

## 2. LBP

### Task specific exacerbations

#### **Task-Specific Sensitivity in Physical Function Testing Predicts Outcome in Patients With Low Back Pain**

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+ AUTHORS

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#### **Study Design**

Prospective cohort study nested in a randomized controlled trial.

#### **Background**

Low back pain (LBP) is the leading cause of pain and disability globally. Few prognostic factors are consistently reported to predict outcome in patients with LBP and findings from clinical examination and physical task performance levels (e.g. walking distance) lack prognostic value. However, recent findings suggest measuring patients' pain sensitivity to task performance tests (task-specific sensitivity) may be of predictive value.

#### **Objective**

To investigate the prognostic value of task-specific sensitivity in patients with LBP by exploring whether task-specific sensitivity during physical function testing is associated with self-reported change in pain and disability.

#### **Methods**

The study included 260 patients with LBP, referred for evaluation in secondary care setting. All patients completed questionnaires and underwent clinical examination by a physiotherapist. Patients rated their pain intensity before and after completing a test battery measuring physical function and were classified into four categories; *worse*, *unchanged*, *better* or *no pain*, depending on their pain response. At 3-month follow-up, outcomes were obtained by a postal questionnaire.

#### **Results**

Task-specific sensitivity significantly predicted pain, when adjusting for known prognostic factors. Patients classified as *no pain*, *better* and *unchanged* improved significantly more in pain score compared to patients classified as *worse*. Patients classified as *no pain* also improved significantly more in disability score compared to patients classified as *worse* after adjusting for known prognostic factors.

#### **Conclusion**

Measuring task-specific sensitivity is predictive of pain intensity after 3 months in patients with LBP. The prognostic value appears limited in respect to disability.

### 3. DISC

#### End plate defects common

#### **Lumbar vertebral endplate defects on Magnetic Resonance Images: Prevalence, distribution patterns, and associations with back pain**

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<https://doi.org/10.1016/j.spinee.2019.10.015>Get rights and content

#### Background Context

While the roles of Modic Changes (MCs) and disc degeneration in back pain remain controversial, clues from cadaveric studies suggest that lumbar vertebral endplate lesions may be important in back pain. Endplate lesions can be detected on magnetic resonance (MR) images as various endplate defects, including focal, corner, and erosive defects. Yet, the clinical significance of such endplate defects remains unknown.

**Purpose** To determine the prevalence and distribution patterns of lumbar vertebral endplate defects and their associations with back pain in a population-based sample.

**Study Design** Cross sectional study.

**Patient Sample** Subjects were randomly selected from a typical community in Hangzhou Eastern China, regardless of back pain status.

#### Outcome Measures

Each subject underwent a structured interview and lumbar MR imaging. Back pain history, including today, over the past 4 weeks, 12 months, and lifetime, were acquired. Endplate defects, MCs, and disc degeneration were evaluated on MRIs. Age, gender and body mass index (BMI, kg/m<sup>2</sup>), as well as lifetime exposures, including smoking history, riding in motorized vehicles and associated vibration, and occupational physical demands were assessed.

**Methods** Descriptive statistics were used to depict prevalence and distribution patterns of endplate defects in the lumbar spine. Logistic regressions were used to examine associations of endplate defects with back pain. The research grant was obtained from the National Natural Science Foundation of China (115,000 USD), Key Platform Project of the Health Department of Zhejiang Province (14,000 USD), Technology Program of Traditional Chinese Medicine Department of Zhejiang Province (21,000 USD), and 2015 Qianjiang Talent Program of Zhejiang Province (7,000 USD) toward this work. There is no conflict to disclose.

**Results** There were 478 subjects (53.3±14.4 years, range 20-88 years) studied. Endplate defects presented in 301 (63.0%) subjects and 842 (16.0%) endplates. The presence of endplate defects, but not MCs and disc degeneration, was associated with lifetime back pain (OR=1.64, P=0.026) in multivariate analyses. Focal and erosive endplate defects were associated with lifetime back pain history (OR=1.74-2.23, P<0.05 for both), while all three types of defects were associated with intensity of worst back pain over the past 12 months (Coef=5.84-7.19, P<0.05 for all).

