2. LBP

LBP in dancers

The Epidemiology of Low Back Pain and Injury in Dance: A Systematic Review

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Study Design
Systematic review.

Background
Dance is a physical pursuit that involves loading the spine through repetitive dynamic movements and lifting tasks. As such, low back pain (LBP) and low back injury (LBI) have been identified as common health problems within contemporary dance and classical ballet populations. However, clarity regarding the experience of LBP and LBI in dance is lacking.

Objectives
To systematically review and synthesize the epidemiology on LBP and LBI in dance populations.

Methods
A comprehensive search of six electronic databases, back catalogues of dance science specific journals, reference lists of relevant articles, and a forward citation search were performed.

Results
Fifty full text articles were included in the final review. There was considerable methodological heterogeneity amongst the included studies. The median (range) point, yearly, and lifetime prevalence of LBP was 27% (17 – 39%), 73% (41 – 82%), and 50% (17 – 88%) respectively. The lower back contributed to 11% (4 – 22%) of time loss and 11% (5 – 23%) of medical attention injuries.

Conclusion
Dancers are vulnerable to LBP and injury. The use of definitions that are sensitive to the complexity of LBP and LBI would facilitate improved understanding of the problem within dance, would inform healthcare strategies, and allow for monitoring of LBP specific intervention outcomes. *J Orthop Sports Phys Ther, Epub 18 Jan 2019. doi:10.2519/jospt.2019.8609*

Comparison of systems

Are movement-based classification systems more effective than therapeutic exercise or guideline based care in improving outcomes for patients with chronic low back pain? A systematic review

Sean P. Riley,Brian T. Swanson &Elizabeth Dyer

https://doi.org/10.1080/10669817.2018.1532693

Objectives: The purpose of this systematic review was to determine if movement-based classification (MBC) systems are more effective than therapeutic exercise or guideline-based care (GBC) in improving outcomes in patients with low back pain (LBP) based upon randomized clinical trials (RCT) with moderate to high methodological quality and low to moderate risk of bias.

Methods: The search strategy was developed by a librarian experienced in systematic review methodology and peer reviewed by a second research librarian. The following databases were searched from their inception to May 17, 2018: PubMed, Embase, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, and the WHO International Clinical Trials Registry Platform. The identified RCTs with a PEDro score of ≥6 were screened and assessed for risk of bias by two blinded individual reviewers using Covidence.

Results: Seven studies were identified that had moderate-to-high methodological quality. One of the studies was identified as having a high risk of bias. Of the six studies that remained, only one study reported finding a statistically significant difference at the immediate follow-up that was not clinically significant. There was no significance at 6 and 12 months.

Discussion: There is a paucity of moderate to high methodological quality RCTs with similar methodology that compare MBC to standard of care treatments for patients with LBP. Studies with moderate to high methodological quality that have a low risk of bias do not support MBCs as being superior to general exercise or GBC in the treatment of nonradicular LBP.

5. SPINAL SURGERY

Surgery for minor leg pain not as effective

Clinical outcome after surgery for lumbar spinal stenosis in patients with insignificant lower extremity pain. A prospective cohort study from the Norwegian registry for spine surgery

Erland Hermansen Tor Åge Myklebust, Ivar Magne Austevoll, Frode Rekeland, Tore Solberg, Kjersti Storheim, Oliver Grundnes, Jørn Aaen, Jens Ivar Brox, hristian Hellum and Kari Indrekvam

*BMC Musculoskeletal Disorders*2019**20**:36
https://doi.org/10.1186/s12891-019-2407-5

Background

Spinal stenosis is a clinical diagnosis in which the main symptom is pain radiating to the lower extremities, or neurogenic claudication. Radiological spinal stenosis is commonly observed in the population and it is debated whether patients with no lower extremity pain should be labelled as having spinal stenosis. However, these patients is found in the Norwegian Registry for Spine Surgery, the main object of the present study was to compare the clinical outcomes after decompressive surgery in patients with insignificant lower extremity pain, with those with more severe pain.

Methods

This study is based on data from the Norwegian Registry for Spine Surgery (NORspine). Patients who had decompressive surgery in the period from 7/1–2007 to 11/3–2013 at 31 hospitals were included. The patients was divided into four groups based on preoperative Numeric Rating Scale (NRS)-score for lowerextremity pain. Patients in group 1 had insignificant pain, group 2 had mild or moderate pain, group 3 severe pain and group 4 extremely severe pain. The primary outcome was change in the Oswestry Disability Index (ODI). Successfully treated patients were defined as patients reporting at least 30% reduction of baseline ODI, and the number of successfully treated patients in each group were recorded.

Results

In total, 3181 patients were eligible; 154 patients in group 1; 753 in group 2; 1766 in group 3; and 528 in group 4. Group 1 had significantly less improvement from baseline in all the clinical scores 12 months after surgery compared to the other groups. However, with a mean reduction of 8 ODI points and 56% of patients showing a reduction of at least 30% in their ODI score, the proportion of patients defined as successfully treated in group 1, was not significantly different from that of other groups.

Conclusion

This national register study shows that patients with insignificant lower extremity pain had less improvement in primary and secondary outcome parameters from baseline to follow-up compared to patients with more severe lower extremity pain.

7. PELVIC ORGANS/WOMAN'S HEALTH

Smoking strongly related to breast CA

Smoking and breast cancer risk by race/ethnicity and oestrogen and progesterone receptor status: The Multiethnic Cohort (MEC) study
International Journal of Epidemiology Gram IT, et al. | January 22, 2019

Researchers examined whether the higher risk of smoking-related breast cancer was similar for the five race/ethnicity groups in the Multiethnic Cohort (MEC) study and oestrogen (ER) and progesterone (PR) receptor status.

Sixty-seven thousand, three hundred thirteen women who were enrolled in the MEC study at 45–75 years of age were followed from 1993 to 2013. Breast cancer cases and tumour receptor status were identified via linkage to the Hawaii and California Surveillance, Epidemiology and End Results Program cancer registries through December 2013. Four thousand, two hundred thirty incident, invasive breast cancer cases were identified during a mean follow-up of 16.7 years.

They discovered that the increased risk of smoking-related breast cancer in racial/ethnic groups and by ER and PR status is similar, showing that breast cancer should be considered as smoking-related cancer.

8. VISCERA

E cigarettes dangerous effects on the liver

Journal Summaries in Gastroenterology

E-cigarettes and western diet: Important metabolic risk factors for hepatic diseases
Hepatology — Hasan KM, et al. | January 23, 2019
In this investigation, researchers studied the harmful effects of electronic nicotine delivery systems (ENDS), also known as e-cigarettes, on the liver.

Apolipoprotein E null (ApoE-/-) mice on a Western diet (WD) were exposed to saline or ENDS with 2.4% nicotine aerosol for 12 weeks using a newly developed mouse ENDS exposure model system that delivers nicotine to mice that results in equivalent levels of serum cotinine found in humans. The investigators observed that ApoE-/- mice on a WD exposed to ENDS showed a marked increase in hepatic lipid accumulation vs ApoE-/- on a similar diet exposed to saline aerosol. Functional analysis shows that genes associated with lipid metabolism, cholesterol biosynthesis, and circadian rhythm have been altered most significantly in the liver in response to ENDS.

