed by visual analogue scale for pain intensity, pain-free grip strength using a hand dynamometer, Cyriax Resisted Muscle Test, and Patient-Rated Tennis Elbow Evaluation Scale. All measurements were collected at baseline and after treatment.

**Results**

There were no significant differences in the demographic characteristics of the patients in all groups at baseline. Intra-group analysis revealed that pain intensity decreased, whereas maximum grip strength and functionality increased in all groups at the end of the treatment ( $p < 0.05$ ). Inter-group analysis revealed that the kinesiotaping group yielded better results in decreasing pain intensity than the other groups ( $p < 0.05$ ). The kinesiotaping group ( $p < 0.001$ ) and ESWT group ( $p = 0.002$ ) yielded better results in improving functionality than the physiotherapy group. There were significant differences in recovering pain-free grip strength in the kinesiotaping group ( $p < 0.05$ ).

**Conclusion**

Kinesiotaping was found to be effective for decreasing pain intensity, recovering grip strength, and improving functionality in patients with lateral epicondylitis undergoing rehabilitation.

**30 A. IMPINGEMENT****Adolescents physical activity and Cam**

Br J Sports Med. 2017 Aug 10. pii: bjsports-2017-097626. doi: 10.1136/bjsports-2017-097626.

**Physical activity during adolescence and the development of cam morphology: a cross-sectional cohort study of 210 individuals.**

Palmer A<sup>1</sup>, Fernquest S<sup>1</sup>, Gimpel M<sup>2</sup>, Birchall R<sup>2</sup>, Judge A<sup>1,3</sup>, Broomfield J<sup>1</sup>, Newton J<sup>1</sup>, Wotherspoon M<sup>2</sup>, Carr A<sup>1</sup>, Glyn-Jones S<sup>1</sup>.

**INTRODUCTION:**

Cam morphology is a strong risk factor for the development of hip pain and osteoarthritis. It is increasingly thought to develop in association with intense physical activity during youth; however, the aetiology remains uncertain. The study aim was to characterise the effect of physical activity on morphological hip development during adolescence.

**METHODS:**

Cross-sectional study of individuals aged 9-18 years recruited from Southampton Football Club Academy (103 male) with an age-matched control population (52 males and 55 females). Assessments included questionnaires and 3 Tesla MRI of both hips. Alpha angle, epiphyseal extension and epiphyseal tilt were measured on radial images.

**RESULTS:**

Alpha angle and epiphyseal extension increased most rapidly between ages 12 and 14 years. Soft-tissue hypertrophy at the femoral head-neck junction preceded osseous cam morphology and was first evident at age 10 years. The greatest increase and highest absolute values of alpha angle and epiphyseal extension were colocalised at 1 o'clock. Maximum alpha angles were 6.7 degrees greater in males than females ( $p=0.005$ ). Compared with individuals who play no regular sport, alpha angles were 4.0 degrees higher in individuals who play sport for a school or club ( $p=0.041$ ) and 7.7 degrees higher in individuals competing at a national or international level ( $p=0.035$ ). There was no association with leg dominance .

**CONCLUSIONS:**

Sporting activity during adolescence is strongly associated with the development of cam morphology secondary to epiphyseal hypertrophy and extension with a dose-response relationship. Males participating in competitive sport are at particularly elevated risk of developing cam morphology and secondary hip pathology.

**32 A. KNEE/ACL****Female knee laxity**

Knee Surg Sports Traumatol Arthrosc. 2017 Aug 19. doi: 10.1007/s00167-017-4684-6

**Female sex is associated with greater rotatory knee laxity in collegiate athletes.**

Pfeiffer TR<sup>1,2</sup>, Kanakamedala AC<sup>2</sup>, Herbst E<sup>2,3</sup>, Nagai K<sup>2</sup>, Murphy C<sup>2</sup>, Burnham JM<sup>2</sup>, Popchak A<sup>4</sup>, Debski RE<sup>5</sup>, Musahl V<sup>6</sup>.

**PURPOSE/HYPOTHESIS:**

The purpose of this observational study was to determine which factors, including sex, are associated with increased rotatory knee laxity in collegiate athletes with no history of knee injuries. It was hypothesized that increased rotatory knee laxity, measured by a quantitative pivot shift test, would correlate with female sex, increased anterior translation during the Lachman test, generalized ligamentous laxity, and knee hyperextension.

**METHODS:**

Ninety-eight collegiate athletes with a median age of 20 (range 18-25) years with no history of knee injuries were tested. IKDC and Marx activity scores were obtained and subjects underwent measurement of anterior translation during the Lachman test with a Rolimeter and measurement of knee hyperextension with a goniometer for both knees. A standardized pivot shift test was performed in both knees and quantified using image analysis technology. Generalized ligamentous laxity was assessed using the modified Beighton score.

**RESULTS:**

The average anterior translation of the lateral compartment during the pivot shift test was 1.6 mm (range 0.1-7.1) with a mean side-to-side difference of 0.6 mm (range 0-2.7). The average anterior translation during the Lachman test was 9.0 (range 2-15). The anterior translation of the lateral compartment during the pivot shift test was significantly higher in females (median, 1.6; range 0.3-4.9) than in males (1.1, 0.1-7.1 mm) ( $p < 0.05$ ). Anterior translation of the lateral compartment during the pivot shift test was significantly correlated with anterior translation during the Lachman test ( $r = 0.34$ ;  $p < 0.05$ ). There was no significant correlation between anterior translation of the lateral compartment during the pivot shift test and knee hyperextension or modified Beighton score (n.s).

**CONCLUSION:**

The data from this study show that female sex is associated with increased rotatory knee laxity measured during the pivot shift test and anterior translation during the Lachman test in collegiate athletes. In the future, these data may be helpful in diagnosing and managing ACL injuries in athletes and could be used in the clinic as a baseline by which to compare and identify patients who might exhibit increased rotatory laxity.

### Location of tear

Knee. 2017 Aug 10. pii: S0968-0160(17)30133-3. doi: 10.1016/j.knee.2017.05.009.

### **Role of tear location on outcomes of open primary repair of the anterior cruciate ligament: A systematic review of historical studies.**

van der List JP<sup>1</sup>, DiFelice GS<sup>2</sup>.