**Conclusions** Endplate defects are common findings on lumbar MRIs in adults. Specific types of endplate defects were associated with back pain history. Endplate defects may be an independent risk factor for back pain.

## 5. SPINAL SURGERY

### Hardware removal

BMC Musculoskelet Disord. 2019 Oct 25;20(1):470. doi: 10.1186/s12891-019-2886-4.

#### **Effect of lordosis on adjacent levels after lumbar interbody fusion, before and after removal of the spinal fixator: a finite element analysis.**

Tsuang FY<sup>1,2</sup>, Tsai JC<sup>3</sup>, Lai DM<sup>4</sup>.

##### *BACKGROUND:*

Literature indicates that adjacent-segment diseases after posterior lumbar interbody fusion with pedicle screw fixation accelerate degenerative changes at unfused adjacent segments due to the increased motion and intervertebral stress. Sagittal alignment of the spine is an important consideration as achieving proper lordosis could improve the outcome of spinal fusion and avoid the risk of adjacent segment diseases. Therefore, restoration of adequate lumbar lordosis is considered as a major factor in the long-term success of lumbar fusion. This study hypothesized that the removal of internal fixation devices in segments that have already fused together could reduce stress at the disc at adjacent segments, particularly in patients with inadequate lordosis. The purpose of this study was to analyze the biomechanical characteristics of a single fusion model (posterior lumbar interbody fusion with internal fixation) with different lordosis angles before and after removal of the internal fixation device.

##### *METHODS:*

Five finite element models were constructed for analysis; 1) Intact lumbar spine without any implants (INT), 2) Lumbar spine implanted with a spinal fixator and lordotic intervertebral cage at L4-L5 (FUS-f-5c), 3) Lumbar spine after removal of the spinal fixator (FUS-5c), 4) Lumbar spine implanted with a spinal fixator and non-lordotic intervertebral cage at L4-L5 (FUS-f-0c), and 5) Lumbar spine after removal of the spinal fixator from the FUS-f-0c model (FUS-0c).

##### *RESULTS:*

The ROM of adjacent segments in the FUS-f-0c model was found to be greater than in the FUS-f-5c model. After removing the fixator, the adjacent segments in the FUS-5c and FUS-0c models had a ROM that was similar to the intact spine under all loading conditions. Removing the fixator also reduced the contact forces on adjacent facet joints and reduced the peak stresses on the discs at adjacent levels. The greatest increase in stress on the discs was found in the FUS-f-0c model (at both L2/L3 and L3/L4), with intervertebral stress at L3/L4 increasing by 83% when placed in flexion.

##### *CONCLUSIONS:*

This study demonstrated how removing the spinal fixation construct after bone fusion could reduce intradiscal pressure and facet contact forces at adjacent segments, while retaining a suitable level of lumbar lordosis.

## Stenosis results

**Predictors of walking ability after surgery for lumbar spinal canal stenosis: a prospective study**

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DOI: <https://doi.org/10.1016/j.spinee.2019.07.002>

**BACKGROUND CONTEXT** Few studies have investigated predictors of objective walking distance in patients with lumbar spinal stenosis (LSS).

**PURPOSE** This study aimed to clarify objective predictors of postoperative 6-minute walk distance (6MWD) in patients with LSS and to develop prediction equations.

**STUDY DESIGN** This was a prospective study. Data were analyzed by multiple linear regression analyses.

**PATIENT SAMPLE** Patients with LSS were enrolled.

**OUTCOME MEASURES** Predictors of 6MWD after surgery were evaluated, including patient characteristics (sex, age, height, and body weight), pain (visual analog scale; low back pain, lower limb pain, and lower limb numbness), surgical factors (number of operation segments [1 or  $\geq 2$ ], surgery type [fusion or decompression], and minimum area of the dural sac), and objective physical function (6MWD and trunk muscle strength).

**METHODS** Patients with LSS were consecutively included and assessed preoperatively (n=113) and 6 months postoperatively (n=78). Simple and multiple linear regression analyses were performed with 6MWD at 6 months postoperation as the dependent variable. We have study funding sources (Nagano Medical Foundation) and no study-specific conflicts of interest-associated biases.

