

## 2. LBP

### Fear reduction in LBP

Systematic review

#### **Conservative Interventions Reduce Fear in Individuals With Chronic Low Back Pain: A Systematic Review**

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#### Objective

To systematically review and critically appraise the effectiveness of conservative and surgical interventions to reduce fear in studies of people with chronic low back pain, based on the analysis of randomized controlled trials for which fear was a primary or secondary outcome.

#### Data Sources

Electronic databases PubMed, CINAHL, PsycINFO, PEDro, and CENTRAL, as well as manual searches and grey literature were searched from inception until May 2019.

#### Study Selection

Randomized controlled trials analyzing the effectiveness of conservative and surgical interventions to reduce fear were included.

#### Data Extraction

Two reviewers independently conducted the search strategy, study selection, data extraction, risk of bias assessment, and quality of the evidence judgment.

#### Data Synthesis

Sixty-one studies (n=7201) were included. A large number of fear-related search terms were used but only 3 fear constructs (kinesiophobia, fear-avoidance beliefs, fear of falling) were measured in the included studies. Multidisciplinary and psychological interventions as well as exercise reduced kinesiophobia. Fear-avoidance beliefs were reduced by the aforementioned interventions, manual therapy, and electrotherapy. A multidisciplinary intervention reduced the fear of falling. There was moderate evidence of multidisciplinary interventions and exercise to reduce kinesiophobia. There was moderate evidence of manual therapy and electrotherapy to reduce fear-avoidance beliefs.

#### Conclusions

The present systematic review highlights the potential effectiveness of conservative interventions to reduce kinesiophobia and fear-avoidance beliefs in individuals with chronic low back pain. This information can help health professionals to reduce fear when treating patients with this condition.

## 5. SPINAL SURGERY

### Fear of movement

#### **Fear of Movement Is Related to Low Back Disability During a Two-Year Period in Patients That Have Undergone Elective Lumbar Spine Surgery**

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**Objective:** To evaluate change in fear of movement and the relationship of fear of movement and pain intensity to low back disability and general health-related quality of life over a two-year period.

**Methods:** Consecutive patients scheduled for lumbar spine surgery were included. In addition to clinical background variables, back pain intensity, fear of movement, low back disability, and general health-related quality of life were assessed at baseline, one year and two years after surgery. Linear mixed-effects models were used to analyze data.

**Results:** In total, 348 patients were included in the final analyses. There was a significant reduction in fear of movement and a significant interaction between fear of movement and low back disability across assessments, showing that higher levels of fear of movement were related to higher levels of disability over the two-year period. Similarly, higher levels of back pain intensity were related to lower levels of general health-related quality of life during this period.

**Conclusions:** We found that fear of movement interacted with low back disability, following lumbar spine surgery, in a longitudinal study. This shows the need to address fear of movement in prehabilitation/rehabilitation pre- or post-surgically to improve health outcomes for patients who undergo lumbar spine surgery.

**Reduced multifidus size with fusion****Paraspinal muscle changes after single-level posterior lumbar fusion: volumetric analyses and literature review**

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Cho et al. BMC Musculoskeletal Disorders (2020) 21:73 <https://doi.org/10.1186/s12891-020-3104-0>

**Background:** Posterior lumbar fusion is a widely accepted surgical technique; however, it has been related to the possibility of paraspinal muscle atrophy after surgery. We investigated 1-year postoperative changes in paraspinal muscle volume using a simple formula applicable to magnetic resonance imaging (MRI) or computed tomography (CT) images.

**Methods:** Patients with degenerative lumbar spinal stenosis who underwent posterior interbody fusion (PLIF) at the L4/5 level in the period from May 2010 to June 2017 were enrolled in this study. Radiologic parameters were measured using MRI or CT images which were taken before surgery and at 1 year after surgery. The volume of the paraspinal muscles was calculated using a simple formula which was derived from the formula for calculating the volume of truncated elliptic cones.