#### **BACKGROUND:**

The general opinion is that outcomes of open primary repair of the anterior cruciate ligament (ACL) in the historical literature were disappointing. Since good outcomes of primary repair of proximal tears have recently been reported, we aimed to assess the role of tear location on open primary repair outcomes in the historical literature.

#### **METHODS:**

All studies reporting outcomes of open primary ACL repair published between the inception of PubMed, Embase and Cochrane and 2000 were identified. Studies were included if tear location was reported. Outcome scores, return to sports, stability examinations, failures and patient satisfaction were collected and reviewed in the total study cohort and in a subgroup of studies treating only proximal tears. Spearman correlation analysis was performed between the percentage of proximal tears in the studies and all outcomes.

#### **RESULTS:**

Twenty-nine studies were included reporting outcomes of open primary in 1457 patients of which 72% had proximal and 23% midsubstance tears. Mean age was 30years, 65% were males, and mean follow-up was 3.6years. Good outcomes were noted in the total cohort, and excellent outcomes were noted following repair of proximal tears. Positive correlation was found between the percentage proximal tears in the studies and percentage satisfied patients ( $p=0.010$ ).

#### **CONCLUSION:**

Tear location seems to have played a role on the outcomes of open primary ACL repair. Outcomes of open primary repair in patients with proximal tears were excellent, which confirms there may be a potential role for primary repair as treatment for proximal ACL tears.

**35. KNEE/TOTAL****Smoking problems**

Knee. 2017 Aug 7. pii: S0968-0160(17)30138-2. doi: 10.1016/j.knee.2017.05.014.

**Smoking is associated with earlier time to revision of total knee arthroplasty.**

Lim CT<sup>1</sup>, Goodman SB<sup>2</sup>, Huddleston JI 3rd<sup>2</sup>, Harris AHS<sup>2</sup>, Bhowmick S<sup>2</sup>, Maloney WJ<sup>2</sup>, Amanatullah DF<sup>3</sup>.

**BACKGROUND:**

Smoking is associated with early postoperative complications, increased length of hospital stay, and an increased risk of revision after total knee arthroplasty (TKA). However, the effect of smoking on time to revision TKA is unknown.

**METHODS:**

A total of 619 primary TKAs referred to an academic tertiary center for revision TKA were retrospectively stratified according to the patient smoking status. Smoking status was then analyzed for associations with time to revision TKA using a Chi square test. The association was also analyzed according to the indication for revision TKA.

**RESULTS:**

Smokers (37/41, 90%) have an increased risk of earlier revision for any reason compared to non-smokers (274/357, 77%,  $p=0.031$ ). Smokers (37/41, 90%) have an increased risk of earlier revision for any reason compared to ex-smokers (168/221, 76%,  $p=0.028$ ). Subgroup analysis did not reveal a difference in indication for revision TKA ( $p>0.05$ ).

**CONCLUSIONS:**

Smokers are at increased risk of earlier revision TKA when compared to non-smokers and ex-smokers. The risk for ex-smokers was similar to that of non-smokers. Smoking appears to have an all-or-none effect on earlier revision TKA as patients who smoked more did not have higher risk of early revision TKA. These results highlight the need for clinicians to urge patients not to begin smoking and encourage smokers to quit smoking prior to primary TKA.

**37. OSTEOARTHRITIS/KNEE****Chondroitin helpful with OA**

Ann Rheum Dis. 2017 Sep;76(9):1537-1543. doi: 10.1136/annrheumdis-2016-210860. Epub 2017 May 22.

**Pharmaceutical-grade Chondroitin sulfate is as effective as celecoxib and superior to placebo in symptomatic knee osteoarthritis: the ChONDroitin versus CElecoxib versus Placebo Trial (CONCEPT).**

Reginster JY<sup>1</sup>, Dudler J<sup>2</sup>, Blicharski T<sup>3</sup>, Pavelka K<sup>4</sup>.

**OBJECTIVES:**

Chondroitin sulfate 800 mg/day (CS) pharmaceutical-grade in the management of symptomatic knee osteoarthritis consistent with the European Medicines Agency guideline.

**METHODS:**

A prospective, randomised, 6-month, 3-arm, double-blind, double-dummy, placebo and celecoxib (200 mg/day)-controlled trial assessing changes in pain on a Visual Analogue Scale (VAS) and in the Lequesne Index (LI) as coprimary endpoints. Minimal-Clinically Important Improvement (MCII), Patient-Acceptable Symptoms State (PASS) were used as secondary endpoints.

**RESULTS:**

604 patients (knee osteoarthritis) diagnosed according to American College of Rheumatology (ACR) criteria, recruited in five European countries and followed for 182 days. CS and celecoxib showed a greater significant reduction in pain and LI than placebo. In the intention-to-treat (ITT) population, pain reduction in VAS at day 182 in the CS group (-42.6 mm) and in celecoxib group (-39.5 mm) was significantly greater than the placebo group (-33.3 mm) ( $p=0.001$  for CS and  $p=0.009$  for celecoxib), while no difference observed between CS and celecoxib. Similar trend for the LI, as reduction in this metric in the CS group (-4.7) and celecoxib group (-4.6) was significantly greater than the placebo group (-3.7) ( $p=0.023$  for CS and  $p=0.015$  for celecoxib), no difference was observed between CS and celecoxib. Both secondary endpoints (MCII and PASS) at day 182 improved significantly in the CS and celecoxib groups. All treatments demonstrated excellent safety profiles.

**CONCLUSION:**

A 800 mg/day pharmaceutical-grade CS is superior to placebo and similar to celecoxib in reducing pain and improving function over 6 months in symptomatic knee osteoarthritis (OA) patients. This formulation of CS should be considered a first-line treatment in the medical management of knee OA.

#### 44. RHUMATOID ARTHRITIS

##### Prevalence of

Rheumatol Int. 2017 Apr 28. doi: 10.1007/s00296-017-3726-1.

##### **Prevalence of rheumatoid arthritis in the United States adult population in healthcare claims databases, 2004-2014.**

Hunter TM<sup>1</sup>, Boytsov NN<sup>2</sup>, Zhang X<sup>2</sup>, Schroeder K<sup>2</sup>, Michaud K<sup>3</sup>, Araujo AB<sup>2</sup>.

This study aimed to determine the prevalence of rheumatoid arthritis in the United States (US) adult insured population from 2004 to 2014.