**RESULTS**

At 6-month follow-up, 6MWD ( $457.7 \pm 105.5$  m) improved significantly compared with preoperative 6MWD ( $275.0 \pm 157.2$  m;  $p < .01$ ). Trunk muscle strength and pain improved significantly compared with the preoperative score ( $p < .01$ ). The predictors of postoperative 6MWD were age, body weight, number of operation segments (1 or  $\geq 2$ ), surgery type (fusion or decompression), preoperative trunk extensor strength, and preoperative 6MWD (adjusted  $R^2 = 0.65$ ,  $p < .01$ ). The proposed prediction equation was as follows: postoperative 6MWD (m) =  $549.5 - 5.3 \times \text{age (years)} - 1.8 \times \text{body weight (kg)} - 68.3 \times \text{surgery type (0: decompression, 1: fusion)} - 58.6 \times \text{operation segment (0: one segment, 1: } \geq 2 \text{ segments)} + 3.5 \times \text{trunk extensor strength (kg)} + 0.2 \times \text{preoperative 6MWD (m)}$ .

**CONCLUSIONS**

Younger age, lower body weight, one level operative segment, decompression surgery, and better preoperative scores for trunk extensor strength and 6MWD predicted better scores for 6 months postoperative 6MWD. Preoperative reduction in body weight and increase of trunk extensor strength might be associated with improved postoperative 6MWD scores

## 6. PELVIC GIRDLE

### SI tests not valid

#### Clinimetric properties of sacroiliac joint mobility tests: A systematic review

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DOI: <https://doi.org/10.1016/j.msksp.2019.102090>

#### Highlights

- There is no new evidence for the validity of SIJ mobility tests.
- Studies of SIJ mobility tests only show poor and fair methodological quality.
- There is only low quality and conflicting evidence for inter-rater reliability.
- There is no evidence for responsiveness of SIJ mobility tests.
- SIJ mobility tests in clinical practice or educational programs remain problematic.

#### Abstract

##### Background

Previous systematic reviews revealed poor reliability and validity for sacroiliac joint (SIJ) mobility tests. However, these reviews were published nearly 20 years ago and recent evidence has not yet been summarised.

##### Objectives

To conduct an up-to-date systematic review to verify whether recommendations regarding the clinical use of SIJ mobility tests should be revised.

##### Study design

Systematic review.

##### Method

The literature was searched for relevant articles via 5 electronic databases. The review was conducted according to the PRISMA guidelines. COSMIN checklists were used to appraise the methodological quality. Studies were included if they had at least fair methodology and reported clinimetric properties of SIJ mobility tests performed in adult patients with non-specific low back pain, pelvic (girdle) pain and/or SIJ pain. Only tests that can be performed in a clinical setting were considered.

##### Results

Twelve relevant articles were identified, of which three were of sufficient methodological quality. These three studies evaluated the reliability of eight SIJ mobility tests and one test cluster. For the majority of individual tests, the intertester reliability showed slight to fair agreement. Although some tests and one test cluster had higher reliability, the confidence intervals around most reliability estimates were large. Furthermore, there were no validity studies of sufficient methodological quality.

##### Conclusion

Considering the low and/or imprecise reliability estimates, the absence of high-quality diagnostic accuracy studies, and the uncertainty regarding the construct these tests aim to measure, this review supports the previous recommendations that the use of SIJ mobility tests in clinical practice is problematic

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### Reproductive health and COPD

BMJ Open. 2019 Oct 28;9(10):e030318. doi: 10.1136/bmjopen-2019-030318.

#### **Female reproductive history in relation to chronic obstructive pulmonary disease and lung function in UK biobank: a prospective population-based cohort study.**

Tang R<sup>1,2</sup>, Fraser A<sup>3,4</sup>, Magnus MC<sup>3,4,5</sup>.

##### *OBJECTIVES:*

Sex differences in respiratory physiology and predilection for developing chronic obstructive pulmonary disease (COPD) have been documented, suggesting that female sex hormones may influence pathogenesis. We investigated whether aspects of female reproductive health might play a role in risk of COPD among women.

##### *DESIGN:*

Population-based prospective cohort study.

##### *SETTING:*

UK Biobank recruited across 22 centres in the UK between 2006 to 2010.

##### *PRIMARY AND SECONDARY OUTCOMES MEASURES:*

We examined a range of female reproductive health indicators in relation to risk of COPD-related hospitalisation/death (n=271 271) using Cox proportional hazards regression; and lung function (n=273 441) using linear regression.