These outcomes exhibit profound adverse effects of ENDS on the liver. This information is important for the regulatory agencies that regulate ENDS.

ABSTRACTS

Fatty liver disease and low sugar

Effect of a Low Free Sugar Diet vs Usual Diet on Nonalcoholic Fatty Liver Disease in Adolescent BoysA Randomized Clinical Trial

Jeffrey B. Schwimmer, MD[1,2]; Miriam B. Vos, MD, MSPH[3,4,5]

JAMA. 2019;321(3):256-265. doi:10.1001/jama.2018.20579

Key Points

Question Does restricting dietary free sugars reduce hepatic steatosis in children with nonalcoholic fatty liver disease?

Findings In this randomized clinical trial that included 40 adolescent boys aged 11 to 16 years with nonalcoholic fatty liver disease followed up for 8 weeks, provision of a diet low in free sugars compared with usual diet resulted in a greater reduction in hepatic steatosis from 25% to 17% in the low free sugar diet group and from 21% to 20% in the usual diet group, a statistically significant difference of −6.23% when adjusted for baseline.

Meaning These preliminary findings suggest potential benefit of a diet low in free sugars for children with nonalcoholic fatty liver disease, but further research is needed to assess long-term and clinical outcomes.

Abstract

Importance Pediatric guidelines for the management of nonalcoholic fatty liver disease (NAFLD) recommend a healthy diet as treatment. Reduction of sugary foods and beverages is a plausible but unproven treatment.

Objective To determine the effects of a diet low in free sugars (those sugars added to foods and beverages and occurring naturally in fruit juices) in adolescent boys with NAFLD.

Design, Setting, and Participants An open-label, 8-week randomized clinical trial of adolescent boys aged 11 to 16 years with histologically diagnosed NAFLD and evidence of active disease (hepatic steatosis >10% and alanine aminotransferase level ≥45 U/L) randomized 1:1 to an intervention diet group or usual diet group at 2 US academic clinical research centers from August 2015 to July 2017; final date of follow-up was September 2017.

Interventions The intervention diet consisted of individualized menu planning and provision of study meals for the entire household to restrict free sugar intake to less than 3% of daily calories for 8 weeks. Twice-weekly telephone calls assessed diet adherence. Usual diet participants consumed their regular diet.

Main Outcomes and Measures The primary outcome was change in hepatic steatosis estimated by magnetic resonance imaging proton density fat fraction measurement between baseline and 8 weeks. The minimal clinically important difference was assumed to be 4%. There were 12 secondary outcomes, including change in alanine aminotransferase level and diet adherence.

Results Forty adolescent boys were randomly assigned to either the intervention diet group or the usual diet group (20 per group; mean [SD] age, 13.0 [1.9] years; most were Hispanic [95%]) and all completed the trial. The mean decrease in hepatic steatosis from baseline to week 8 was significantly greater for the intervention diet group (25% to 17%) vs the usual diet group (21% to 20%) and the adjusted week 8 mean difference was −6.23% (95% CI, −9.45% to −3.02%; $P < .001$). Of the 12 prespecified secondary outcomes, 7 were null and 5 were statistically significant including alanine aminotransferase level and diet adherence. The geometric mean decrease in alanine aminotransferase level from baseline to 8 weeks was significantly greater for the intervention diet group (103 U/L to 61 U/L) vs the usual diet group (82 U/L to 75 U/L) and the adjusted ratio of the geometric means at week 8 was 0.65 U/L (95% CI, 0.53 to 0.81 U/L; $P < .001$). Adherence to the diet was high in the intervention diet group (18 of 20 reported intake of <3% of calories from free sugar during the intervention). There were no adverse events related to participation in the study.

Conclusions and Relevance In this study of adolescent boys with NAFLD, 8 weeks of provision of a diet low in free sugar content compared with usual diet resulted in significant improvement in hepatic steatosis. However, these findings should be considered preliminary and further research is required to assess long-term and clinical outcomes.

13 D. SLEEP

Low exercise and sleep disruption

J Clin Sleep Med. 2018 Dec 15;14(12):1995-2004. doi: 10.5664/jcsm.7522.

Objectively Measured Disrupted Sleep Is Independently and Directly Associated With Low Exercise Capacity in Males: A Structural Equation Model.

Huang RJ[1], Lee SD[2,3,4], Lai CH[5], Chang SW[6], Chung AH[6], Chen CW[7], Huang IN[7], Ting H[6,7,8].

STUDY OBJECTIVES:
We investigated the interaction between objective sleep disturbance and obesity, sedentary lifestyle, and lung dysfunction and whether it is negatively associated with cardiorespiratory fitness.

METHODS:
In this community cohort study of 521 men (age 46.6 ± 7.5 years), measures of anthropometry, pulmonary function, overnight sleep polysomnography, and cardiopulmonary exercise testing were processed stepwise using structural equation modeling (SEM).

RESULTS:
A univariate correlation analysis was used to group the corresponding variables (in parentheses) into the following eligible latent variables for lower exercise capacity: obesity (body mass index, waist-to-hip ratio), irregular exercise, impaired lung function (predicted values of forced expiratory volume in the first second, forced vital capacity, maximal ventilatory volume, and lung diffusion capacity for carbon monoxide), disrupted sleep (total sleep time, percentage of slow-wave sleep, sleep efficiency), and sleep-disordered breathing (apnea-hypopnea index, lowest oxygen saturation, percentage of total period of oxygen saturation < 90%). Advanced SEM analyses produced a well-fitted final confirmatory model that obesity (direct strength β_d = .366, $P < .001$), irregular exercise (β_d = .274, $P < .001$), and impaired lung function (β_d = .152, $P < .001$), with their mutual interactions, as well as disrupted sleep (β_d = .135, P = .001) were independently and directly associated with low exercise capacity. By contrast, sleep-disordered breathing (β_d = 0, P = .215) was related to low exercise capacity indirectly through obesity into the mutual interaction cycle of obesity, irregular exercise, and impaired lung function. Sleep-disordered breathing was robustly and mutually correlated with obesity (mutual relationship index = .534, $P < .001$).

CONCLUSIONS:
Objectively measured disrupted sleep is directly and independently associated with low exercise capacity; however, sleep-disordered breathing is indirectly mediated by obesity and mutual interactions among obesity, lung dysfunction, and sedentary lifestyle and is linked to low exercise capacity. Our findings indicate that individuals with limited exercise capacity without definite causes should undertake a sleep study, particularly in those describing symptoms of sleep-disordered breathing or insomnia.