This was an observational, retrospective, cross-sectional study based on US administrative health insurance claims databases (Truven Health MarketScan<sup>®</sup> Research database and IMS PharMetrics Plus database). Trends in RA prevalence focusing on the 10-year period covering January 1, 2004-December 31, 2014 were analyzed using a validated algorithm for the identification of RA. Prevalence rates in the databases were determined and age- and gender-adjusted rates were projected to the US population in 2014. Analysis of data from the two databases indicated that the RA prevalence rate in commercially insured adult US population ranged from 0.41 to 0.54% from 2004 to 2014. The prevalence varied substantially by gender and age in each year and increased gradually across the years for most subgroups. In 2014, out of 31,316,902 adult patients with continuous enrollment in the Truven Health MarketScan<sup>®</sup> Research database, 157,634 (0.50%) patients met our criteria for RA. Similarly, out of 35,083,356 adult patients in the IMS PharMetrics Plus database, 139,300 (0.50%) patients met our criteria for RA. In 2014, the overall age-adjusted prevalence of RA ranged from 0.53 to 0.55% (0.29-0.31% for males and 0.73-0.78% for females).

The prevalence of RA in the US appeared to increase during the period from 2004 to 2014, affecting a conservative estimate of 1.28-1.36 million adults in 2014.

**45 C. MANUAL THERAPY THORACIC****Effects of****RESEARCH REPORT****Neuroendocrine Response Following a Thoracic Spinal Manipulation in Healthy Men**

**Authors:** Kesava Kovanur Sampath, PT, MOst<sup>1</sup>, Erik Botnmark, PT<sup>1</sup>, Ramakrishnan Mani, PT, PhD<sup>1</sup>, James David Cotter, PhD<sup>2</sup>, Rajesh Katare, PhD<sup>3</sup>, Pujika Emani Munasinghe, BSc<sup>3</sup>, Steve Tumilty, PT, PhD<sup>1</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2017 **Volume:**47 **Issue:**9 **Pages:**617–627 **DOI:**10.2519/jospt.2017.7348

PDF | PDF Plus

**Study Design**

Controlled laboratory study.

**Background**

Spinal manipulation (SM) can trigger a cascade of responses involving multiple systems, including the sympathetic nervous system and the endocrine system, specifically, the hypothalamic-pituitary axis. However, no manual therapy study has investigated the neuroendocrine response to SM (ie, sympathetic nervous system-hypothalamic-pituitary axis) in the same trial.

**Objective**

To determine short-term changes in sympathetic nervous system activity, heart rate variability, and endocrine activity (cortisol, testosterone, and testosterone-cortisol [T/C] ratio) following a thoracic SM.

**Methods**

Twenty-four healthy men aged between 18 and 45 years were randomized into 2 groups: thoracic SM (n = 12) and sham (n = 12). Outcome measures were salivary cortisol (micrograms per deciliter), salivary testosterone (picograms per milliliter), T/C ratio, heart rate variability, and changes in oxyhemoglobin concentration of the right calf muscle (micromoles per liter). Measurements were done before and at 5 minutes, 30 minutes, and approximately 6 hours after intervention.

**Results**

A statistically significant group-by-time interaction was noted for T/C ratio ( $P < .05$ ) and salivary cortisol ( $P < .01$ ) concentrations. Significant between-group differences were noted for salivary cortisol concentration at 5 minutes (mean difference, 0.35; 95% confidence interval: 0.12, 0.6; interaction:  $P < .01$ ) and for T/C ratio at 6 hours postintervention (mean difference,  $-0.09$ ; 95% confidence interval:  $-0.16$ ,  $-0.04$ ;  $P = .02$ ). However, SM did not differentially alter oxyhemoglobin, testosterone, or heart rate variability relative to responses in the sham group.

**Conclusion**

Thoracic SM resulted in an immediate decrease in salivary cortisol concentration and reduced T/C ratio 6 hours after intervention. A pattern of immediate sympathetic excitation was also observed in the SM group. *J Orthop Sports Phys Ther* 2017;47(9):617–627. Epub 13 Jul 2017. doi:10.2519/jospt.2017.7348

**46 A. UPPER LIMB NEUROMOBILIZATION****Neural mobilization impact**

## RESEARCH REPORT

**The Effectiveness of Neural Mobilization for Neuromusculoskeletal Conditions: A Systematic Review and Meta-analysis**

**Authors:** Annalie Basson, PhD<sup>1</sup>, Benita Olivier, PhD<sup>1</sup>, Richard Ellis, PhD<sup>2</sup>, Michel Coppieters, PhD<sup>3-5</sup>, Aimee Stewart, PhD<sup>1</sup>, Witness Mudzi, PhD<sup>1</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2017 **Volume:**47 **Issue:**9 **Pages:**593–615 **DOI:**10.2519/jospt.2017.7117

**Study Design**

Systematic review with meta-analysis.

**Objectives**

To determine the efficacy of neural mobilization (NM) for musculoskeletal conditions with a neuropathic component.

**Background** Neural mobilization, or neurodynamics, is a movement-based intervention aimed at restoring the homeostasis in and around the nervous system. The current level of evidence for NM is largely unknown.

**Methods**

A database search for randomized trials investigating the effect of NM on neuromusculoskeletal conditions was conducted, using standard methods for article identification, selection, and quality appraisal. Where possible, studies were pooled for meta-analysis, with pain, disability, and function as the primary outcomes.

**Results**

Forty studies were included in this review, of which 17 had a low risk of bias. Meta-analyses could only be performed on self-reported outcomes. For chronic low back pain, disability (Oswestry Disability Questionnaire [0–50]: mean difference, –9.26; 95% confidence interval [CI]: –14.50, –4.01;  $P < .001$ ) and pain (intensity [0–10]: mean difference, –1.78; 95% CI: –2.55, –1.01;  $P < .001$ ) improved following NM. For chronic neck-arm pain, pain improved (intensity: mean difference, –1.89; 95% CI: –3.14, –0.64;  $P < .001$ ) following NM. For most of the clinical outcomes in individuals with carpal tunnel syndrome, NM was not effective ( $P > .11$ ) but showed some positive neurophysiological effects (eg, reduced intraneural edema). Due to a scarcity of studies or conflicting results, the effect of NM remains uncertain for various conditions, such as postoperative low back pain, cubital tunnel syndrome, and lateral epicondylalgia.