##### *RESULTS:*

Parity >3 was associated with greater risk of COPD-related hospitalisation/death (adjusted HR 1.45; 95% CI: 1.16 to 1.82) and lower forced expiratory volume at 1 second/forced vital capacity ratio (FEV<sub>1</sub>/FVC) (adjusted mean difference -0.06; 95% CI: -0.07 to 0.04). Any oral contraception use was associated with lower risk of COPD-related hospitalisation/death (adjusted HR 0.85; 95% CI: 0.74 to 0.97) and greater FEV<sub>1</sub>/FVC (adjusted mean difference 0.01; 95% CI: 0.003 to 0.03). Late menarche (age >15) and early menopause (age <47) were also associated with greater risk of COPD-related hospitalisation/death (but not lung function), while endometriosis was associated with greater FEV<sub>1</sub>/FVC (not COPD-related hospitalisation/death). Early menarche (age <12 years) was associated with lower FEV<sub>1</sub>/FVC (but not COPD hospitalisation/death). Associations with polycystic ovary syndrome (PCOS) or ovarian cysts, any hormone replacement therapy (HRT) use, hysterectomy-alone and both hysterectomy and bilateral oophorectomy were in opposing directions for COPD-related hospitalisation/death (greater risk) and FEV<sub>1</sub>/FVC (positive association).

##### *CONCLUSIONS:*

Multiple female reproductive health indicators across the life course are associated with COPD-related hospitalisation/death and lung function. Further studies are necessary to understand the opposing associations of PCOS/ovarian cysts, HRT and hysterectomy with COPD and objective measures of airway obstruction.

## 8. VISCERA

### Low cholesterol levels and CD and IBS

Poster presentations: Epidemiology (2019)

#### **P797 Crohn's disease and ulcerative colitis was associated with different lipid profile disorders: a nationwide population-based study**

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H. Soh\*<sup>1</sup>, J. Chun<sup>1</sup>, K. Han<sup>2</sup>, S. Park<sup>1</sup>, E. A. Kang<sup>1</sup>, J. P. Im<sup>1</sup>, J. S. Kim<sup>1</sup>

<sup>1</sup>Seoul National University College of Medicine, Department of Internal Medicine and Liver Research Institute, Seoul, South Korea, <sup>2</sup>The Catholic University of Korea College of Medicine, Department of Medical Statistics, Seoul, South Korea

#### **Background**

The relationships between lipid profiles and the risk for developing inflammatory bowel disease (IBD) including Crohn's disease (CD) and ulcerative colitis (UC) still remains elusive. We conducted a nationwide population-based cohort study to investigate the relationship between lipid profiles and the risk for developing IBD.

#### **Methods**

We conducted a retrospective study using claims data from the National Healthcare Insurance (NHI) service in Korea. A total of 9,706,026 subjects who received medical check-ups arranged by NHI in 2009 were included and followed up until 2016. Serum lipid profiles, including total cholesterol, triglyceride (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) were collected. Individuals who developed CD and UC were identified during the follow-up.

#### **Results**

After a mean follow-up of 7.3 years, IBD was detected in 7,058 (0.073%) individuals. IBD group showed a significantly lower prevalence of hypertension, diabetes and dyslipidaemia, compared with non-IBD controls (p-value < 0.001 for each variable). IBD group was inversely associated with serum fasting glucose, serum total cholesterol, LDL-C, HDL-C and TG levels (p-value < 0.001 for each variable). Compared with the highest quartile (Q4) of serum total cholesterol, low serum total cholesterol was associated with higher risk of CD (adjusted hazard ratio [HR]: Q1, 2.52; Q2, 1.52; Q3, 1.27; p-value: Q1, < 0.001; Q2, < 0.001; Q3, 0.042), but not UC. Compared with the highest quartile (Q4) of LDL-C, low serum LDL-C was associated with higher risk of CD (adjusted HR: Q1, 1.92; Q2, 1.47; Q3, 1.22; p-value: Q1, < 0.001; Q2, < 0.001; Q3, 0.078), but not UC. Moreover, compared with the highest quartile (Q4) of HDL-C, low serum HDL-C was associated with higher rates of CD (adjusted HR: Q1, 2.49; Q2, 1.90; Q3 1.43; p-value: Q1, < 0.001; Q2, < 0.001; Q3, 0.002), but not UC. In contrast, low serum TG was associated with higher risk of UC (adjusted HR: Q1, 1.22; Q2, 1.19; Q3, 1.19; p-value < 0.001 for each quartile), but not CD.