14. HEADACHES

Migraine suffers increase risk of stroke

Migraine Age of Onset and Association With Ischemic Stroke in Late Life: 20 Years Follow-Up in ARIC

X. Michelle Androulakis, MD, MS
; Souvik Sen, MD, MS; Nishanth Kodumuri, MD;
Tianming Zhang, PhD; John Grego, PhD; Wayne Rosamond, PhD, MS; Rebecca F. Gottesman, MD, PhD; Eyal Shahar, MD, MPH; B. Lee Peterlin, DO

Background and Purpose.—To evaluate the association between cumulative exposure to migraine and incidence of ischemic
stroke in the Atherosclerosis Risk in Communities (ARIC) study.
Methods.—In this ongoing, prospective longitudinal community-based cohort, participants were interviewed to ascertain
migraine history at the third visit (1993–1995), followed for ischemic stroke incidence over 20□ years. We performed a post hoc analysis to evaluate the association between the age of migraine onset and ischemic stroke.
Results.—We identified 447 migraineurs with aura (MA) and 1128 migraineurs without aura (MO) among 11,592 black and white participants. There was an association between the age of MA onset ≥50□ years old (average duration□ =□ 4.75□ years) and ischemic stroke when compared to no headache group (multivariable adjusted HR□ =□ 2.17, 95%□ CI [1.39–3.39], P□ <□ .001). MA onset <50□ years old (average duration□ =□ 28.17□ years) was not associated with stroke (multivariable adjusted HR□ =□ 1.31, 95%□ CI [0.86–2.02], P□ =□ .212). These results were consistent with our logistic regression model. MO was not associated with increased stroke regardless of the age of onset. The absolute risk for stroke in migraine with aura is 37/447 (8.27%) and migraine without
aura is 48/1128 (4.25%).

Conclusion.—As compared to the no headache participants, increased stroke risk in late life was observed in participants with late onset of MA. In this cohort, longer cumulative exposure to migraine with visual aura, as would be expected with early onset of migraine, was not associated with increased risk of ischemic stroke in late life. This study underscores the importance
of the age of onset of MA in assessing stroke risk in older migraineurs.

HA's and Strike

Journal Summaries in Pain Management

Migraine age of onset and association with ischemic stroke in late life: 20 years follow-up in ARIC
Headache: The Journal of Head and Face Pain
Androulakis XM, et al. | January 23, 2019

How cumulative exposure to migraine correlates to ischemic stroke incidence was evaluated in the Atherosclerosis Risk in Communities (ARIC) study. At the third visit (1993–1995), researchers interviewed participants to determine migraine history, and then followed them for ischemic stroke incidence over 20 years in this ongoing, prospective longitudinal community-based cohort. Participants with late onset of migraine with aura (MA) displayed increased stroke risk in late life vs no headache participants. No increased risk of ischemic stroke in late life was seen in association with longer cumulative exposure to migraine with visual aura, as might be expected with early onset of migraine. Findings thereby emphasize the significance of the age of onset of MA in judging risk of stroke in older migraineurs

16. CONCUSSIONS

Neck strength important

The Potential Role of the Cervical Spine in Sports-Related Concussion: Clinical Perspectives and Considerations for Risk Reduction

Authors: Michael Streifer, BA[1], Allison M. Brown, PT, PhD[1], Tara Porfido, PT, DPT[1], Ellen Zambo Anderson, PT, PhD[1,2], Jennifer Buckman, PhD[3], Carrie Esopenko, PhD[1,2]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2019 **Volume:**0 **Issue:**0 **Pages:**1–22 **DOI:**10.2519/jospt.2019.8582

Synopsis
Sports-related concussions (SRC) occur due to biomechanical forces to the head or neck that can result in pathophysiological changes in the brain.

The musculature of the cervical spine has been identified as one potential factor in reducing SRC risk as well as underlying sex differences in SRC rates. Recent research has demonstrated that linear and rotational head acceleration, as well as the magnitude of force, upon impact is influenced by cervical spine biomechanics. Increased neck strength and girth is associated with reduced linear and rotational head acceleration during impact. Past work has also shown that overall neck strength and girth are lower in athletes with SRC. Additionally, differences in cervical spine biomechanics are hypothesized as a critical factor underlying sex differences in SRC rates. Specifically, compared to males, females tend to have less neck strength and girth which is associated with increased linear and rotational head acceleration. Although our ability to detect SRC has greatly improved, our ability to prevent SRCs from occurring and decrease the severity of clinical outcomes post-injury is limited. However, we suggest, along with others, that cervical spine biomechanics is a modifiable factor in reducing SRC risk.

We review the role of the cervical spine in reducing SRC risk, and how this differs dependent on sex. We discuss clinical considerations for the examination of the cervical spine and the potential clinical relevance for SRC prevention. Additionally, we provide suggestions for future research examining cervical spine properties as modifiable factors in reducing SRC risk. *J Orthop Sports Phys Ther, Epub 15 Jan 2019. doi:10.2519/jospt.2019.8582*

21. ADHESIVE CAPSULITIS

MT and exercise

A 12-Week Tailored Manual Therapy and Home Stretching Program Based on Level of Irritability and Range of Motion Impairments in Patients With Primary Frozen Shoulder Contracture Syndrome: A Case Series With 9-Months Follow-Up

Authors: Lirios Dueñas, PT, PhD[1], Mercè Balasch-Bernat, PT, PhD[1], Marta Aguilar-Rodríguez, PT, PhD[1], Filip Struyf, PT, PhD[2], Mira Meeus, PT, PhD[2-4], Enrique Lluch, PT, PhD[1,4,5]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2019 **Volume:**0 **Issue:**0 **Pages:**1–24 **DOI:**10.2519/jospt.2019.8194
Study Design
Case series.

Background
Manual therapy has been demonstrated to reduce pain and improve function in patients with frozen shoulder contracture syndrome (FSCS), but no evidence exists to support one form of manual therapy over another. The purpose of this case series was to describe both short and long-term outcomes after a manual therapy program and home stretching exercises based on specific impairments in shoulder mobility and level of tissue irritability in patients with FSCS.

Case Description
Eleven patients with primary FSCS were treated with an individually tailored multimodal manual therapy approach once weekly for 12 visits coupled with home stretching exercises once a day, five days per week. Pain, disability, range of motion (ROM) and muscle strength of the affected shoulder were assessed at baseline, post-treatment, 6-months and 9-months.

Outcomes
Significant improvements in self-reported pain, disability, shoulder ROM (active abduction and active abduction with overpressure, active external rotation and active external rotation with overpressure and isolated glenohumeral active abduction) and strength (shoulder flexion and internal rotation) were reported following treatment with impairment- and tissue irritability-based manual physical therapy and stretching exercises. Additionally, 4 of 11 of the patients showed pain improvements exceeding the minimal clinically important difference (MCID) on visual analogue scale (VAS) post-intervention and 8 of 11 on VAS at 6 and 9-months. Moreover, 7 of 11 of the patients showed improvements in Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire scores exceeding the MCID post-intervention and at 6-months, and 8 of 11 exceeded the MCID at 9-months.

Discussion
Clinically meaningful changes in shoulder pain and disability, ROM, or muscle strength were observed in eleven patients with primary FSCS treated with an individually tailored approach of both manual therapy techniques and stretching exercises, while accounting for tissue irritability. Randomized controlled trials are required to determine the effectiveness of this multimodal approach for the management of individuals with FSCS.

