

ABSTRACTS

LUMBAR SPINE

Motion in degenerative segments

Assessment of stress patterns on a spinal motion segment in healthy versus osteoporotic bony models with or without disc degeneration - a finite element analysis

The Spine Journal, 01/12/2015 Evidence Based Medicine

Tsouknidas A, et a

Abstract

Background Context

With an increasing prevalence of low back pain, physicians strive to optimize treatment of patients with degenerated motion segments. There exists a consensus in literature that osteoporotic patients exhibit non-physiologic loading patterns, while degenerated intervertebral discs are also believed to alter spine biomechanics.

Purpose

To evaluate alterations occurring in lumbo-sacral spine biomechanics of an osteoporotic model, with or without intervertebral disc degeneration, when compared to a healthy spine segment.

Study Design/Setting: The investigation was based on Finite Element Analysis of a patient-specific lumbo-sacral spine model.

Methods

A bio-realistic model of a lumbo-sacral spine segment is introduced to determine the morbidity of disc degeneration and osteoporosis. The model was verified and validated for the purpose of the study and subjected to a dynamic Finite Element analysis, considering anisotropic bone properties and solid ligamentous tissue.

Results

The yielded results merit high clinical interest. Osteoporosis resulted in a non-uniform increase of facet joint loading, which was even more pronounced in the scenario simulating a degenerated disc. The results also revealed an enslavement of intradiscal pressure to the disc state (in the degenerated and superior adjacent level).

Conclusions

The investigation presented refined insight into the dynamic biomechanical response of a degenerated spine segment. The increase in the calculated occurring stresses was considered as critical in the motion segment adjacent and superior to the degenerated one. This suggests that prevalent trauma in a motion segment, may be a symptomatic condition of a poorly treated formal pathology in the inferior spine level.

LBP

Depression and LBP

Clin J Pain. 2015 Feb;31(2):137-44. doi: 10.1097/AJP.0000000000000094.

Pain Self-efficacy Mediates the Relationship Between Depressive Symptoms and Pain Severity.

Skidmore JR¹, Koenig AL, Dyson SJ, Kupper AE, Garner MJ, Keller CJ.

Author information

Abstract

OBJECTIVES:

We examined the relationships between depressive symptoms, pain severity, and pain self-efficacy (PSE) in patients with chronic low back pain (CLBP). We hypothesized that change in depressive symptoms would significantly influence change in pain severity, and that PSE indirectly affects this relationship.

MATERIALS AND METHODS:

Participants were 109 CLBP patients in a 4-week multidisciplinary rehabilitation program for CLBP. They completed measures of PSE, depression, and pain severity at admission and discharge. Structural equation modeling was used to test the significant direct and indirect effects from pretreatment to posttreatment.

RESULTS:

Change in depressive symptoms significantly predicted change in pain severity in affective ($\beta=0.358$; 95% confidence interval [CI], 0.206-0.480; $P=0.006$), sensory ($\beta=0.384$; 95% CI, 0.257-0.523; $P=0.002$), and evaluative pain ($\beta=0.456$; 95% CI, 0.285-0.605; $P=0.002$). The indirect effects of change in PSE partially accounted for the relationship between change in depressive symptoms and change in sensory ($\beta=0.105$; 95% CI, 0.016-0.241; $P=0.023$) and evaluative pain ($\beta=0.121$; 95% CI, 0.010-0.249; $P=0.040$). The relationship between change in depressive symptoms and change in affective pain was fully accounted for by the indirect effect of change in PSE ($\beta=0.203$; 95% CI, 0.082-0.337; $P=0.002$).

DISCUSSION:

These findings suggest that pain management and rehabilitation programs for CLBP should specifically target PSE as a key aspect of treatment.

PMID: 24751545

Spinal stenosis

Spine:

15 January 2015 - Volume 40 - Issue 2 - p 63–76

doi: 10.1097/BRS.0000000000000731

Randomized Trial

Long-term Outcomes of Lumbar Spinal Stenosis: Eight-Year Results of the Spine Patient Outcomes Research Trial (SPORT)

Lurie, Jon D. MD, MS^{*,†}; Tosteson, Tor D. ScD^{*,†}; Tosteson, Anna ScD^{*,†}; Abdu, William A. MD, MS^{*,‡}; Zhao, Wenyang PhD^{*,†}; Morgan, Tamara S. MA[†]; Weinstein, James N. DO, MS^{†,‡}

Abstract

Study Design Randomized trial with a concurrent observational cohort study.

Objective To compare 8-year outcomes of surgery with nonoperative care for symptomatic lumbar spinal stenosis.

Summary of Background Data Surgery for spinal stenosis has been shown to be more effective than nonoperative treatment during 4 years, but longer-term data are less clear.

Methods Surgical candidates from 13 centers in 11 US states with at least 12 weeks of symptoms and confirmatory imaging were enrolled in a randomized cohort or observational cohort. Treatment was standard, decompressive laminectomy *versus* standard nonoperative care. Primary outcomes were SF-36 (MOS 36-Item Short-Form Health Survey) Bodily Pain and Physical Function scales and the modified Oswestry Disability Index assessed at 6 weeks, 3 months, 6 months, and yearly up to 8 years.