#### **Conclusion**

Low serum total cholesterol, LDL-C and HDL-C were associated with the risk for developing CD, but low serum TG was related to the risk for developing UC.

**Altered microbiome in Fibromyalgia**

Pain. 2019 Nov;160(11):2589-2602. doi: 10.1097/j.pain.0000000000001640.

**Altered microbiome composition in individuals with fibromyalgia.**

Minerbi A<sup>1</sup>, Gonzalez E<sup>2,3</sup>, Brereton NJB<sup>4</sup>, Anjarkouchian A<sup>5</sup>, Dewar K<sup>3,6</sup>, Fitzcharles MA<sup>1,7</sup>, Chevalier S<sup>5,8,9</sup>, Shir Y<sup>1</sup>.

Fibromyalgia (FM) is a prevalent syndrome, characterised by chronic widespread pain, fatigue, and impaired sleep, that is challenging to diagnose and difficult to treat.

The microbiomes of 77 women with FM and that of 79 control participants were compared using 16S rRNA gene amplification and whole-genome sequencing. When comparing FM patients with unrelated controls using differential abundance analysis, significant differences were revealed in several bacterial taxa. Variance in the composition of the microbiomes was explained by FM-related variables more than by any other innate or environmental variable and correlated with clinical indices of FM. In line with observed alteration in butyrate-metabolising species, targeted serum metabolite analysis verified differences in the serum levels of butyrate and propionate in FM patients. Using machine-learning algorithms, the microbiome composition alone allowed for the classification of patients and controls (receiver operating characteristic area under the curve 87.8%). To the best of our knowledge, this is the first demonstration of gut microbiome alteration in nonvisceral pain.

This observation paves the way for further studies, elucidating the pathophysiology of FM, developing diagnostic aids and possibly allowing for new treatment modalities to be explored.



**13 C. AIRWAYS/SWALLOWING/SPEECH****COPD in females**

BMJ Open. 2019 Oct 28;9(10):e030318. doi: 10.1136/bmjopen-2019-030318.

**Female reproductive history in relation to chronic obstructive pulmonary disease and lung function in UK biobank: a prospective population-based cohort study.**

Tang R<sup>1,2</sup>, Fraser A<sup>3,4</sup>, Magnus MC<sup>3,4,5</sup>.

**OBJECTIVES:**

Sex differences in respiratory physiology and predilection for developing chronic obstructive pulmonary disease (COPD) have been documented, suggesting that female sex hormones may influence pathogenesis. We investigated whether aspects of female reproductive health might play a role in risk of COPD among women.

**DESIGN:**

Population-based prospective cohort study.

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UK Biobank recruited across 22 centres in the UK between 2006 to 2010.

**PRIMARY AND SECONDARY OUTCOMES MEASURES:**

We examined a range of female reproductive health indicators in relation to risk of COPD-related hospitalisation/death (n=271 271) using Cox proportional hazards regression; and lung function (n=273 441) using linear regression.

**RESULTS:**

Parity >3 was associated with greater risk of COPD-related hospitalisation/death (adjusted HR 1.45; 95% CI: 1.16 to 1.82) and lower forced expiratory volume at 1 second/forced vital capacity ratio (FEV<sub>1</sub>/FVC) (adjusted mean difference -0.06; 95% CI: -0.07 to 0.04). Any oral contraception use was associated with lower risk of COPD-related hospitalisation/death (adjusted HR 0.85; 95% CI: 0.74 to 0.97) and greater FEV<sub>1</sub>/FVC (adjusted mean difference 0.01; 95% CI: 0.003 to 0.03). Late menarche (age >15) and early menopause (age <47) were also associated with greater risk of COPD-related hospitalisation/death (but not lung function), while endometriosis was associated with greater FEV<sub>1</sub>/FVC (not COPD-related hospitalisation/death). Early menarche (age <12 years) was associated with lower FEV<sub>1</sub>/FVC (but not COPD hospitalisation/death). Associations with polycystic ovary syndrome (PCOS) or ovarian cysts, any hormone replacement therapy (HRT) use, hysterectomy-alone and both hysterectomy and bilateral oophorectomy were in opposing directions for COPD-related hospitalisation/death (greater risk) and FEV<sub>1</sub>/FVC (positive association).