Level of Evidence
Therapy, level 4. *J Orthop Sports Phys Ther, Epub 16 Jan 2019. doi:10.2519/jospt.2019.8194*

22 A. SHOULDER IMPINGMENT

Importance of shoulder girdle upward rotation

The Impact of Decreased Scapulothoracic Upward Rotation on Subacromial Proximities

Authors: Rebekah L. Lawrence, PT, PhD[1], Jonathan P. Braman, MD[2], Paula M. Ludewig, PT, PhD[1]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2019 **Volume:**0 **Issue:**0 **Pages:**1–40 **DOI:**10.2519/jospt.2019.8590

Background
Decreased scapulothoracic upward rotation has been theorized to increase an individual's risk for rotator cuff compression by reducing the clearance for the tendons in the subacromial space (i.e. subacromial proximities). However, the impact of decreased scapulothoracic upward rotation on subacromial proximities has not been tested during dynamic in vivo shoulder motion.

Objective
Determine the impact of decreased scapulothoracic upward rotation on subacromial proximities.

Methods
Shoulder kinematics were quantified in 40 participants classified as having high or low scapulothoracic upward rotation during scapular plane abduction using single-plane fluoroscopy and 2D/3D shape-matching. Subacromial proximities were calculated as: 1) the normalized minimum distance between the coracoacromial arch and humeral rotator cuff insertion, and 2) the surface area of the humeral rotator cuff insertion in immediate proximity to the coracoacromial arch. The effect of decreased scapulothoracic upward rotation on subacromial proximities was assessed using two-factor mixed-model ANOVAs. The prevalence of contact between the coracoacromial arch and rotator cuff was also quantified.

Results
Subacromial distances were generally smallest below 70° humerothoracic elevation. With the arm at the side, the normalized minimum distance for participants in the low scapulothoracic upward rotation group was 34.8% smaller compared to those in the high upward rotation group ($p=0.049$). Contact between the coracoacromial arch and rotator cuff tendon occurred in 45% of participants.

Conclusion
Decreased scapulothoracic upward rotation shifts the range of risk for subacromial rotator cuff compression to lower angles. However, the low prevalence of contact suggests subacromial rotator cuff compression may be less common than traditionally presumed.

J Orthop Sports Phys Ther, Epub 18 Jan 2019. doi:10.2519/jospt.2019.8590

26. CARPAL TUNNEL SYNDROME

Impact of

Pain Med. 2018 Dec 17. doi: 10.1093/pm/pny248.

Perceived Pain Extent Is Not Associated with Physical, Psychological, or Psychophysical Outcomes in Women with Carpal Tunnel Syndrome.

Fernández-de-Las-Peñas C[1,2], Falla D[3], Palacios-Ceña M[1,2], De-la-Llave-Rincón AI[1,2], Schneebeli A[4], Barbero M[4].

OBJECTIVE:
Our aims were 1) to investigate whether perceived pain extent, assessed from the pain drawing, relates to clinical, psychological, and psychophysical outcomes in women with carpal tunnel syndrome (CTS); 2) to assess differences in pain extent depending on the presence of median or extramedian symptoms; and 3) to investigate differences in pain extent according to severity (minimal, moderate, or severe) or laterality (unilateral or bilateral) of CTS.

METHODS:
One hundred forty (N = 140) women with CTS completed pain drawings, which were subsequently digitized, allowing pain extent to be calculated. Clinical features including pain intensity (numerical pain rating scale, 0-10) and disability (Boston Carpal Tunnel Questionnaire), psychological features including depression (Beck Depression Inventory), and psychophysical variables (pressure pain and thermal pain thresholds) were assessed. Spearman rho correlation coefficients were used to reveal the correlations between pain extent and other outcomes. Differences in pain extent according to severity (minimal, moderate, severe) or laterality (unilateral, bilateral) and the presence of extramedian symptoms were also evaluated.

RESULTS:
No significant associations were identified between pain extent and clinical, psychological, or psychophysical outcomes. Women with extramedian symptoms (88%) exhibited a larger ($P < 0.001$) pain extent (total: 24.2% ± 13.5%) than women with median symptoms (12%; total: 12.2% ± 6.9%). Pain extent was not significantly different depending on the severity or laterality of the symptoms.

CONCLUSIONS:
Pain extent in the upper extremity was not associated with clinical, psychological, or psychophysical variables and was not related to the severity or laterality of the symptoms in women with CTS

32 A. KNEE/ACL

Return to sports criteria challenged

The Association Between Passing Return-to-Sport Criteria and Second Anterior Cruciate Ligament Injury Risk: A Systematic Review With Meta-Analysis

Authors: Justin M. Losciale, PT, DPT, CSCS[1], Rachael M. Zdeb, PT, DPT, CSCS, USAW-L1SP[2], Leila Ledbetter, MLIS[3], Michael P. Reiman, PT, DPT, OCS, SCS, ATC/L, FAAOMPT, CSCS[4], Timothy C. Sell, PT, PhD[1,4]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**0 **Issue:**0 **Pages:**1–52 **DOI:**10.2519/jospt.2019.8190

Study Design
Systematic review with meta-analysis.

Background
There is no consensus on the components of return-to-sport (RTS) testing following anterior cruciate ligament reconstruction (ACLR) or if passing RTS criteria can reduce the risk of re-injury.

Objectives
Determine if objective criteria-based RTS decisions are associated with less risk of a second ACL injury (either graft failure or contralateral ACL injury).

Methods
An electronic literature search was conducted in PubMed/MEDLINE, Embase, CINAHL, SPORTDiscus and ProQuest Dissertations and Theses Global using database specific vocabulary related to ACLR and RTS. Individual study quality was assessed with the modified Downs and Black checklist and overall quality of evidence was determined with Grading of Recommendations, Assessment, Development and Evaluation (GRADE) scale. Pooled risk difference (RD) (passed vs. failed RTS criteria), injury incidence proportion and the diagnostic accuracy of each RTS criteria were calculated.

Results
Four studies met selection criteria. Overall, 42.7% (95% CI 18%, 69%) of patients passed RTS criteria, with 14.4% (95% CI 8%, 21%) suffering a second ACL injury (graft rupture or contralateral ACL). There was a non-significant 3% less risk of a second ACL injury after passing RTS criteria (RD= -3%, 95% CI -16%, 10%, I2 = 74%, p=.610). The GRADE rating was ‘very low-quality evidence’ due to imprecision and heterogeneity of RD estimate.

Conclusions
Passing RTS criteria did not show a statistically significant association with risk of a second ACL injury. Quality of evidence rating prevents a definitive conclusion on this topic and presents opportunities for future research.

Level of Evidence
2a-. *J Orthop Sports Phys Ther, Epub 30 Nov 2018. doi:10.2519/jospt.2019.8190*

42. PLANTAR SURFACE

Neural glides help

Cupping with neural glides for the management of peripheral neuropathic plantar foot pain: a case study

James Escaloni,Ian Young &Justin Loss

- https://doi.org/10.1080/10669817.2018.1514355

Background/purpose: Plantar foot pain of neural origin is a challenging diagnosis to identify and treat. The purpose of this paper is to illustrate the novel way in which cupping was utilized in conjunction with neural glides to better diagnose and manage a patient who presented with symptoms of peripheral neuropathic plantar foot pain.

Case description: A 65-year-old male presented to physical therapy with the diagnosis of plantar fasciitis by an orthopedic surgeon. The presentation included a diffuse area of pain toward the medial border of the foot with a peripheral neuropathic pain description. Cupping was used to identify pain in the saphenous nerve distribution and aided in resolving symptoms with the concomitant use of lower quarter neural glides.