**Conclusion**

This review reveals benefits of NM for back and neck pain, but the effect of NM on other conditions remains unclear. Due to the limited evidence and varying methodological quality, conclusions may change over time.

**Level of Evidence** Therapy, level 1a. *J Orthop Sports Phys Ther* 2017;47(9):593–615. Epub 13 Jul 2017. doi:10.2519/jospt.2017.7117

## 53. CORE

### Stab ex in hypermobile system

#### **Effects of spinal stabilization exercises in women with benign joint hypermobility syndrome: A randomized controlled trial**

Rheumatology International

Celenay ST, et al.

The effects of an 8-week lumbar spinal stabilization exercise program were examined on pain, trunk muscle endurance, and postural stability in women with benign joint hypermobility syndrome (BJHS). Outcomes approved that the lumbar spinal stabilization exercise program improved pain complaints, postural stability, and trunk muscle endurance in women with BJHS.

- In this study, women with BJHS were randomly allocated into exercise (n = 20) and control (n = 18) groups.
- The lumbar spinal stabilization exercise program was carried out 3 days a week for 8 weeks.
- BJHS with Brighton criteria, musculoskeletal pain intensity with Visual Analog Scale, trunk muscle endurance with McGill's trunk muscle endurance tests, and postural stability as static and dynamic while eyes open and closed with Biodex Balance System SD were evaluated.
- For statistical analysis, Chi-square test, independent sample t test, Mann-Whitney U test, and Wilcoxon test were used.
- It was reported that most of the patients with BJHS had low back (exercise group 40.0%; control group 22.2%) and knee pain (exercise group 15.0%; control group 22.2%).
- In the exercise group after the program, pain intensity, and static and dynamic stability scores (eyes closed) decreased, and trunk muscle endurance scores increased.
- In the control group, there was no difference for all parameters.
- Pain intensity, trunk muscle endurance, and only dynamic stability (eyes open) improved in the exercise group in comparison to the control group.

**55. SCOLIOSIS****QOL after surgery**

Eur J Orthop Surg Traumatol. 2017 Aug 10. doi: 10.1007/s00590-017-2027-4

**Midlife changes of health-related quality of life in adolescent idiopathic scoliosis patients who underwent spinal fusion during adolescence.**

Akazawa T<sup>1,2</sup>, Kotani T<sup>3</sup>, Sakuma T<sup>3</sup>, Minami S<sup>3</sup>, Torii Y<sup>4</sup>, Orita S<sup>5</sup>, Inage K<sup>5</sup>, Fujimoto K<sup>5</sup>, Shiga Y<sup>5</sup>, Inoue G<sup>6</sup>, Miyagi M<sup>6</sup>, Saito W<sup>6</sup>, Ohtori S<sup>5</sup>, Niki H<sup>4</sup>.

**PURPOSE:**

Our previous study reported a good health-related quality of life (HRQOL) in adolescent idiopathic scoliosis (AIS) patients 21 years or more after surgery. The purpose of this study is to investigate midlife changes in HRQOL among AIS patients who passed further 5 years from the previous survey.

**METHODS:**

Subjects were 252 individuals who underwent spinal fusion for AIS between 1968 and 1988. The survey was administered twice-in 2009 and in 2014 using Scoliosis Research Society Patient Questionnaire (SRS-22). We analysed survey responses from 42 individuals (39 females, 3 males) who responded to both surveys.

**RESULTS:**

The average scores for each respective domain of the SRS-22 in 2009 and 2014, respectively, were: function, 4.3 and 4.2; pain, 4.3 and 4.3; self-image, 3.0 and 2.9; mental, 3.9 and 3.8; satisfaction, 3.6 and 3.5. There were no significant differences in any domain of the SRS-22 between 2009 and 2014. Comparing non-fused segments of the lumbar spine of patients with fewer than four discs remaining with patients with four discs or more remaining, SRS-22 satisfaction score decreased more in patients with fewer than four discs (change in patients with four discs or more: -0.02; change in patients with fewer than four discs: -0.38; P = 0.05).

**CONCLUSION:**

Each SRS-22 subscore was similar between 2009 and 2014 surveys. Those scoliosis patients who underwent spinal fusion during adolescence had good HRQOL scores in midlife. Even after five years passed, good conditions were maintained.

**56. ATHLETICS****Depression in athletes**

Br J Sports Med. 2017 Sep;51(18):1348-1354. doi: 10.1136/bjsports-2016-096455. Epub 2017 Mar 2.

**Depressive symptoms in high-performance athletes and non-athletes: a comparative meta-analysis.**

Gorczynski PF<sup>1</sup>, Coyle M<sup>2</sup>, Gibson K<sup>2</sup>.

**OBJECTIVE:**

To assess whether a difference exists in the prevalence of mild or more severe depressive symptoms between high-performance athletes and non-athletes.

**DESIGN:**

Comparative OR meta-analysis.

**DATA SOURCES:**

We searched PsycINFO, PubMed, MEDLINE, CINAHL, SPORTDiscus and Google Scholar, as well as the reference lists of reviews of mental health issues in high-performance athletes.

**ELIGIBILITY:**

We included studies that compared high-performance athletes and non-athletes, included a validated measure of depressive symptoms and included the prevalence of individuals who indicated at least mild depressive symptoms.

**RESULTS:**

Five articles reporting data from 1545 high-performance athletes and 1811 non-athletes were examined. A comparative OR meta-analysis found high-performance athletes were no more likely than non-athletes to report mild or more severe depressive symptoms (OR=1.15, 95% CI=0.954 to 1.383, p=0.145). Male high-performance athletes (n=940) were no more likely than male non-athletes (n=605) to report mild or more severe depressive symptoms (OR=1.17, 95% CI=0.839 to 1.616, p=0.362). For females, high-performance athletes (n=948) were no more likely than non-athletes (n=605) to report mild or more severe depressive symptoms (OR=1.11, 95% CI=0.846 to 1.442, p=0.464). Overall, male high-performance athletes (n=874) were 52% less likely to report mild or more severe depressive symptoms than female high-performance athletes (n=705) (OR=0.48, 95% CI=0.369 to 0.621, p<0.001).

**SUMMARY/CONCLUSIONS:**

High-performance athletes were just as likely as non-athletes to report depressive symptoms. Researchers need to move beyond self-report measures of depressive symptoms and examine the prevalence of clinically diagnosed depressive disorders in athletes.