**CONCLUSIONS:**

Multiple female reproductive health indicators across the life course are associated with COPD-related hospitalisation/death and lung function. Further studies are necessary to understand the opposing associations of PCOS/ovarian cysts, HRT and hysterectomy with COPD and objective measures of airway obstruction.

## 16. CONCUSSIONS

### Concussion – Brain drain

J Orthop Sports Phys Ther. 2019 Jun 1:1-10. doi: 10.2519/jospt.2019.8849

#### **Brain Drain: Psychosocial Factors Influence Recovery Following Mild Traumatic Brain Injury: 3 Recommendations for Clinicians Assessing Psychosocial Factors.**

Cancelliere C<sup>1,2</sup>, Mohammed RJ<sup>3</sup>.

Mild traumatic brain injury (TBI) is a major global public health concern.

While most people recover within days to months, one in five people with mild TBI report persistent, disabling symptoms that interfere with participation (e.g. work, school, sport). People with non-head injuries may also report similar symptoms. The biopsychosocial model of health can help to explain this phenomenon: factors other than biomedical factors are associated with recovery. Important psychosocial factors include poor recovery expectations and pre- and post-traumatic psychological symptoms. Recent clinical practice guidelines recommend that clinicians examine all relevant biopsychosocial factors that may contribute to persisting post-concussive symptoms and consider them when helping patients make decisions about management.

However, clinical training continues to prioritize treating biomedical symptoms, and clinicians may not feel confident to deal with the psychosocial domain.

Our objective is to provide 3 recommendations for clinicians to assess psychosocial factors in patients after concussion, and to argue a case for clinicians improving their skills in assessing psychosocial factors.

*J Orthop Sports Phys Ther, Epub 1 Jun 2019. doi:10.2519/jospt.2019.8849.*

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Problems with RCT's reproducibility****Systematic Review/ Metanalysis****Low reproducibility of randomized clinical trials methodology related to sampling: a systematic methodological review**Sean P. Riley, Brian T. Swanson, Jean-Michel Brismée, Steven F. Sawyer & Elizabeth J. Dyer 

- <https://doi.org/10.1080/10669817.2019.1587134>
- **Objectives:** The reporting of sampling methods in Randomized Clinical Trials (RCTs) allows for research quality assessment, determination of sampling bias, and assures the presence of details necessary for reproducibility in future trials. The purpose of this study was to: (1) determine if sampling methodology was reproducible in RCTs related to musculoskeletal physical therapy (MSKPT) interventions to treat non-specific low back pain (NSLBP) and (2) establish if there was a relationship between sample reproducibility and established measures of research quality.

**Methods:** Data were collected through a systematic review by a professional librarian. The identified RCTs were assessed for methodological quality by two blinded individual reviewers. Data analysis was performed by a third, blinded researcher; additional comparisons were made based on Journal Impact Factor and PEDro score.

**Results:** Ninety-nine published peer-reviewed RCTs were identified that met inclusion criteria. Only 29% of the articles were judged to be reproducible based on the reported sampling methodology. There were meaningful correlations between two out of ten of the sampling reporting criteria and the judgement made if the sample was reported in significant detail to allow for replication. There was no relationship between sampling reporting criteria, Journal Impact Factors (JIFs), and Physiotherapy Evidence Database (PEDro) scores.

**Discussion:** The reporting of sampling methodology needs to be considered to ensure reproducibility and avoid sampling bias. Despite the proliferation of measures of research quality, the overall reporting quality of RCTs continues to be inadequate to allow widespread reproducibility of trials.

**51. CFS/BET****LBP motor control training**

Eur Spine J. 2019 Nov;28(11):2462-2469. doi: 10.1007/s00586-019-06045-7. Epub 2019 Jun 27.