Outcome: At discharge and 1-year follow-up, the patient had a full resolution of symptoms and a return to prior level of function. Self-report outcomes included the numeric pain rating scale and the lower extremity functional scale.

Discussion: This case is the first to describe the use of cupping combined with neural glides in the diagnosis and management of peripheral neuropathic pain from the saphenous nerve that was previously diagnosed as plantar fasciitis. The proposed mechanisms behind this treatment are also reviewed.

Conclusion: In patients that present with symptoms of plantar fasciitis, testing neural glides combined with cupping may be warranted to confirm or refute the presence of a peripheral neuropathic pain source. Further studies are necessary to determine the mechanisms and further utility of the combined interventions in well controlled trials.

45 D. MANUAL THERAPY EXTREMITIES

Frozen shoulder

A 12-Week Tailored Manual Therapy and Home Stretching Program Based on Level of Irritability and Range of Motion Impairments in Patients With Primary Frozen Shoulder Contracture Syndrome: A Case Series With 9-Months Follow-Up

Authors: Lirios Dueñas, PT, PhD[1], Mercè Balasch-Bernat, PT, PhD[1], Marta Aguilar-Rodríguez, PT, PhD[1], Filip Struyf, PT, PhD[2], Mira Meeus, PT, PhD[2-4], Enrique Lluch, PT, PhD[1,4,5]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2019 **Volume:**0 **Issue:**0 **Pages:**1–24 **DOI:**10.2519/jospt.2019.8194

Study Design
Case series.

Background
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Case Description
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Outcomes
Significant improvements in self-reported pain, disability, shoulder ROM (active abduction and active abduction with overpressure, active external rotation and active external rotation with overpressure and isolated glenohumeral active abduction) and strength (shoulder flexion and internal rotation) were reported following treatment with impairment- and tissue irritability-based manual physical therapy and stretching exercises. Additionally, 4 of 11 of the patients showed pain improvements exceeding the minimal clinically important difference (MCID) on visual analogue scale (VAS) post-intervention and 8 of 11 on VAS at 6 and 9-months. Moreover, 7 of 11 of the patients showed improvements in Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire scores exceeding the MCID post-intervention and at 6-months, and 8 of 11 exceeded the MCID at 9-months.

Discussion
Clinically meaningful changes in shoulder pain and disability, ROM, or muscle strength were observed in eleven patients with primary FSCS treated with an individually tailored approach of both manual therapy techniques and stretching exercises, while accounting for tissue irritability. Randomized controlled trials are required to determine the effectiveness of this multimodal approach for the management of individuals with FSCS.

Level of Evidence
Therapy, level 4. *J Orthop Sports Phys Ther, Epub 16 Jan 2019. doi:10.2519/jospt.2019.8194*

46 B. LOWER LIMB NEUROMOILIZATION

For plantar pain

Cupping with neural glides for the management of peripheral neuropathic plantar foot pain: a case study

James Escaloni,Ian Young &Justin Loss

- https://doi.org/10.1080/10669817.2018.1514355

Background/purpose: Plantar foot pain of neural origin is a challenging diagnosis to identify and treat. The purpose of this paper is to illustrate the novel way in which cupping was utilized in conjunction with neural glides to better diagnose and manage a patient who presented with symptoms of peripheral neuropathic plantar foot pain.

Case description: A 65-year-old male presented to physical therapy with the diagnosis of plantar fasciitis by an orthopedic surgeon. The presentation included a diffuse area of pain toward the medial border of the foot with a peripheral neuropathic pain description. Cupping was used to identify pain in the saphenous nerve distribution and aided in resolving symptoms with the concomitant use of lower quarter neural glides.

Outcome: At discharge and 1-year follow-up, the patient had a full resolution of symptoms and a return to prior level of function. Self-report outcomes included the numeric pain rating scale and the lower extremity functional scale.

Discussion: This case is the first to describe the use of cupping combined with neural glides in the diagnosis and management of peripheral neuropathic pain from the saphenous nerve that was previously diagnosed as plantar fasciitis. The proposed mechanisms behind this treatment are also reviewed.

Conclusion: In patients that present with symptoms of plantar fasciitis, testing neural glides combined with cupping may be warranted to confirm or refute the presence of a peripheral neuropathic pain source. Further studies are necessary to determine the mechanisms and further utility of the combined interventions in well controlled trials.

50 B. PNF

Hold and contract relax

Phys Ther Sport. 2019 Jan;35:42-55. doi: 10.1016/j.ptsp.2018.11.001. Epub 2018 Nov 3.

Hold-relax and contract-relax stretching for hamstrings flexibility: A systematic review with meta-analysis.

Cayco CS[1], Labro AV[2], Gorgon EJR[3].

OBJECTIVE:
To synthesize evidence on the effects of hold-relax and contract-relax stretching (HR and CR) on hamstrings flexibility compared with no intervention and other stretching techniques.

DESIGN:
Electronic databases (PubMed, PEDro, Cochrane CENTRAL, Scopus, LILACS) were searched from inception until March 31, 2014 and updated until May 31, 2017. Randomized controlled trials involving HR and CR to improve hamstrings flexibility in adults (aged ≥18 years old) with or without a pathological condition were included. Two reviewers independently searched literature, assessed risk of bias, and extracted data, while a third reviewer settled disagreements.

RESULTS:
Thirty-nine trials (n = 1770 healthy adults; median PEDro score = 4/10) were included. Meta-analysis showed large effects compared to control immediately after 1 session (6 trials, SMD = 1.02, 95% CI = 0.69 to 1.35, I^2 = 2%) and multiple sessions (4 trials, SMD = 1.02, 95% CI = 0.64 to 1.40, I^2 = 0%). Meta-analysis showed conflicting results compared to static stretching, while individual trials demonstrated conflicting results compared to other techniques.

CONCLUSIONS:
The immediate effects of HR and CR on hamstrings flexibility in adults are better against control. The long-term effects against other stretching types, and optimal exercise prescription parameters require further research.

52. EXERCISE

Exercise and longevity

Journal Summaries in Family Medicine

Body size, non-occupational physical activity and the chance of reaching longevity in men and women: Findings from the Netherlands Cohort Study
Journal of Epidemiology and Community Health
Brandts L, et al. | January 24, 2019
Using data from the Netherlands Cohort Study, researchers evaluated how the likelihood of reaching 90 years of age was influenced by height, BMI, and non-occupational physical activity in men and women separately.

A total of 7,807 participants completed a questionnaire in 1986 (at ages 68–70 years). These participants were followed up until the age of 90 years (2006–2007) in order to extract vital status information. The investigators noted associations of body size and physical activity with the likelihood of reaching 90 years of age; these links, however, varied by sex. Significant associations were observed between reaching longevity and height, BMI at baseline, and BMI change since 20 years of age in females.

Males demonstrated that height and BMI had no relation with respect to longevity. An inverse U-shaped association of non-occupational physical activity with reaching longevity was observed in females, with the highest risk ratio around 60 minutes of physical activity per day. Men showed that physical activity, positively and in a linear manner, was related to reaching longevity.

Physical exercise reduces fall rate in elderly

Sports Med Open. 2018 Dec 13;4(1):56. doi: 10.1186/s40798-018-0170-z.