**Results:** A total of 40 patients were included; 24 were analyzed using MRI and 16 were analyzed using CT. The mean age of the patients was  $59.6 \pm 12.1$  years and 32 (80.5%) were female. When comparing the preoperative and 1-year postoperative images, multifidus muscle (MF) reduction was consistently observed in the MRI and CT groups, right and left ( $p = 0.003$ ,  $p < 0.001$ ,  $p = 0.005$  and  $p < 0.001$ , respectively). In the erector spinae (ES) group, decrease in muscle volume was observed in the right-sided muscles of the CT group ( $p < 0.001$ ), but no significant change was observed in the MRI group. The psoas muscle showed no significant change after 1 year. Conversely, regression analysis showed a negative correlation between MF muscle volume loss and age in the MRI group (right and left,  $p = 0.002$  and  $p = 0.015$ , respectively), that is, the younger the age, the greater loss of muscle mass.

**Conclusion:** After the posterior lumbar fusion, the volume of the MF muscles was markedly decreased, and the degree of decrease was apparent in the MRI. The volume of the ES muscles, which are located relatively laterally, also tended to decrease at 1 year after surgery.

**Keywords:** Lumbar spinal fusion, Paraspinal muscle atrophy, Denervation, Multifidus, Back muscles

## 8. VISCERA

### Pancreatic and reduced psoas size

European Radiology

#### **Psoas muscle size as a magnetic resonance imaging biomarker of progression of**

**pancreatitis** Andre E. Modesto Charlotte E. Stuart Jaelim Cho Juyeon Ko Ruma G. Singh

Maxim S. Petrov

#### **Objective**

Pancreatitis often represents a continuous inflammatory process, from the first episode of acute pancreatitis (FAP) to recurrent acute pancreatitis (RAP) to chronic pancreatitis (CP). Psoas muscle size is a validated surrogate for global skeletal mass, changes in which are associated with inflammation. The objective was to investigate psoas muscle size in individuals following FAP, RAP, and CP, as well as its associations with pro-inflammatory cytokines.

#### **Methods**

Individuals following pancreatitis and healthy individuals were recruited. All participants underwent magnetic resonance imaging, from which psoas muscle volume was derived independently by two raters in a blinded fashion. Circulating levels of four major cytokines (interleukin-6, tumour necrosis factor- $\alpha$ , C-C motif chemokine ligand 2, and leptin) were measured. Five linear regression additive models were built to adjust for possible confounders (age, sex, body composition, physical activity, tobacco smoking, alcohol consumption, comorbidities, and endocrine and exocrine pancreatic functions).

#### **Results**

A total of 145 participants were enrolled. A significant downward trend in psoas muscle volume was observed between healthy controls and individuals following FAP, RAP, and CP in all adjusted models ( $p = 0.047, 0.005, 0.004, \text{ and } < 0.001$ ). Leptin was significantly associated with psoas muscle volume in all models ( $\beta = -0.16, p = 0.030$  in the most adjusted model). The other studied cytokines were not significantly associated with psoas muscle volume.

#### **Conclusions**

Psoas muscle size is significantly reduced along the continuum from FAP to RAP to CP. Leptin appears to be one of the factors implicated in this. Further studies are warranted to investigate the relationship between skeletal muscle and inflammation of the pancreas.

#### **Key Points**

- *First acute pancreatitis, recurrent acute pancreatitis, and chronic pancreatitis were associated with progressively reduced psoas muscle size.*

- *The findings were independent of age, sex, body fat composition, physical activity, tobacco smoking, alcohol consumption, comorbidities, and exocrine and endocrine functions of the pancreas.*
- *The mechanism underlying the observed findings may involve hyperleptinaemia.*

[Link between IBS and osteoporosis](#)**The Association Between Irritable Bowel Syndrome and Osteoporosis: A Systematic Review and Meta-Analysis**W Wongtrakul<sup>1</sup>, N Charoenngam<sup>2</sup>, P Ungprasert<sup>3</sup>

PMID: 32008157 DOI: 10.1007/s00198-020-05318-y

**Background:** Recent studies have suggested that irritable bowel syndrome (IBS) could be a risk factor for osteoporosis although the evidence is still limited. The current study aimed to comprehensively examine the risk of osteoporosis among patients with IBS using systematic review and meta-analysis technique.