**Creatine and biking**

Med Sci Sports Exerc. 2017 Aug 11. doi: 10.1249/MSS.0000000000001401.

**Effects of Creatine and Carbohydrate Loading on Cycling Time Trial Performance.**

Tomcik KA<sup>1</sup>, Camera DM, Bone JL, Ross ML, Jeacocke NA, Tachtsis B, Senden J, van Loon LJC, Hawley JA, Burke LM.

**INTRODUCTION:**

Creatine- and carbohydrate-loading are dietary strategies used to enhance exercise capacity. This study examined the metabolic and performance effects of a combined creatine and CHO-loading regiment on time-trial (TT) cycling bouts.

**METHODS:**

Eighteen well-trained (~65mL[BULLET OPERATOR]kg[BULLET OPERATOR]min VO<sub>2</sub>peak) males completed three performance trials (PT) comprised of a 120-km cycling TT interspersed with alternating 1- and 4-km sprints (6 sprints each) performed every 10-km followed by an inclined ride to fatigue (~90% VO<sub>2</sub>peak). Subjects were pair-matched into either creatine-loaded (20g[BULLET OPERATOR]d for 5d + 3 g[BULLET OPERATOR]d for 9d; CR) or placebo (PLA) groups (n=9) following the completion of PT1. All subjects undertook a cross-over application of the carbohydrate interventions, consuming either moderate-(6g[BULLET OPERATOR]kg body mass (BM)/d; MOD) or CHO-loaded (12g[BULLET OPERATOR]kg BM/d; LOAD) diets before PT2 and PT3. Muscle biopsies were taken prior to PT1, 18h post-PT1, and prior to both PT2 and PT3.

**RESULTS:**

No significant differences in overall TT or inclined ride times were observed between intervention groups. PLA+LOAD improved power above baseline (P<0.05) during the final 1-km sprint whereas CR+ MOD and CR+LOAD improved power (P<0.05) during the final 4-km sprint. Greater power was achieved with MOD and LOAD compared to baseline with PLA (P<0.05). CR increased pre-PT BM compared to PLA (+1.54% vs +0.99% from baseline). CR+LOAD facilitated greater [total creatine] (P<0.05 vs. baseline) and muscle [glycogen] (P<0.01 vs. baseline and MOD) compared to PLA+LOAD. Mechanistic target of rapamycin (mTOR) decreased from baseline following glycogen depletion (~30%; P< 0.05).

**CONCLUSION:**

Power output in the closing sprints of exhaustive time-trial cycling increased with creatine ingestion despite a creatine-mediated increase in weight. Creatine co-supplemented with carbohydrates may therefore be beneficial strategy for late-stage breakaway moments in endurance events.

**59. PAIN****Phantom pain**

J Pain Res. 2017 Aug 7;10:1861-1870. doi: 10.2147/JPR.S124664. eCollection 2017.

**A review of the management of phantom limb pain: challenges and solutions.**

Richardson C<sup>1</sup>, Kulkarni J<sup>2</sup>.

**BACKGROUND:**

Phantom limb pain (PLP) occurs in 50% and 80% of amputees. Although it is often classified as a neuropathic pain, few of the large-scale trials of treatments for neuropathic pain included sufficient numbers of PLP sufferers to have confidence that they are effective in this condition. Many therapies have been administered to amputees with PLP over the years; however, as of yet, there appears to be no first-line treatment.

**OBJECTIVES:**

To comprehensively review the literature on treatment modalities for PLP and to identify the challenges currently faced by clinicians dealing with this pain.

**METHOD:**

MEDLINE, EMBASE, CINAHL, British Nursing Index, Cochrane and psycINFO databases were searched using "Phantom limb" initially as a MeSH term to identify treatments that had been tried. Then, a secondary search combining phantom limb with each treatment was performed to find papers specific to each therapy. Each paper was assessed for its research strength using the GRADE system.

**RESULTS:**

Thirty-eight therapies were identified. Overall, the quality of evidence was low. There was one high-quality study which used repetitive transcutaneous magnetic stimulation and found a statistical reduction in pain at day 15 but no difference at day 30. Significant results from single studies of moderate level quality were available for gabapentin, ketamine and morphine; however, there was a risk of bias in these papers. Mirror therapy and associated techniques were assessed through two systematic reviews, which conclude that there is insufficient evidence to support their use.

**CONCLUSION:**

No decisions can be made for the first-line management of PLP, as the level of evidence is too low. Robust studies on homogeneous populations, an understanding of what amputees consider a meaningful reduction in PLP and agreement of whether pain intensity is the legitimate therapeutic target are urgently required.

**Weight loss in chronic pain**

J Pain. 2017 Aug 25. pii: S1526-5900(17)30684-3. doi: 10.1016/j.jpain.2017.08.004.

**Improvement in the Spatial Distribution of Pain, Somatic Symptoms, and Depression Following a Weight-Loss Intervention.**

Schrepf A<sup>1</sup>, Harte SE<sup>2</sup>, Miller N<sup>3</sup>, Fowler C<sup>3</sup>, Nay C<sup>3</sup>, Williams DA<sup>2</sup>, Clauw DJ<sup>2</sup>, Rothberg A<sup>4</sup>.

Weight loss is known to improve pain localized to weight bearing joints but it is not known how weight loss affects the spatial distribution of pain and associated somatic symptoms like fatigue.

We sought to determine if weight loss using a low calorie diet improves pain, affect, and somatic symptoms commonly associated with chronic pain conditions in an observational study. We also documented changes in inflammatory markers in serum before and after weight loss. Participants were 123 obese individuals undergoing a 12-16 week calorie restriction weight loss intervention. The spatial distribution of pain, symptom severity (e.g., fatigue, sleep difficulties), depression, and total fibromyalgia scale scores were measured before and after weight loss. Pain ( $p = .022$ ), symptom severity ( $p = .004$ ), depression ( $p < .001$ ), and fibromyalgia scores ( $p = .004$ ) improved following weight loss; men showed greater improvement than women on somatic symptoms and fibromyalgia scores (both  $p < .01$ ).

Those who lost at least 10% of body weight showed greater improvement than those who lost less than 10%. Levels of the regulatory cytokine Interleukin-10 increased following the intervention ( $p = .002$ ). Weight loss may improve diffuse pain and co-morbid symptoms commonly seen in chronic pain participants.