Follow-up efficacy of physical exercise interventions on fall incidence and fall risk in healthy older adults: a systematic review and meta-analysis.

Hamed A[1,2,3], Bohm S[4,5], Mersmann F[1,2], Arampatzis A[6,7].

BACKGROUND:
The risk of falling and associated injuries increases with age. Therefore, the prevention of falls is a key priority in geriatrics and is particularly based on physical exercising, aiming to improve the age-related decline in motor performance, which is crucial in response to postural threats. Although the benefits and specifications of effective exercise programs have been well documented in pre-post design studies, that is during the treatment, the definitive retention and transfer of these fall-related exercise benefits to the daily life fall risk during follow-up periods remains largely unclear. Accordingly, this meta-analysis investigates the efficacy of exercise interventions on the follow-up risk of falling.

METHODS:
A systematic database search was conducted. A study was considered eligible if it examined the number of falls (fall rate) and fallers (fall risk) of healthy older adults (≥ 65 years) during a follow-up period after participating in a randomized controlled physical exercise intervention. The pooled estimates of the fall rate and fall risk ratios were calculated using a random-effects meta-analysis. Furthermore, the methodological quality and the risk of bias were assessed.

RESULTS:
Twenty-six studies with 31 different intervention groups were included (4739 participants). The number of falls was significantly ($p < 0.001$) reduced by 32% (rate ratio 0.68, 95% confidence interval 0.58 to 0.80) and the number of fallers by 22% (risk ratio 0.78, 95% confidence interval 0.68 to 0.89) following exercising when compared with controls. Interventions that applied posture-challenging exercises showed the highest effects. The methodological quality score was acceptable (73 ± 11%) and risk of bias low.

CONCLUSIONS:
The present review and meta-analysis provide evidence that physical exercise interventions have the potential to significantly reduce fall rate and risk in healthy older adults. Posture-challenging exercises might be particularly considered when designing fall prevention interventions.

Physical activity important for brain development

Physical Activity Increases White Matter Microstructure in Children

Laura Chaddock-Heyman1 *, Kirk I. Erickson2 , Caitlin Kienzler 3 , Eric S. Drollette4 , Lauren B. Raine5 , Shih-Chun Kao5 , Jeanine Bensken6 , Robert Weisshappel 1 , Darla M. Castelli 7 , Charles H. Hillman5,8 and Arthur F. Kramer 1,5 1

Children are becoming increasingly inactive, unfit, and overweight, yet there is relatively little causal evidence regarding the effects of physical activity on brain health during childhood.

The present study examined the effects of an after-school physical activity program (FITKids2) on the microstructure of white matter tracts in 7- to 9-year-old children. We measured the microstructural properties of white matter via diffusion tensor imaging in 143 children before and after random assignment to either a 9-month after-school physical activity program (N = 76, mean age = 8.7 years) or a wait list control group (N = 67, mean age = 8.7 years).
Our results demonstrate that children who participated in the physical activity program showed increased white matter microstructure in the genu of the corpus callosum, with no changes in white matter microstructure in the wait list control group which reflects typical development. Specifically, children in the physical activity program showed increases in fractional anisotropy (FA) and decreases in radial diffusivity (RD) in the genu from pre- to post-test, thereby suggesting more tightly bundled and structurally compact fibers (FA) and increased myelination (RD), with no changes in estimates of axonal fiber diameter (axial diffusivity, AD).

The corpus callosum integrates cognitive, motor, and sensory information between the left and right hemispheres of the brain, and the white matter tract plays a role in cognition and behavior. Our findings reinforce the importance of physical activity for brain health during child development.

Movement based classification systems no better than…..

Are movement-based classification systems more effective than therapeutic exercise or guideline based care in improving outcomes for patients with chronic low back pain? A systematic review

Sean P. Riley,Brian T. Swanson &Elizabeth Dyer

https://doi.org/10.1080/10669817.2018.1532693

Objectives: The purpose of this systematic review was to determine if movement-based classification (MBC) systems are more effective than therapeutic exercise or guideline-based care (GBC) in improving outcomes in patients with low back pain (LBP) based upon randomized clinical trials (RCT) with moderate to high methodological quality and low to moderate risk of bias.

Methods: The search strategy was developed by a librarian experienced in systematic review methodology and peer reviewed by a second research librarian. The following databases were searched from their inception to May 17, 2018: PubMed, Embase, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, and the WHO International Clinical Trials Registry Platform. The identified RCTs with a PEDro score of ≥6 were screened and assessed for risk of bias by two blinded individual reviewers using Covidence.

Results: Seven studies were identified that had moderate-to-high methodological quality. One of the studies was identified as having a high risk of bias. Of the six studies that remained, only one study reported finding a statistically significant difference at the immediate follow-up that was not clinically significant. There was no significance at 6 and 12 months.

Discussion: There is a paucity of moderate to high methodological quality RCTs with similar methodology that compare MBC to standard of care treatments for patients with LBP. Studies with moderate to high methodological quality that have a low risk of bias do not support MBCs as being superior to general exercise or GBC in the treatment of nonradicular LBP.

53. CORE

Unstable surface impact on core

J Sport Rehabil. 2018 Dec 11:1-20. doi: 10.1123/jsr.2017-0385.

Exercising on Different Unstable Surfaces Increases Core Abdominal Muscle Thickness; An Observational Study Using Real Time Ultrasound.

Gibbons TJ[1], Bird ML[2].

BACKGROUND::
The training of abdominal muscles has a positive impact on the functional capacity of healthy adults, being applied practically in fields of athletics and fitness through to rehabilitation for lower back pain.

OBJECTIVE::
The study compares abdominal muscle activity while performing graded isometric exercises on stable and unstable surfaces. We also examined perceived stability and comfort for the different surfaces.

METHODS::
Thirty young, healthy adults performed three graded, isometric exercises on a Pilates table, foam roller and Oov (a newly developed tool). Ultrasound investigation measured Transversus Abdominus (TrA), Internal Oblique Abdominus (IO) and External Oblique Abdominus (EO) thickness during each task, comparing muscle thickness between conditions using general linear modeling.

RESULTS::
Core abdominal activation was greater on the foam roller than the Oov and Pilates table during crook lying (bilateral leg support). Both Oov and foam roller elicited greater contralateral TrA and IO thickness than the Pilates table during Table Top and Straight Leg Raise (unilateral leg exercises). For TrA only, the foam roller elicited more muscle thickness than the Oov during straight leg raise. The Oov was rated more comfortable than the foam roller.

DISCUSSION::
Exercises performed on the Oov and foam roller elicit core greater abdominal muscle thickness than those performed on a Pilates table. Unilateral leg exercises in supine elicit more contralateral muscle thickness than those with bilateral leg support.

CONCLUSION::
These results provide information to support choices in exercise progression from flat stable to more unstable surfaces, and from those with bilateral foot support to unilateral foot support. The Oov was more comfortable that the foam roller, and this may help with exercise adherence.