**Predicting a beneficial response to motor control training in patients with low back pain: a longitudinal cohort study.**

Hides JA<sup>1,2</sup>, Murphy M<sup>3,4</sup>, Jang E<sup>5,4</sup>, Blackwell L<sup>5,4</sup>, Sexton M<sup>6</sup>, Sexton C<sup>7</sup>, Mendis MD<sup>6,4</sup>.

**PURPOSE:**

Exercise therapy such as motor control training (MCT) has been shown to reduce pain and disability in people with low back pain (LBP). It is unknown which patients are most likely to benefit. This longitudinal cohort study aimed to: (1) retrospectively examine records from a large cohort of patients who received MCT treatment, (2) identify potentially important predictors of response to MCT and (3) test the predictors on an independent (split) sample derived from the original cohort of patients, using one group to identify the predictors and the other to test them.

**METHODS:**

The response of 775 patients with LBP to MCT was classified as 'improved' or 'not improved' based on self-reported change in pain levels and symptoms. Measures were examined for associations with improvement and entered into a logistic regression model to classify patients as low, medium or high benefits of improvement with MCT. The model was tested on an independent sample.

**RESULTS:**

A positive response was seen in patients with: no evidence of scoliosis [OR = 4.0, 95% CI (1.7, 9.6)], LBP without associated groin pain [OR = 2.2, 95% CI (1.0, 5.0)], LBP which was chronic recurrent in nature [OR = 3.1, 95% CI (1.8, 5.3)] and poor results on muscle testing of the multifidus muscle [OR = 2.0, 95% CI (1.1, 3.7)]. Testing on an independent sample confirmed that patients could be classified into benefit groups.

**CONCLUSIONS:**

This study provides a first step towards assisting clinicians to select patients most likely to respond to MCT. These slides can be retrieved under Electronic Supplementary Material.

## 55. SCOLIOSIS

### DNA changes

BMC Musculoskelet Disord. 2019 Oct 25;20(1):479. doi: 10.1186/s12891-019-2869-5.

#### **Changes in circulating cell-free nuclear DNA and mitochondrial DNA of patients with adolescent idiopathic scoliosis.**

Li J<sup>1</sup>, Wang L<sup>1</sup>, Yang G<sup>1</sup>, Wang Y<sup>1</sup>, Guo C<sup>1</sup>, Liu S<sup>1</sup>, Gao Q<sup>1</sup>, Zhang H<sup>2</sup>.

##### *BACKGROUND:*

Adolescent idiopathic scoliosis (AIS) which characterized by complex three-dimensional deformity of spine has been difficult to cure because of the unknown etiopathology and uncertainty of progression. Nowadays, circulating cell-free (ccf) DNA was found to be a potential biomarker for several benign and malignant diseases. However, whether ccf DNA can be a biomarker for AIS has not been reported yet. In this study, we investigate the circulating cell-free nuclear DNA (ccf n-DNA) and mitochondrial DNA (ccf mt-DNA) concentrations in the plasma of patients with AIS and controls (CT), and the changed plasma ccf n-DNA and ccf mt-DNA levels and their association with clinical parameters were assessed.

##### *METHODS:*

The plasma of peripheral blood from 69 AIS patients and 21 age-matched CT was collected for ccf DNA analysis. Quantitative PCR was used to detect ccf n-DNA and ccf mt-DNA levels, and correlation analyses between the ccf n-DNA and ccf mt-DNA levels and clinical characteristics were conducted. Receiver operator curves (ROC) were used to analyze the sensitivity and specificity of ccf n-DNA and ccf mt-DNA levels to different characteristics.

##### *RESULTS:*

The plasma ccf n-DNA levels of both GAPDH and ACTB were significantly decreased in AIS patients compared with those in controls, while the plasma ccf mt-DNA levels did not changed. According to sex-related analyses, the ccf n-DNA levels in male CT-M was higher than that in female CT and male AIS, but the ccf n-DNA levels in female AIS was not significantly changed when compared with male AIS or female CT. However, the concentration of ccf mt-DNA in female AIS increased significantly when compared with male AIS. Surprisingly, Lenke type-related analyses suggested that Lenke type 1 patients had lower ccf n-DNA levels, whereas Lenke type 5 patients had higher ccf mt-DNA levels compared with those of controls. However, a lower sensitivity and specificity of AIS predicted by ccf n-DNA or ccf mt-DNA levels was observed, whether in total, by sex, or by Lenke type.