**Methodology:** Literature search was independently conducted by two investigators using MEDLINE, EMBASE, and Google Scholar database up to October 2019. Eligible study must evaluate whether patients with IBS have a higher risk of osteoporosis and/or osteoporotic fracture. It could be either cross-sectional study, case-control study, or cohort study. Point estimates and standard errors from each eligible study were combined together using the generic inverse variance method of DerSimonian and Laird.

**Results:** Of the 320 articles identified from the three databases, four cohort and one cross-sectional study with 526,633 participants met the eligibility criteria and were included into the meta-analysis. All five studies investigated the risk of osteoporosis among patients with IBS, and the pooled analysis found that patients with IBS had a significantly higher risk of osteoporosis than individuals without IBS with the pooled risk ratio of 1.95 (95% CI, 1.04-3.64;  $I^2$  100%). Sensitivity analysis including only cohort studies found a lower RR (pooled RR 1.55; 95% CI, 1.39-1.72) with a lower  $I^2$  (59%). Three studies investigated the risk of osteoporotic fracture, and the pooled analysis found that patients with IBS also had a higher risk of osteoporotic fracture than individuals without IBS with the pooled risk ratio of 1.58 although statistical significance was not reached (95% CI, 0.95-2.62;  $I^2$  99%). Sensitivity analysis including only cohort studies found a lower RR (pooled RR 1.27; 95% CI, 1.20-1.39) with a dramatically lower  $I^2$  (0%). Limitations included high heterogeneity and reliance on diagnostic codes.

**Conclusion:** A significantly increased risk of osteoporosis among IBS patients was observed in this study. Early intervention to prevent the development of osteoporosis, such as weight-bearing exercise, adequate intake of vitamin D and calcium, and early screening for osteoporosis, may be beneficial to these patients although further studies are still required to confirm the efficacy and cost-effectiveness of this approach.

## 13 A. CRANIUM

### Treatment of panic disorder through the trigeminal nerve rx

#### **Treatment of panic disorder by trigeminal nerve manipulation: A case series**

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DOI: <https://doi.org/10.1016/j.jbmt.2020.01.002>

#### **Abstract**

The report on two cases of patients with acute severe panic disorder relieved of their symptoms by manual manipulations of the trigeminal nerve's alveolar branches.

The manipulations were performed via the oral cavity during one session, or two consecutive sessions less than a week apart. No other effective treatment was administered prior, concurrently or since the time of the treatment.

The recovery from panic disorder was immediate and lasted for the entire period of observation of three years. The authors used the same procedure and achieved identical clinical results treating ten other clients over a period of three years. This was not a planned experiment or randomized study. Rather, this report presents clinical evidence and the authors' hypothesis based on clinical data and literature review.

**13 D. SLEEP****ANS involvement**

J Clin Sleep Med 2020 Feb 10

**Frequency and Severity of Autonomic Symptoms in Idiopathic Hypersomnia**

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**Study objectives:** We aimed to quantify the symptoms of autonomic nervous system (ANS) dysfunction in a large online cohort of patients with IH, and to determine how the severity of these symptoms interacts with sleepiness, fatigue, and quality of life.

**Methods:** One hundred thirty-eight IH patients and 81 age- and sex-matched controls were recruited through the website of the Hypersomnia Foundation, a U.S.-based patient advocacy group. Twenty-four confirmed IH patients were selected by the study investigators as a comparison group. All participants completed a battery of online sleep, autonomic, and quality of life questionnaires including the composite autonomic symptom score-31 (COMPASS-31).

**Results:** Online and confirmed patients reported significantly higher COMPASS-31 scores (43.6 [33.6-52.7] & 32.9 [21.7- 46.8] vs. 17.6 [11.7-27.9],  $p < 0.001$ ), with the greatest symptom burden in the orthostatic and vasomotor domains. Online and confirmed patients reported more sleepiness (ESS), whereas only online patients reported more fatigue (CFQ). Both the ESS and CFQ positively correlated with COMPASS-31 scores. Patients reported lower quality of life as reflected by lower scores across all domains of the RAND-36, which was negatively correlated with COMPASS-31 scores.