58. RUNNING

Stiffness

Clinical Predictors of Dynamic Lower Extremity Stiffness During Running

Authors: Jonathan S. Goodwin, PT, DPT[1], J. Troy Blackburn, PhD, ATC[2], Todd A. Schwartz, DrPH[3], D.S. Blaise Williams III, PT, PhD[4]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**0 **Issue:**0 **Pages:**1–24 **DOI:**10.2519/jospt.2019.7683

Study Design
Cross-sectional controlled laboratory study.

Background
Lower extremity stiffness describes the relative loading and kinematics of the entire lower extremity during ground contact. Previously injured subjects demonstrate altered lower extremity stiffness values. Clinical analysis of lower extremity stiffness is not currently feasible due to increased time and cost.

Objective
To determine the clinical identifiable contributors to lower extremity stiffness.

Methods
Ninety-two healthy runners completed a clinical screening involving passive assessment of hip, knee, and ankle range of motion along with body anthropometrics. The range of motion was predominately assessed in the sagittal and frontal planes. In the same session runners completed an overground kinematic and kinetic running assessment at 3.35 m/s (±5%) to obtain lower extremity stiffness. Correlations between lower extremity stiffness and clinical variables were completed. Modifiable variables were included in an all possible linear regressions approach to determine a parsimonious model for predicting lower extremity stiffness.

Results
Clinically modifiable measures included in the regression model accounted for 48.4% of the variance of lower extremity stiffness during running. The variables that predicted greater stiffness included: greater body mass, less ankle dorsiflexion range of motion with the knee flexed, less hip internal rotation range of motion and less first ray mobility.

Conclusion
Reduced lower extremity range of motion and greater body mass are associated with greater lower extremity stiffness during running. These variables could be addressed clinically to potentially alter lower extremity stiffness and injury risk. *J Orthop Sports Phys Ther, Epub 27 Jul 2018. doi:10.2519/jospt.2019.7683*

Age and variability

Influence of Aging on Lower Extremity Sagittal Plane Variability During 5 Essential Sub-phases of Stance in Male Recreational Runners

Authors: Jacqueline Morgan, DPT[1], Yong Ung Kwon, PhD[2], D.S. Blaise Williams III, PT, PhD[3]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**0 **Issue:**0 **Pages:**1–29 **DOI:**10.2519/jospt.2019.8419

Study Design
Cross-sectional design.

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

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

Methods
Twelve older (≥60y) and 12 (≤30y) younger male recreational runners volunteered. 3D gait analyses were collected at preferred and fixed speeds. Stance phase (SP) was divided into 5 sub-phases: loading response (SP1), peak breaking (SP2), peak compression (SP3), midstance (SP4), and peak propulsion (SP5). Continuous relative phase variability for sagittal plane joint pairs Hip-Knee (H-K), Knee-Ankle (K-A), and Hip-Ankle (H-A) were calculated. Repeated-measures linear mixed models were employed to compare variability for each joint pair.

Results
An Age by SP interaction was found for K-A ($p<0.01$) and H-A ($p<0.01$), while main effects for Age and SP were found for H-K ($p<0.05$). Specifically, SP1-2 variability was lower in older runners and greater across stance for K-A and H-A, while SP4 was lowest in H-K and lower overall for older runners. No effects for running pace were found.

Conclusion
Less adaptive movement strategies seen in older runners may partially contribute to the increased eccentric stresses during periods of high load. *J Orthop Sports Phys Ther, Epub 30 Nov 2018. doi:10.2519/jospt.2019.8419*

21 days most injuries in preparing for marathon

Preparing for Half-Marathon: The Association Between Changes in Weekly Running Distance and Running-Related Injuries—Does It Matter How the Running Is Scheduled?

Authors: Camma Damsted, MScPT[1], Erik Thorlund Parner, PhD[2], Henrik Sørensen, PhD[1], Laurent Malisoux, PhD[3], Adam Hulme, PhD[4], Nielsen Rasmus Oestergaard, PhD[1]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**0 **Issue:**0 **Pages:**1–24 **DOI:**10.2519/jospt.2019.8541

Study Design
A prospective cohort study with a study period of 14-weeks.

Background
Sudden changes in training load have been suggested to play a key role in the development of running-related injury (RRI). Since the injury mechanism also depends on the runner's musculoskeletal load capacity, the running schedule undertaken prior to the sudden change may influence the amount of change a runner is able to tolerate before placing the runner at a high risk of RRI.

Objectives
To investigate the association between changes in weekly running distances and RRI, and to examine whether this association is modified by the type of running schedule followed.

Methods
A cohort of 261 healthy non-injured runners was included. Data on running activity were collected objectively on a daily basis using a Global-Positioning System watch or smartphone. RRIs were collected using e-mail-based weekly questionnaires. Primary exposure was changes in weekly running distances. Data were analyzed with time-to-event models producing cumulative risk difference (RD) as the measure of association.

Results
A total of 56 participants (21.5%) sustained an RRI during the 14-week study period Twenty-one days into the study period significantly more runners were injured when increasing their weekly running distance between 20%-60% compared with increasing ≤20% ($RD_{21\ days}$ = 22.6% (95% CI: 0.9%, 44.3%); p=0.041). No significant difference was found after 56 and 98 days. No significant effect-measure modification by running schedule was found.

Conclusion
Significantly more runners were injured 21 days into the study period when increasing their weekly running distance between 20%-60% compared with those increasing less than 20%.

Level of Evidence
Prognosis, level 1b. *J Orthop Sports Phys Ther, Epub 7 Dec 2018. doi:10.2519/jospt.2019.8541*

59. PAIN

European workers pain

Correlations between pain in the back and neck/upper limb in the European Working Conditions Survey

Emanuele Rizzello, Georgia Ntani and David Coggon

*BMC Musculoskeletal Disorders*2019**20**:38
https://doi.org/10.1186/s12891-019-2404-8

Background

Recent research has suggested that wide international variation in the prevalence of disabling regional pain among working populations is driven largely by factors predisposing to musculoskeletal pain in general and not specific to individual anatomical sites. We sought to confirm this finding, using data from an independent source.

Methods

Using data from the fifth (2010) and sixth (2015) European Working Conditions Surveys, we explored correlations between the one-year prevalence of pain in the back and neck/upper limb among people of working age across 33 European countries, and between changes in pain prevalence at the two anatomical sites from 2010 to 2015.

Results

Each survey recruited ≥1000 participants per country, response rates ranging from 11 to 78%. In 2010, the estimated one-year population prevalence of back pain ranged from 23% in Ireland to 66% in Portugal, and that of pain in the neck/upper limb from 25% in Ireland to 69% in Finland, the prevalence of pain at the two anatomical sites being correlated across the 33 countries ($r = 0.42$). A similar pattern was apparent in 2015. For back pain, the percentage change in prevalence from 2010 to 2015 varied from − 41.4% (Hungary) to + 29.6% (Ireland), with a mean across countries of − 3.0%. For neck/upper limb pain, the variation was from − 41.0% (Hungary) to + 44.1% (Romania), with an average of − 0.1%. There was a strong correlation across countries in the change in pain prevalence at the two anatomical sites ($r = 0.85$).

Conclusions

Our findings accord with the hypothesis that international variation in common pain complaints is importantly driven by factors that predispose to musculoskeletal pain in general.

Motor imagery

Clin J Pain. 2019 Jan;35(1):87-99. doi: 10.1097/AJP.0000000000000648.