##### *CONCLUSION:*

Although with no/little predictive accuracy of AIS/progressed AIS by ccf DNA levels, significantly changed plasma ccf DNA levels were observed in AIS patients compared with those in controls.

**59. PAIN****Familiar pain patterns**

Pain. 2019 Nov;160(11):2430-2439. doi: 10.1097/j.pain.0000000000001639.

**Family history of pain and risk of musculoskeletal pain in children and adolescents: a systematic review and meta-analysis.**

Dario AB<sup>1,2</sup>, Kamper SJ<sup>1,2,3</sup>, O’Keeffe M<sup>1,2</sup>, Zadro J<sup>1,2</sup>, Lee H<sup>3,4,5</sup>, Wolfenden L<sup>5,6</sup>, Williams CM<sup>3,4,5,6</sup>.

Emerging evidence suggests that musculoskeletal (MSK) pain should be viewed from a biopsychosocial perspective and consider the influence of family factors.

We conducted a review with meta-analysis to provide summary estimates of effect of family history of pain on childhood MSK pain and explore whether specific family pain factors influence the strength of the association (PROSPERO CRD42018090130). Included studies reported associations between family history of pain and nonspecific MSK pain in children (age <19 years). The outcome of interest was MSK pain in children.

We assessed the methodological quality using a modified version of the Quality in Prognosis Studies instrument and quality of evidence for the main analyses using the GRADE criteria. After screening of 7281 titles, 6 longitudinal and 23 cross-sectional studies were included. Moderate quality evidence from 5 longitudinal studies (n = 42,131) showed that children with a family history of MSK pain had 58% increased odds of experiencing MSK pain themselves (odds ratio [OR] 1.58, 95% confidence interval 1.20-2.09). Moderate quality evidence from 18 cross-sectional studies (n = 17,274) supported this finding (OR 2.02, 95% 1.69-2.42). Subgroup analyses showed that the relationship was robust regardless of whether a child's mother, father, or sibling experienced pain. Odds were higher when both parents reported pain compared with one ([mother OR = 1.61; father OR = 1.59]; both parents OR = 2.0).

Our findings show moderate quality evidence that children with a family history of pain are at higher risk of experiencing MSK pain. Understanding the mechanism by which this occurs would inform prevention and treatment efforts.

## 61. FIBROMYALGIA

### Mindfulness therapy helpful

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#### **A randomized controlled efficacy trial of mindfulness-based stress reduction compared with an active control group and usual care for fibromyalgia: the EUDAIMON study.**

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Fibromyalgia (FM) syndrome represents a great challenge for clinicians and researchers because the efficacy of currently available treatments is limited. This study examined the efficacy of mindfulness-based stress reduction (MBSR) for reducing functional impairment as well as the role of mindfulness-related constructs as mediators of treatment outcomes for people with FM. Two hundred twenty-five participants with FM were randomized into 3 study arms: MBSR plus treatment-as-usual (TAU), FibroQoL (multicomponent intervention for FM) plus TAU, and TAU alone. The primary endpoint was functional impact (measured with the Fibromyalgia Impact Questionnaire Revised), and secondary outcomes included "fibromyalginess," anxiety and depression, pain catastrophising, perceived stress, and cognitive dysfunction. The differences in outcomes between groups at post-treatment assessment (primary endpoint) and 12-month follow-up were analyzed using linear mixed-effects models and mediational models through path analyses.

Mindfulness-based stress reduction was superior to TAU both at post-treatment (large effect sizes) and at follow-up (medium to large effect sizes), and MBSR was also superior to FibroQoL post-treatment (medium to large effect sizes), but in the long term, it was only modestly better (significant differences only in pain catastrophising and fibromyalginess). Immediately post-treatment, the number needed to treat for 20% improvement in MBSR vs TAU and FibroQoL was 4.0 (95% confidence interval [CI] = 2.1-6.5) and 5.0 (95% CI = 2.7-37.3). An unreliable number needed to treat value of 9 (not computable 95% CI) was found for FibroQoL vs TAU. Changes produced by MBSR in functional impact were mediated by psychological inflexibility and the mindfulness facet acting with awareness. These findings are discussed in relation to previous studies of psychological treatments for FM.