**Conclusions:** Symptoms of ANS dysfunction are common in IH. In addition, ANS symptom burden was positively correlated with sleepiness and negatively correlated with quality of life.

## 31. KNEE

### Dry needling helps knee pain

Arch Phys Med Rehabil , 101 (2), 265-274 Feb 2020

#### **Added Value of Gluteus Medius and Quadratus Lumborum Dry Needling in Improving Knee Pain and Function in Female Athletes With Patellofemoral Pain Syndrome: A Randomized Clinical Trial**

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PMID: 31465756 DOI: 10.1016/j.apmr.2019.07.009

**Objective:** To compare the effects of exercise therapy alone and exercise therapy plus gluteus medius (GM) and quadratus lumborum (QL) dry needling on pain and function in female athletes with patellofemoral pain (PFP).

**Design:** Single-blind randomized controlled trial with follow-up.

**Setting:** Physiotherapy clinic.

**Participants:** Convenience sample of female athletes with PFP (N=40), who were randomly assigned to the exercise therapy (Ex group) or exercise-therapy+dry needling (Ex+DN group) group.

**Interventions:** The Ex group received exercise therapy for 4 weeks, and the Ex+DN group received exercise therapy in combination with dry needling directed at GM and QL trigger points for 4 weeks.

**Main outcome measures:** In all participants, pain intensity, function (Kujala score, modified star excursion balance test, step-down test), and QL and GM pressure pain threshold (PPT) were recorded at baseline and at 4 and 6 weeks after the start of treatment. Analysis of variance (2 groups×3 times) was used to compare within- and between-group differences.

**Results:** The group versus time interaction effect was significant for all variables ( $P<.05$ ). Both groups showed significant improvements in pain, function, and PPT at weeks 4 and 6 compared to baseline ( $P<.05$ ). Between-groups comparisons showed significantly greater improvements in pain, function, and PPT in the Ex+DN group ( $P<.05$ ).

**Conclusions:** Targeting intervention to treat trigger points in the GM and QL muscles combined with exercise therapy had superior beneficial effects compared to exercise alone in managing PFP. Therefore, adding GM and QL muscle dry needling to exercise therapy may be advisable to enhance the effects of PFP rehabilitation.



### 33. MENISCUS

#### Operative vs non

Arthritis Rheumatol , 72 (2), 273-281 Feb 2020

#### **Five-Year Outcome of Operative and Nonoperative Management of Meniscal Tear in Persons Older Than Forty-Five Years**

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PMID: 31429198 MCID: PMC6994332 (available on 2021-02-01) DOI: 10.1002/art.41082

**Objective:** To determine the 5-year outcome of treatment for meniscal tear in osteoarthritis.

**Methods:** We examined 5-year follow-up data from the Meniscal Tear in Osteoarthritis Research trial (METEOR) of physical therapy versus arthroscopic partial meniscectomy. We performed primary intent-to-treat (ITT) and secondary as-treated analyses. The primary outcome measure was the Knee Injury and Osteoarthritis Outcome Score (KOOS) pain scale; total knee replacement (TKR) was a secondary outcome measure. We used piecewise linear mixed models to describe change in KOOS pain. We calculated 5-year cumulative TKR incidence and used a Cox model to estimate hazard ratios (HRs) for TKR, with 95% confidence intervals (95% CIs).

**Results:** Three hundred fifty-one participants were randomized. In the ITT analysis, the KOOS pain scores were ~46 (scale of 0 [no pain] to 100 [most pain]) at baseline in both groups. Pain scores improved substantially in both groups over the first 3 months, continued to improve through the next 24 months (to ~18 in each group), and were stable at 24-60 months. Results of the as-treated analyses of the KOOS pain score were similar. Twenty-five participants (7.1% [95% CI 4.4-9.8%]) underwent TKR over 5 years. In the ITT model, the HR for TKR was 2.0 (95% CI 0.8-4.9) for subjects randomized to the arthroscopic partial meniscectomy group, compared to those randomized to the physical therapy group. In the as-treated analysis, the HR for TKR was 4.9 (95% CI 1.1-20.9) for subjects ultimately treated with arthroscopic partial meniscectomy, compared to those treated nonoperatively.