The Effects of Motor Imagery on Pain and Range of Motion in Musculoskeletal Disorders: A Systematic Review Using Meta-Analysis.

Yap BWD[1], Lim ECW[2,3].

INTRODUCTION:
In recent years, there has been an increase in the use of motor imagery (MI) in the rehabilitation of musculoskeletal pain conditions. Across the literature, most reviews have yet to consider Laterality Judgement Task training as a form of MI method. This review aimed to evaluate the effectiveness of using MI as an adjunct to standard rehabilitation on the improvement of pain and range of motion parameters when managing patients with musculoskeletal pain conditions.

METHODS:
Searches of 8 major electronic databases were conducted. Data for pain and range of motion were extracted. Meta-analyses (where possible) with either a fixed or random-effect(s) model, standardized mean differences (SMDs), and tests of heterogeneity were performed.

RESULTS:
Eight clinical controlled trials were identified and included in the meta-analyses. When compared with standard rehabilitation alone, the adjunctive role of MI provided superior pain relief (pooled SMD, -2.25; 95% confidence interval, -4.11 to -0.4; P=0.02), and greater improvement in range of motion (pooled SMD, 3.04; 95% confidence interval, 0.66-5.43; P=0.01) in chronic musculoskeletal pain disorders.

DISCUSSION:
The results suggest that MI may be effective for pain relief and improvement in range of motion among chronic musculoskeletal pain conditions, although conclusion is based on a limited certainty of evidence as assessed using the GRADES (Grading of Recommendation, Assessment, Development and Evaluation) approach.

62 A. NUTRITION/VITAMINS

Fried foods and increased risk of CA

Association of fried food consumption with all cause, cardiovascular, and cancer mortality: prospective cohort study

BMJ 2019; 364 doi: https://doi.org/10.1136/bmj.k5420

Objective To examine the prospective association of total and individual fried food consumption with all cause and cause specific mortality in women in the United States.
Design Prospective cohort study.
Setting Women's Health Initiative conducted in 40 clinical centers in the US.
Participants 106 966 postmenopausal women aged 50-79 at study entry who were enrolled between September 1993 and 1998 in the Women's Health Initiative and followed until February 2017.
Main outcome measures All cause mortality, cardiovascular mortality, and cancer mortality.
Results 31 558 deaths occurred during 1 914 691 person years of follow-up. For total fried food consumption, when comparing at least one serving per day with no consumption, the multivariable adjusted hazard ratio was 1.08 (95% confidence interval 1.01 to 1.16) for all cause mortality and 1.08 (0.96 to 1.22) for cardiovascular mortality. When comparing at least one serving per week of fried chicken with no consumption, the hazard ratio was 1.13 (1.07 to 1.19) for all cause mortality and 1.12 (1.02 to 1.23) for cardiovascular mortality. For fried fish/shellfish, the corresponding hazard ratios were 1.07 (1.03 to 1.12) for all cause mortality and 1.13 (1.04 to 1.22) for cardiovascular mortality. Total or individual fried food consumption was not generally associated with cancer mortality.
Conclusions Frequent consumption of fried foods, especially fried chicken and fried fish/shellfish, was associated with a higher risk of all cause and cardiovascular mortality in women in the US.

Flavonoids reduce mortality

Association of flavonoids and flavonoid-rich foods with all-cause mortality: The Blue Mountains Eye Study

Nicola P. Bondonno Joshua R. Lewis Paul Mitchell Jonathan M. Hodgson

DOI: https://doi.org/10.1016/j.clnu.2019.01.004

Background
Higher intakes of flavonoids provide health benefits, however, the importance of each flavonoid class and which population groups may receive the greatest protection from higher flavonoid intake warrants further investigation.

Objective
To explore the associations of flavonoid and flavonoid-rich wholefood intakes with all-cause mortality and the moderating effects of early mortality risk factors.

Design
The study included 2 349 participants of The Blue Mountains Eye Study, with a mean±SD age at baseline of 64.7±9.2 years. We calculated flavonoid intake from baseline food frequency questionnaires using US Department of Agriculture food composition databases. Associations were examined using adjusted Cox proportional hazards models.

Results
After 14 years of follow-up, 677 participants died. There was a flavonoid threshold effect with the greatest risk reduction seen between low and moderate intakes of total flavonoids, flavonoid classes and flavonoid-rich foods. Amongst the whole cohort, participants in the highest tertile of anthocyanidin intake had a significantly lower risk of all-cause mortality [multivariable adjusted HR (95%CI): 0.76 (0.61, 0.94)] when compared to those in the lowest tertile. Amongst participants with at least one early mortality risk factor (smoking, high alcohol consumption, no regular exercise or obesity), risk of all-cause mortality was lower in those in the highest intake tertile for total flavonoids [adjusted HR: 0.77 (0.59, 1.00)], flavan-3-ols [0.75 (0.58, 0.98)], anthocyanidins [0.70 (0.54, 0.92)], and proanthocyanidins [0.69 (0.52, 0.92)], compared to those in the lowest tertile. No similar associations were observed among those without any risk factors. Similarly, consumption of apples, tea and the individual flavonoid compounds, quercetin and epicatechin, were associated with a lower risk of all-cause mortality among participants with at least one risk factor, but not amongst other participants.

Conclusion
Moderate to high intakes of flavonoids and certain flavonoid subclasses may provide health benefits, particularly for individuals with at least one early mortality risk factor.

63. PHARMACOLOGY

Opioid use in totals

Opioid use in knee or hip osteoarthritis: a region-wide population-based cohort study

Jonas Bloch Thorlund Aleksandra Turkiewicz Daniel Prieto-Alhambra Martin Englund

DOI: https://doi.org/10.1016/j.joca.2019.01.005

Objective
To quantify opioid use in knee and hip osteoarthritis (OA) patients, and to estimate the proportion of opioids in the population attributable to OA patients.

Design
Population-based cohort study.

Methods
We included 751579 residents in southern Sweden, aged ≥35 years in 2015. Doctor-diagnosed knee or hip OA between 1998 and 2015 was the exposure. Dispensed weak and strong opioids were identified between November 2013 and October 2015 from the Swedish Prescribed Drug Register. We determined age- and sex-standardized 12-month period prevalence of opioid use from November 2014 until October 2015 and calculated prevalence ratios and incidence rate ratios adjusted for age, sex, and other socio-demographic variables. We estimated the population attributable fraction (PAF) of incident opioid use attributable to OA patients.

Results
The 12-month prevalence of opioid use among OA patients was 23.7% [95% CI 23.3-24.2], which was two-fold higher compared to individuals without knee or hip OA: prevalence ratio: 2.1 [95% CI 2.1-2.1]. Similarly, OA patients were more likely to have an incident opioid dispensation, especially for strong opioids (incidence rate ratio: 2.6 [95% CI 2.5-2.7]). PAF of incident opioid use attributable to OA patients was 12%, 9% for weak and 17% for strong opioids.

Conclusions
Every fourth patient with knee or hip OA has opioids dispensed over a one-year period, and 12% of incident opioid dispensations are attributable to OA and/or its related comorbidities. These results highlight that patients with knee and hip OA constitute a group of patients with an alarmingly high use of opioids.