Results Data were obtained for 55% of participants in the randomized group and 52% of participants in the observational group at the 8-year follow-up. Intent-to-treat analyses showed no differences between randomized cohorts; however, 70% of those randomized to surgery and 52% of those randomized to nonoperative had undergone surgery by 8 years. As-treated analyses in the randomized group showed that the early benefit for surgery out to 4 years converged over time, with no significant treatment effect of surgery seen in years 6 to 8 for any of the primary outcomes. In contrast, the observational group showed a stable advantage for surgery in all outcomes between years 5 and 8. Patients who were lost to follow-up were older, less well-educated, sicker, and had worse outcomes during the first 2 years in both surgical and nonoperative arms.

Conclusion. Patients with symptomatic spinal stenosis show diminishing benefits of surgery in as-treated analyses of the randomized group between 4 and 8 years, whereas outcomes in the observational group remained stable. Loss to follow-up of patients with worse early outcomes in both treatment groups could lead to overestimates of long-term outcomes but likely not bias treatment effect estimates.

Level of Evidence: 1

Subgrouping LBP patients

Clin J Pain. 2015 Feb;31(2):123-32. doi: 10.1097/AJP.000000000000100.

Subgrouping of Low Back Pain Patients for Targeting Treatments: Evidence from Genetic, Psychological, and Activity-related Behavioral Approaches.

Huijnen IP¹, Rusu AC, Scholich S, Meloto CB, Diatchenko L.

Author information

Abstract

INTRODUCTION:

Many patients with low back pain (LBP) are treated in a similar manner as if they were a homogenous group. However, scientific evidence is available that pain is a complex perceptual experience influenced by a wide range of genetic, psychological, and activity-related factors. The leading question for clinical practice should be what works for whom.

OBJECTIVES:

The main aim of the present review is to discuss the current state of evidence of subgrouping based on genetic, psychosocial, and activity-related factors in order to understand their contribution to individual differences.

RESULTS:

Based on these perspectives, it is important to identify patients based on their specific characteristics. For genetics, very promising results are available from other chronic musculoskeletal pain conditions. However, more research is warranted in LBP. With regard to subgroups based on psychosocial factors, the results underpin the importance of matching patients' characteristics to treatment. Combining this psychosocial profile with the activity-related behavioral style may be of added value in tailoring the patient's treatment to his/her specific needs.

CONCLUSIONS:

For future research and treatment it might be challenging to develop theoretical frameworks combining different subgrouping classifications. On the basis of this framework, tailoring treatments more specifically to the patient needs may result in improvements in treatment programs for patients with LBP.

PMID: 24681821

Bio-psychological factors

Eur J Pain. 2015 Jan 6. doi: 10.1002/ejp.633.

Prognosis and course of pain in patients with chronic non-specific low back pain: A 1-year follow-up cohort study.

Verkerk K¹, Luijsterburg PA, Heymans MW, Ronchetti I, Pool-Goudzwaard AL, Miedema HS, Koes BW.

Author information

Abstract

BACKGROUND:

It remains unclear to what extent patients recover from chronic non-specific low back pain (NSLBP). The objective of this study was to determine (1) the course of chronic NSLBP in tertiary care and (2) which factors predicted 5- and 12-month outcomes.

METHODS:

This prospective study includes 1760 chronic NSLBP patients from a rehabilitation clinic (mean age 40.1 years, SD 10.6). After baseline measurement, patients followed a 2-month multidisciplinary therapy programme; evaluation took place at 2, 5 and 12 months post baseline. Recovery was defined as (1) relative recovery [30% improvement on the pain, visual analogue scale (VAS) compared with baseline] and (2) absolute recovery (VAS pain \leq 10 mm). The multivariate logistic regression analysis included 23 baseline characteristics.

RESULTS:

Patient-reported intensity of back pain decreased from 55.5 (SD 23.0) at baseline to 37.0 (SD 23.8), 35.3 (SD 26.1) and 32.3 (SD 26.9) at 2-, 5- and 12-month follow-up, respectively. Younger age, back pain at baseline, no psychological/physical dysfunction (Symptom Check List-90, item 9), and higher baseline scores on the physical component scale and mental component scale of quality of life (Short Form-36) were positively associated with recovery at 5 and 12 months. At 5-month follow-up, higher work participation at baseline was also a prognostic factor for both definitions of recovery. At 12-month follow-up, having co-morbidity was predictive for both definitions.

CONCLUSION:

The results of this study indicate that in chronic NSLBP patients, bio-psychosocial prognostic factors may be important for clinicians when predicting recovery in back pain intensity during a 1-year period.

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PMID:25565501

SURGERY

Exercise following surgery

Br J Sports Med. 2015 Jan;49(2):100-6. doi: 10.1136/bjsports-2013-092402. Epub 2013 Sep 12.