**Conclusion:** Pain improved considerably in both groups over 60 months. While ITT analysis revealed no statistically significant differences following TKR, greater frequency of TKR in those undergoing arthroscopic partial meniscectomy merits further study

## 35. KNEE/TOTAL

## Pre balance training improved post results

Clin Rehabil , 34 (2), 182-193 Feb 2020

**The Effects of Preoperative Balance Training on Balance and Functional Outcome After Total Knee Replacement: A Randomized Controlled Trial**

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- PMID: 31608677 DOI: 10.1177/0269215519880936

**Objective:** To assess the effects of preoperative balance training on the early postoperative balance and functional outcomes after total knee replacement surgery and to test whether an outpatient intervention may be as effective as a domiciliary intervention.

**Design:** This is a three-arm randomized controlled trial.

**Setting:** University hospital.

**Subjects:** Eighty-six individuals were recruited. Seventy-seven were analysed, aged 72.1 (SD 7.6) years, of which 68% were women.

**Outcome measures:** Overall state of balance, as measured with the Berg Balance Scale, and patient-perceived functionality, as measured with the Knee Injury and Osteoarthritis Outcome Score Function in Activities in Daily Living (KOOS-ADL) questionnaire, were the primary outcomes. Secondary assessments targeted knee function, balance and mobility, quality of life, and self-reported outcomes. The primary end-point was six weeks after surgery.

**Intervention:** The hospital group implemented a four-week preoperative outpatient balance-oriented intervention. The home group implemented similar training, but this was domiciliary. The control group was instructed to keep performing their normal activities.

**Results:** Home and hospital groups presented a moderate effect against the control group ( $d_{hospital-control} = 0.54$ ;  $d_{home-control} = 0.63$ ), both being similarly effective in improving the overall state of balance at six weeks after surgery ( $P = 0.013$ ). KOOS-ADL scores showed no between-group differences and a small effect size ( $d < 0.5$ ;  $P = 0.937$ ). Secondary assessments suggested non-significant between-group differences.

**Conclusion:** Preoperative balance training, conducted either as domiciliary or as an outpatient, is an effective approach to enhance early postoperative balance outcome but not the perceived functionality of individuals undergoing total knee replacement.

## 40. ANKLE SPRAINS AND INSTABILITY

### Proximal changes

Med Sci Sports Exerc 2020 Jan 17

#### **Proximal Adaptations in Chronic Ankle Instability: Systematic Review and Meta-analysis**

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- PMID: 31977639 DOI: 10.1249/MSS.0000000000002282

**Introduction:** Chronic ankle instability (CAI) is known to induce impairments throughout the lower quarter kinetic chain, however there is currently no synthesized information on proximal adaptations of the trunk, hip, thigh, and knee for neuromuscular and biomechanical outcomes during strength, balance, jumping, and gait among CAI patients. The purpose of this systematic review and meta-analysis was to synthesize trunk, hip, thigh and knee neuromuscular and biomechanical outcome measures during functional assessments when comparing CAI to healthy groups.

**Methods:** CINAHL and MEDLINE with PubMed databases were searched on June 3, 2019. Studies comparing outcomes at the trunk, hip, thigh, or knee regardless of assessment type in CAI versus healthy groups were considered for inclusion. Assessment categories were used to differentiate adaptations by assessment type after inclusion. Two independent reviewers assessed methodological quality using the Physiotherapy Evidence Database scoring criteria. Data pertaining to study methodology and primary proximal adaptation outcomes were extracted. Separate random effects meta-analyses were performed for consistently reported outcome measures.

**Results:** Pooled estimates reflected that CAI patients had decreased tri-planar isometric hip strength outcomes ( $p < .001$ , effect size range: 0.52-0.93). Knee kinematics did not differ from healthy groups during dynamic balance testing ( $p = .26$ ). Few studies found CAI patients have altered knee kinematics during jumping tasks. The remaining findings were isolated to individual studies and thus inconclusive.