## 61. FIBROMYALGIA

### Brain changes

J Headache Pain. 2017 Aug 23;18(1):89. doi: 10.1186/s10194-017-0799-x.

#### **Altered insula-default mode network connectivity in fibromyalgia: a resting-state magnetoencephalographic study.**

Hsiao FJ<sup>1,2</sup>, Wang SJ<sup>1,2,3,4</sup>, Lin YY<sup>1,2,3,4</sup>, Fuh JL<sup>1,3,4</sup>, Ko YC<sup>3,5</sup>, Wang PN<sup>1,3,4</sup>, Chen WT<sup>6,7,8,9</sup>.

#### **BACKGROUND:**

Fibromyalgia (FM) is a disabling chronic pain syndrome with unknown pathophysiology. Functional magnetic resonance imaging studies on FM have suggested altered brain connectivity between the insula and the default mode network (DMN). However, this connectivity change has not been characterized through direct neural signals for exploring the embedded spectrotemporal features and the pertinent clinical relevance.

#### **METHODS:**

We recorded the resting-state magnetoencephalographic activities of 28 patients with FM and 28 age- and sex-matched controls, and analyzed the source-based functional connectivity between the insula and the DMN at 1-40 Hz by using the minimum norm estimates and imaginary coherence methods. We also measured the connectivity between the DMN and the primary visual (V1) and somatosensory (S1) cortices as inpatient negative controls. Connectivity measurement was further correlated with the clinical parameters of FM.

#### **RESULTS:**

Compared with the controls, patients with FM reported more tender points ( $15.2 \pm 2.0$  vs.  $5.9 \pm 3.7$ ) and higher total tenderness score (TTS;  $29.1 \pm 7.0$  vs.  $7.7 \pm 5.5$ ; both  $p < 0.001$ ); they also had decreased insula-DMN connectivity at the theta band (4-8 Hz; left,  $p = 0.007$ ; right,  $p = 0.035$ ), but displayed unchanged V1-DMN and S1-DMN connectivity ( $p > 0.05$ ). When patients with FM and the controls were combined together, the insula-DMN theta connectivity was negatively correlated with the number of tender points (left insula,  $r = -0.428$ ,  $p = 0.001$ ; right insula,  $r = -0.4$ ,  $p = 0.002$ ) and TTS score (left insula,  $r = -0.429$ ,  $p = 0.001$ ; right insula,  $r = -0.389$ ,  $p = 0.003$ ). Furthermore, in patients with FM, the right insula-DMN connectivity at the beta band (13-25 Hz) was negatively correlated with the number of tender points ( $r = -0.532$ ,  $p = 0.004$ ) and TTS ( $r = -0.428$ ,  $p = 0.023$ ), and the bilateral insula-DMN connectivity at the delta band (1-4 Hz) was negatively correlated with FM Symptom Severity (left:  $r = -0.423$ ,  $p = 0.025$ ; right:  $r = -0.437$ ,  $p = 0.020$ ) and functional disability (Fibromyalgia Impact Questionnaire; left:  $r = -0.415$ ,  $p = 0.028$ ; right:  $r = -0.374$ ,  $p = 0.050$ ).

#### **CONCLUSIONS:**

We confirmed the frequency-specific reorganization of the insula-DMN connectivity in FM. The clinical relevance of this connectivity change may warrant future studies to elucidate its causal relationship and potential as a neurological signature for FM.

**62 A. NUTRITION/VITAMINS****Coffee helps myocardial**

Am J Clin Nutr. 2017 Aug 23. pii: ajcn153338. doi: 10.3945/ajcn.117.153338.

**Coffee consumption after myocardial infarction and risk of cardiovascular mortality: a prospective analysis in the Alpha Omega Cohort.**

van Dongen LH<sup>1</sup>, Mölenberg FJ<sup>1</sup>, Soedamah-Muthu SS<sup>1</sup>, Kromhout D<sup>1,2</sup>, Geleijnse JM<sup>3</sup>.

**Background:** Consumption of coffee, one of the most popular beverages around the world, has been associated with a lower risk of cardiovascular and all-cause mortality in population-based studies. However, little is known about these associations in patient populations.

**Objective:** This prospective study aimed to examine the consumption of caffeinated and decaffeinated coffee in relation to cardiovascular disease (CVD) mortality, ischemic heart disease (IHD) mortality, and all-cause mortality in patients with a prior myocardial infarction (MI).

**Design:** We included 4365 Dutch patients from the Alpha Omega Cohort who were aged 60-80 y (21% female) and had experienced an MI <10 y before study enrollment. At baseline (2002-2006), dietary data including coffee consumption over the past month was collected with a 203-item validated food-frequency questionnaire. Causes of death were monitored until 1 January 2013. HRs for mortality in categories of coffee consumption were obtained from multivariable Cox proportional hazard models, adjusting for lifestyle and dietary factors.

**Results:** Most patients (96%) drank coffee, and the median total coffee intake was 375 mL/d (~3 cups/d). During a median follow-up of 7.1 y, a total of 945 deaths occurred, including 396 CVD-related and 266 IHD-related deaths. Coffee consumption was inversely associated with CVD mortality, with HRs of 0.69 (95% CI: 0.54, 0.89) for >2-4 cups/d and 0.72 (0.55, 0.95) for >4 cups/d, compared with 0-2 cups/d. Corresponding HRs were 0.77 (95% CI: 0.57, 1.05) and 0.68 (95% CI: 0.48, 0.95) for IHD mortality and 0.84 (95% CI: 0.71, 1.00) and 0.82 (95% CI: 0.68, 0.98) for all-cause mortality, respectively. Similar associations were found for decaffeinated coffee and for coffee with additives.

**Conclusion:** Drinking coffee, either caffeinated or decaffeinated, may lower the risk of CVD and IHD mortality in patients with a prior MI. This study was registered at [clinicaltrials.gov](https://clinicaltrials.gov) as [NCT03192410](https://clinicaltrials.gov/ct2/show/study/NCT03192410).

**Vit. E and Alzheimers**

Int J Geriatr Psychiatry. 2017 Aug 23. doi: 10.1002/gps.4780.

**Do low-serum vitamin E levels increase the risk of Alzheimer disease in older people? Evidence from a meta-analysis of case-control studies.**

Dong Y<sup>1</sup>, Chen X<sup>2</sup>, Liu Y<sup>3</sup>, Shu Y<sup>4</sup>, Chen T<sup>1</sup>, Xu L<sup>1</sup>, Li M<sup>1</sup>, Guan X<sup>5</sup>.