**Conclusions:** CAI groups demonstrated tri-planar hip strength deficits and altered knee flexion angles during jumping assessments. Clinicians should consider proximal evaluations and interventions for CAI patients

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Student taught manipulation**

J Man Manip Ther 1-9 2020 Feb 7

**Use of Thrust Joint Manipulation by Student Physical Therapists in the United States During Clinical Education Experiences**

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PMID: 32031508 DOI: 10.1080/10669817.2020.1720948

**Introduction:** Thrust joint manipulation (TJM) is used in physical therapy practice and taught in entry-level curricula in the United States (US); however, research regarding implementation by student physical therapists (SPT)s is scarce.

**Objectives:** To explore the use of TJM in SPT clinical education and factors influencing implementation.

**Methods:** In a cross-sectional exploratory study, accredited physical therapy (PT) programs in the US (n = 227) were invited to participate in an electronic survey. SPTs were queried about TJM use and their clinical instructor's (CI) credentials during their final musculoskeletal clinical experience.

**Results:** Forty-five programs participated in the study, consisting of 2,147 SPTs. Of those, 414 (19.3%) responses were used for analysis and 69% reported using TJM. SPTs who utilized TJM were more likely to have a CI who used TJM ( $p < 0.001$ ) and/or had advanced certification/training in manual therapy ( $p < .001$ ). A majority of students agreed or strongly agreed that their academic preparation provided them with clinical reasoning tools (84%) and psychomotor skills (69%) necessary to perform TJM. SPT use of TJM was facilitated by CI clinical practice, SPT competence in psychomotor skill, confidence in clinical reasoning, and practice setting. A main barrier to student use of TJM was CI lack of TJM use.

**Conclusions:** Clinical practice of the CI appears to be a key factor in determining student use of TJM. Level of evidence: 2b.

**MT improves sit to stand in LBP**

Chiropr Man Therap , 28, 5 2020 Jan 24 eCollection 2020

**Does Manual Therapy Affect Functional and Biomechanical Outcomes of a Sit-To-Stand Task in a Population With Low Back Pain? A Preliminary Analysis**

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PMID: 31998472 PMCID: PMC6979331 DOI: 10.1186/s12998-019-0290-7

**Introduction:** Manual therapy (MT) hypothetically affects discrepant neuromuscular control and movement observed in populations with low back pain (LBP). Previous studies have demonstrated the limited influence of MT on movement, predominately during range of motion (ROM) testing. It remains unclear if MT affects neuromuscular control in mobility-based activities of daily living (ADLs). The sit-to-stand (STS) task represents a commonly-performed ADL that is used in a variety of clinical settings to assess functional and biomechanical performance.

**Objective:** To determine whether MT affects functional performance and biomechanical performance during a STS task in a population with LBP.

**Methods:** Kinematic data were recorded from the pelvis and thorax of participants with LBP, using an optoelectronic motion capture system as they performed a STS task before and after MT from November 2011 to August 2014. MT for each participant consisted of two high-velocity low-amplitude spinal manipulations, as well as two grade IV mobilizations of the lumbar spine and pelvis targeted toward the third lumbar vertebra and sacroiliac joint in a side-lying position; the order of these treatments was randomized. Pelvis and thorax kinematic data were used to derive the time-varying lumbar angle in the sagittal plane for each STS trial. The difference between the maximum and minimum lumbar angles during the STS trial determined the sagittal ROM that was used as the biomechanical outcome. Time to complete each STS trial was used as a functional measure of performance. Pre-MT and post-MT values for the lumbar sagittal ROM and time to completion were statistically analysed using paired samples t-tests.

**Results:** Data were obtained from 40 participants with 35 useful datasets (NRS =  $3.3 \pm 1.2$ ;  $32.4 \pm 9.8$  years; 16 females, 19 males). After MT, lumbar sagittal ROM increased by  $2.7 \pm 5.5$  degrees ( $p = 0.007$ ). Time to complete the STS test decreased by  $0.4 \pm 0.4$  s ( $p < 0.001$ ).

**Discussion:** These findings provide preliminary evidence that MT might influence the biomechanical and functional performance of an STS task in populations with LBP. The MT intervention in this study involved a combination of spinal manipulations and mobilizations. Future work will expand upon these data as a basis for targeted investigations on the effects of either spinal manipulation and mobilization on neuromuscular control and movement in populations with LBP

**45 D. MANUAL THERAPY EXTREMITIES****Ankle mob to increase dorsi flexion**

Phys Ther 2020 Jan 16

**A Randomized Controlled Trial Assessing the Evolution of the Weight-Bearing Ankle Dorsiflexion Range of Motion Over 6 Sessions of Talus Mobilizations in Older Adults**

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PMID: 31944252 DOI: 10.1093/ptj/pzaa003

**Background:** Ankle range of motion declines with age, affecting mobility and postural control.

**Objective:** The objective of this study was to investigate the effects of a talus mobilization-based intervention among healthy community-dwelling older adults presenting with limited weight-bearing ankle dorsiflexion range of motion and determine how ankle mobility evolved over the treatment.

**Design:** This was a randomized clinical trial.

**Setting:** This study was conducted in an outpatient clinic.

**Participants:** Community-dwelling, older adults over age 60 who had limited ankle mobility participated in this study.

**Interventions:** The experimental intervention consisted of 6 sessions of manual therapy applied in the ankle joint. The control group received the same volume of sham treatment.

**Measurements:** The primary outcome was the weight-bearing ankle dorsiflexion range of motion as measured using the lunge test. Data were collected at 9 time points: baseline, after each session, and follow-up.

**Results:** Thirty-six participants were analyzed. A single session of mobilization increased ankle range of motion by 8 degrees (95% CI 6 to 11). At the end of the sixth session, this effect had increased slightly to 11 degrees (95% CI 9 to 13). Significant between-group differences were found throughout the intervention.

**Limitations:** Optimal dose and effects from follow-up evaluations for treatment volumes of fewer than 6 sessions remain unknown.

**Conclusions:** Six sessions of a talus mobilization-based intervention in healthy community-dwelling older adults found that the greatest mobility gain in terms of the weight-bearing ankle dorsiflexion range of motion is produced after the first session. Additional sessions produce smaller improvements with a slight upward trend. Importantly, the restoration of joint mobility is enhanced over time after the end of the intervention.

## 49. STRETCHING

### Comparisons

J Biomech , 109670 2020 Jan 31

#### **Effects of Static Stretching Programs Performed at Different Volume-Equated Weekly Frequencies on Passive Properties of Muscle-Tendon Unit**

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PMID: 32035662 DOI: 10.1016/j.jbiomech.2020.109670

Whether static stretching (SS) frequency has an effect on increasing the range of motion (ROM) and decreasing muscle stiffness remains unclear. Therefore, this study aimed to investigate the effects of two 6-week SS programs performed with different frequencies but generally the same duration of stretching on the passive properties of the medial gastrocnemius muscle-tendon unit.

The study participants comprised 24 male volunteers randomly assigned to either the one-time/week group or the three-times/week group, performing 6 min of SS once per week and 2 min of SS thrice per week, respectively. The dorsiflexion ROM (DF ROM) and muscle stiffness of the medial gastrocnemius during passive ankle dorsiflexion were assessed using a dynamometer and ultrasonography before and after 6 weeks of SS programs.

The results show that the DF ROM was increased and muscle stiffness was decreased significantly in the three-times/week group ( $P < 0.01$  and  $P < 0.01$ , respectively), whereas no significant changes were observed in DF ROM and muscle stiffness in the one-time per week group ( $P = 0.25$  and  $P = 0.32$ , respectively).

These results suggest that a high-frequency SS program is more effective than a low-frequency SS program in increasing ROM and decreasing muscle stiffness.

**52. EXERCISE****Restricted blood flow**

Phys Ther Sport , 43, 1-7 2020 Jan 30

**Eccentric, but Not Concentric Blood Flow Restriction Resistance Training Increases Muscle Strength in the Untrained Limb**

Ethan C Hill <sup>1</sup>

PMID: 32035361 DOI: 10.1016/j.ptsp.2020.01.013

**Objectives:** Little is known regarding the variables or mechanisms mediating cross-education as a result of resistance training. Therefore, the purpose of the present study was to examine the effects of low-load eccentric-only blood flow restriction (Ecc-BFR) and low-load concentric-only BFR (Con-BFR) on indices of cross-education.