**OBJECTIVE:**

Whether low-serum vitamin E increases the risk of Alzheimer disease (AD) in older people remains inconclusive. This meta-analysis aims to synthesize evidence-based case-control studies to evaluate the association between serum vitamin E and the risk of AD.

**METHODS:**

Potentially relevant studies were selected through PubMed, Embase, Wanfang, Chongqing VIP, and China National Knowledge Infrastructure databases by using the core terms Vitamin E/alpha-tocopherol and Alzheimer's disease/senile dementia/AD in the titles, abstracts, and keywords of the articles. The association between serum vitamin E levels and AD was estimated by using the weighted mean difference (WMD) and 95% confidence interval by adopting a random effects model. Heterogeneity was assessed by using Cochran Q test and I<sup>2</sup> statistic. Forest plot was used to present the results graphically from meta-analysis. Publication bias was evaluated by using funnel plots and Egger test.

**RESULTS:**

We identified 17 studies that met the eligibility criteria. The studies included 2057 subjects with 904 AD patients and 1153 controls. The results indicated that AD patients had a lower concentration of serum vitamin E compared with healthy controls among older people (WMD = -6.811 μmol/L, 95% confidence interval -8.998 to -4.625; Z = -6.105, P < .001). Publication bias was not detected and sensitivity analysis performed by omitting each study, and calculating the pooled WMD again for the remaining studies indicated the results stable.

**CONCLUSIONS:**

Alzheimer disease is associated with a low concentration of serum vitamin E in older people. However, necessary prospective cohort studies should be conducted to determine the risk of serum vitamin E for AD in the future.

**Vit D and pain**

Clin Rheumatol. 2017 Aug 15. doi: 10.1007/s10067-017-3754-y

**Effect of vitamin D supplementation in chronic widespread pain: a systematic review and meta-analysis.**

Yong WC<sup>1</sup>, Sanguankeo A<sup>2,3</sup>, Upala S<sup>2,3</sup>.

Chronic non-specific widespread pain (CWP) including fibromyalgia (FMS) is characterized by widespread pain, reduced pain threshold, and multiple tender points on examination, causing disability and decreased quality of life.

Vitamin D has been proposed as an associated factor in CWP. This meta-analysis aimed to explore the benefit of vitamin D supplementation in the management of CWP. A comprehensive search of the CENTRAL, MEDLINE, and Embase databases was performed from inception through January 2017. The inclusion criterion was the randomized clinical trials' evaluating the effects of vitamin D treatment in adult subjects with CWP or FMS. CWP was defined as chronic recurrent musculoskeletal pain without secondary causes; FMS patients met the American College of Rheumatology criteria for FMS. Study outcome was assessed using visual analog scale (VAS) of pain intensity. Pooled mean difference (MD) of VAS and 95% confidence interval (CI) were calculated using a random-effect meta-analysis. Meta-regression analysis using a random-effects model was performed to explore the effects of change in vitamin D in the treatment group on difference in the mean of VAS. Sensitivity analysis was performed to evaluate the robustness of results. The between-study heterogeneity of effect size was quantified using the Q statistic and  $I^2$ . Data were extracted from four randomized controlled trials involving 287 subjects. Pooled result demonstrated a significantly lower VAS in CWP patients who received vitamin D treatment compared with those who received placebo (MD = 0.46; 95% CI 0.09-0.89,  $I^2 = 48\%$ ). Meta-regression analysis revealed no significant relationship between the changes of vitamin D and VAS (coefficient = 0.04 (95% CI -0.01 to 0.08),  $p = 0.10$ ).

In this meta-analysis, we conclude that vitamin D supplementation is able to decrease pain scores and improve pain despite no significant change in VAS after increasing serum vitamin D level. Further studies need to be conducted in order to explore the improvement of functional status, quality of life, and the pathophysiological change that improves chronic widespread pain.

**More fats****Study challenges conventional wisdom on fats, fruits and vegetables**

Reuters Health News

Global dietary guidelines should possibly be changed to allow people to consume somewhat more fats, to cut back on carbohydrates and in some cases to slightly scale back on fruits and vegetables, a large study suggests.

Over the course of about 7 years, diets with roughly 35% of calories from fats were tied to a lower mortality rate than diets with about 60% of calories from carbohydrates. "What we are suggesting is moderation as opposed to very low and very high intakes of fats and carbohydrates," said Mahshid Dehghan from McMaster University in Hamilton, Ontario, Canada. The World Health Organization currently advises people to get no more than 30% of energy from fats and to avoid saturated fats found in things like animal products. Those recommendations are based on data from North America and Europe, however. Dehghan and colleagues write in *The Lancet*, in a paper online August 29, that cardiovascular disease is a global epidemic, with 80% of the burden being found in low- and middle-income countries. The new data are drawn from the Prospective Urban Rural Epidemiology (PURE) study, which recruited people ages 35 to 70 in 18 countries between 2003 and 2013. The researchers had dietary and other information from 135,335 people who were followed for roughly 7 years. During the study period, the researchers identified 5,796 deaths and 4,784 cardiovascular events in the study population. When the researchers separated people into quintiles based on carbohydrate consumption, they found that people who ate the most carbohydrates were 28% more likely to die from any cause during the study than those who ate the least. When people were divided into quintiles based on how their fat consumption, those who consumed the most fat – of any kind – were about 23% less likely to die during the study than those who ate the least. The findings were consistent no matter what type of fat was consumed. "We are hoping that dietary guidelines are reconsidered in light of the new findings," Dehghan told Reuters Health. Guidelines could relax restrictions on fat while focusing on carbohydrate intake, for example. A second analysis from the PURE study also suggests that the benefits of eating fruits and vegetables aren't limitless. WHO guidelines suggest five servings of fruits, vegetables or legumes each day, according to coauthor Victoria Miller, who is also with McMaster University. Those guidelines, again, are mostly based on evidence from North America and Europe. In other parts of the world, five servings of fruit each day may be too expensive. "Our findings show the lowest risk of death was among people who ate three to four servings with little additional benefit beyond that range," said Miller. If dietary guidelines were adjusted to reflect a smaller recommended amount, she told Reuters Health, it would be more achievable and more people would meet that goal.