**Design:** Thirty-six women were randomly assigned to 4-wks of unilateral resistance training with Ecc-BFR (n = 12), Con-BFR (n = 12) or control (no intervention, n = 12) group. Eccentric peak torque, concentric peak torque, maximal voluntary isometric contraction torque, muscle thickness, and muscle activation were assessed from the contralateral, untrained arm.

**Results:** Muscle strength (collapsed across mode) increased from 0-wk to 2-wks (4.9%) and 4-wks (13.0%) for Ecc-BFR only. There were increases in muscle activation (collapsed across mode and group) regardless of training modality, but there were no changes in muscle size for any of the conditions.

**Conclusions:** The findings of the present study indicated that low-load Ecc-BFR increased muscle strength. The increases in muscle strength as a result of Ecc-BFR were not mode-specific. Thus, low-load Ecc-BFR provides a unique alternative to maintain muscle function in an untrained limb that may have application during limb immobilization and rehabilitation practices.



**59. PAIN****Pain science and interviewing**

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**Integrating Motivational Interviewing in Pain Neuroscience Education for People With Chronic Pain: A Practical Guide for Clinicians**

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Pain neuroscience education (PNE) and motivational interviewing (MI) have been widely implemented and tested in the field of chronic pain management, and both strategies have been shown to be effective in the short term (small effect sizes) for the management of chronic pain.

PNE uses contemporary pain science to educate patients about the biopsychosocial nature of the chronicity of their pain experience. The goal of PNE is to optimize patients' pain beliefs/perceptions to facilitate the acquisition of adaptive pain coping strategies. MI, on the other hand, is a patient-centered communication style for eliciting and enhancing motivation for behavior change by shifting the patient away from a state of indecision or uncertainty.

Conceptually, PNE and MI appear to be complementary interventions, with complementary rather than overlapping effects; MI primarily improves cognitive and behavioral awareness and, potentially, adherence to treatment principles, whereas PNE potentially increases pain knowledge/beliefs, awareness, and willingness to explore psychological factors that are potentially associated with pain.

Therefore, combining PNE with MI might lead to improved outcomes with larger and longer-lasting effect sizes. The combined use of PNE and MI in patients having chronic pain is introduced here, along with a description of how clinicians might be able to integrate PNE and MI in the treatment of patients experiencing chronic pain. Clinical trials are needed to examine whether combining PNE with MI is superior to PNE or MI alone for improving pain and quality of life in patients having chronic pain.

**Pain rehab in adolescence**

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**Pain Rehabilitation During Adolescence; Work in Adulthood? A Long-Term Follow-Up Study to Explore the Facilitators and Barriers for Work**

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**Background:** Adolescents with chronic musculoskeletal pain face different impairments in daily life. After an inpatient pain rehabilitation program adolescents function better on several domains. The aim of this study is to explore the long-term work participation of adults who followed inpatient pain rehabilitation during adolescence because of chronic musculoskeletal pain and to identify potential facilitators and barriers regarding work in later life.

**Methods:** A mixed methods study with standardized questionnaires and semi-structured interviews. The questionnaires measured pain, disability, work status and quality and quantity of the work. The interviews contained questions about work participation. Potential participants were all patients who received an inpatient pain rehabilitation program 15-20 years ago. Analyses were performed by thematic analysis. Using the Sherbrooke model as guidance, themes were classified in four systems: healthcare, workplace, legislative/insurance and personal system.

**Results:** Fourteen patients consented to participate (12 females). 71% Of them have paid work. The mean self-reported quality of the work delivered is 9.6 (Standard Deviation=0.5). 18 Facilitators and 12 barriers regarding work participation later on in life were mentioned. The inpatient pain rehabilitation program is the most frequently mentioned facilitator (n=5), while the personal system and coping related factors are the most frequently mentioned barriers (n=5).

**Conclusions:** Ten out of 14 participants are currently working, most of them despite experiencing pain. Several factors based on the four systems of the Sherbrooke model contribute as facilitators or barriers regarding current work participation. Pain rehabilitation is mostly regarded as a facilitator for work participation later on in life.