Miller also emphasized that people who are meeting or exceeding the daily goal of fruits, vegetables and legumes shouldn't take the findings as a license to eat less of those foods. "We don't want to tell people who are eating more than the recommendation to eat less," she said. "That's not the message."—Andrew M. Seaman

**Protein ingestion before sleep is helpful**

J Nutr. 2017 Aug 30. pii: jn254532. doi: 10.3945/jn.117.254532

**Protein Ingestion before Sleep Increases Overnight Muscle Protein Synthesis Rates in Healthy Older Men: A Randomized Controlled Trial.**

Kouw IW<sup>1,2</sup>, Holwerda AM<sup>1,2</sup>, Trommelen J<sup>1,2</sup>, Kramer IF<sup>1,2</sup>, Bastiaanse J<sup>1</sup>, Halson SL<sup>3</sup>, Wodzig WK<sup>4</sup>, Verdijk LB<sup>1,2</sup>, van Loon LJ<sup>5,2</sup>.

**Background:** The loss of skeletal muscle mass with aging has been attributed to the blunted anabolic response to protein intake. Presleep protein ingestion has been suggested as an effective strategy to compensate for such anabolic resistance.

**Objective:** We assessed the efficacy of presleep protein ingestion on dietary protein digestion and absorption kinetics and overnight muscle protein synthesis rates in older men.

**Methods:** In a randomized, double-blind, parallel design, 48 older men (mean  $\pm$  SEM age:  $72 \pm 1$  y) ingested 40 g casein (PRO40), 20 g casein (PRO20), 20 g casein plus 1.5 g leucine (PRO20+LEU), or a placebo before sleep. Ingestion of intrinsically l-[1-<sup>13</sup>C]-phenylalanine- and l-[1-<sup>13</sup>C]-leucine-labeled protein was combined with intravenous l-[ring-<sup>2</sup>H<sub>5</sub>]-phenylalanine and l-[1-<sup>13</sup>C]-leucine infusions during sleep. Muscle and blood samples were collected throughout overnight sleep.

**Results:** Exogenous phenylalanine appearance rates increased after protein ingestion, but to a greater extent in PRO40 than in PRO20 and PRO20+LEU ( $P < 0.05$ ). Overnight myofibrillar protein synthesis rates (based on l-[ring-<sup>2</sup>H<sub>5</sub>]-phenylalanine) were  $0.033\% \pm 0.002\%/h$ ,  $0.037\% \pm 0.003\%/h$ ,  $0.039\% \pm 0.002\%/h$ , and  $0.044\% \pm 0.003\%/h$  in placebo, PRO20, PRO20+LEU, and PRO40, respectively, and were higher in PRO40 than in placebo ( $P = 0.02$ ). Observations were similar based on l-[1-<sup>13</sup>C]-leucine tracer (placebo:  $0.047\% \pm 0.004\%/h$  and PRO40:  $0.058\% \pm 0.003\%/h$ ,  $P = 0.08$ ). More protein-derived amino acids (l-[1-<sup>13</sup>C]-phenylalanine) were incorporated into myofibrillar protein in PRO40 than in PRO20 ( $0.033 \pm 0.002$  and  $0.019 \pm 0.002$  MPE, respectively,  $P < 0.001$ ) and tended to be higher than in PRO20+LEU ( $0.025 \pm 0.002$  MPE,  $P = 0.06$ ).

**Conclusions:** Protein ingested before sleep is properly digested and absorbed throughout the night, providing precursors for myofibrillar protein synthesis during sleep in healthy older men. Ingestion of 40 g protein before sleep increases myofibrillar protein synthesis rates during overnight sleep. These findings provide the scientific basis for a novel nutritional strategy to support muscle mass preservation in aging and disease.

### 63. PHARMACOLOGY

#### Antiinflammatory and increased blood pressure

#### **Differential blood pressure effects of ibuprofen, naproxen, and celecoxib in patients with arthritis: The PRECISION-ABPM (Prospective Randomized Evaluation of Celecoxib Integrated Safety Versus Ibuprofen or Naproxen Ambulatory Blood Pressure Measurement) Trial**

European Heart Journal

Ruschitzka F, et al.

A substudy of PRECISION, named as PRECISION-ABPM, was conducted at 60 sites, to examine the impacts of the selective cyclooxygenase-2 (COX-2) inhibitor celecoxib vs. the non-selective non-steroidal anti-inflammatory drugs (NSAIDs) naproxen and ibuprofen on blood pressure (BP) in patients with arthritis. Researchers observed a significant increase in systolic BP (SBP) and a higher incidence of new-onset hypertension in relation to allocation to the non-selective NSAID ibuprofen, compared with the COX-2 selective inhibitor celecoxib.

#### Methods

- A double-blind, randomized, multicentre non-inferiority CV-safety trial was performed in 444 patients (mean age  $62 \pm 10$  years, 54% female) with osteoarthritis (92%) or rheumatoid arthritis (8%) and evidence of or at increased risk for coronary artery disease.
- Study participants received celecoxib (100–200 mg bid), ibuprofen (600–800 mg tid), or naproxen (375–500 mg bid) with matching placebos in a 1: 1: 1 allocation, for assessment of the effect of these medications on 24-h ambulatory BP after 4 months.

#### Results

- Findings demonstrated that the change in mean 24-h systolic BP (SBP) in celecoxib, ibuprofen and naproxen-treated patients was -0.3 mmHg [95% confidence interval (CI), -2.25, 1.74], 3.7 (95% CI, 1.72, 5.58) and 1.6 mmHg (95% CI, -0.40, 3.57), respectively.
- Researchers observed that these changes resulted in a difference of -3.9 mmHg ( $P = 0.0009$ ) between celecoxib and ibuprofen, of -1.8 mmHg ( $P = 0.12$ ) between celecoxib and naproxen, and of -2.1 mmHg ( $P = 0.08$ ) between naproxen and ibuprofen.
- In addition, they noted that the percentage of patients with normal baseline BP who developed hypertension (mean 24-h SBP  $\geq 130$  and/or diastolic BP  $\geq 80$  mmHg) was 23.2% for ibuprofen, 19.0% for naproxen, and 10.3% for celecoxib (odds ratio 0.39,  $P = 0.004$  and odds ratio 0.49,  $P = 0.03$  vs. ibuprofen and naproxen, respectively).