Early multimodal rehabilitation following lumbar disc surgery: a randomised clinical trial comparing the effects of two exercise programmes on clinical outcome and lumbar multifidus muscle function.

Hebert JJ¹, Fritz JM², Thackeray A³, Koppenhaver SL⁴, Teyhen D⁵.

Author information

Abstract

BACKGROUND:

The optimal components of postoperative exercise programmes following single-level lumbar discectomy have not been identified. Facilitating lumbar multifidus (LM) function after discectomy may improve postoperative recovery. The aim of this study was to compare the clinical and muscle function outcomes of patients randomised to receive early multimodal rehabilitation following lumbar discectomy consisting of exercises targeting specific trunk muscles including the LM or general trunk exercises.

METHODS:

We included participants aged 18 to 60 years who were scheduled to undergo single-level lumbar discectomy. After two postoperative weeks, participants were randomly assigned to receive an 8-week multimodal exercise programme including either general or specific trunk exercises. The primary outcome was pain-related disability (Oswestry Index). Secondary outcomes included low back and leg pain intensity (0-10 numeric pain rating scale), global change, sciatica frequency, sciatica bothersomeness and LM function measured with real-time ultrasound imaging. Treatment effects 10 weeks and 6 months after surgery were estimated with linear mixed models.

RESULTS:

61 participants were randomised to receive a general trunk (n=32) or specific (n=29) exercise programme. There were no between-group differences in clinical or muscle function outcomes. Participants in both groups experienced improvements in most outcome measures.

CONCLUSIONS:

Following lumbar discectomy, multimodal rehabilitation programmes comprising specific or general trunk exercises have similar effects on clinical and muscle function outcomes. Local factors such as the individual patient characteristics identified by specific assessment findings, clinician expertise and patient preferences should direct therapy selection when considering the types of exercises tested in this trial for inclusion in rehabilitation programmes following lumbar disc surgery.

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KEYWORDS:

Back injuries; Core stability/pelvis/hips, ribs; Exercise rehabilitation; Physiotherapy; Skeletal Muscle Physiology MID: 24029724

PELVIC ORGANS

Prostate and green tea

Prostate. 2014 Dec 24. doi: 10.1002/pros.22943.

Randomized clinical trial of brewed green and black tea in men with prostate cancer prior to prostatectomy.

Henning SM¹, Wang P, Said JW, Huang M, Grogan T, Elashoff D, Carpenter CL, Heber D, Aronson WJ.

Author information

Abstract

BACKGROUND:

Preclinical and epidemiologic studies suggest chemopreventive effects of green tea (GT) and black tea (BT) in prostate cancer. In the current study we determined the effect of GT and BT consumption on biomarkers related to prostate cancer development and progression.

METHODS:

In this exploratory, open label, phase II trial 113 men diagnosed with prostate cancer were randomized to consume six cups daily of brewed GT, BT or water (control) prior to radical prostatectomy (RP). The primary endpoint was prostate tumor markers of cancer development and progression determined by tissue immunostaining of proliferation (Ki67), apoptosis (Bcl-2, Bax, Tunel), inflammation (nuclear and cytoplasmic nuclear factor kappa B [NFκB]) and oxidation (8-hydroxydeoxy-guanosine [8OHdG]). Secondary endpoints of urinary oxidation, tea polyphenol uptake in prostate tissue, and serum prostate specific antigen (PSA) were evaluated by high performance liquid chromatography and ELISA analysis.

RESULTS:

Ninety three patients completed the intervention. There was no significant difference in markers of proliferation, apoptosis and oxidation in RP tissue comparing GT and BT to water control. Nuclear staining of NFκB was significantly decreased in RP tissue of men consuming GT (P = 0.013) but not BT (P = 0.931) compared to water control. Tea polyphenols were detected in prostate tissue from 32 of 34 men consuming GT but not in the other groups. Evidence of a systemic antioxidant effect was observed (reduced urinary 8OHdG) only with GT consumption (P = 0.03). GT, but not BT or water, also led to a small but statistically significant decrease in serum prostate-specific antigen (PSA) levels (P = 0.04).

CONCLUSION:

Given the GT-induced changes in NFκB and systemic oxidation, and uptake of GT polyphenols in prostate tissue, future longer-term studies are warranted to further examine the role of GT for prostate cancer prevention and treatment, and possibly for other prostate conditions such as prostatitis. Prostate © 2014 Wiley Periodicals, Inc.

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KEYWORDS: Bcl-2; bax; nuclear factor kappa B; phase II clinical intervention study

Vulvodynia

Pain Pract. 2015 Jan 12. doi: 10.1111/papr.12274.

Vulvodynia-An Evidence-Based Literature Review and Proposed Treatment Algorithm.

De Andres J¹, Sanchis-Lopez N, Asensio-Samper JM, Fabregat-Cid G, Villanueva-Perez VL, Monsalve Dolz V, Minguez A.

Author information

Abstract

OBJECTIVE:

We searched the medical literature from the last 15 years (1998 to 2013) relating to the etiology, diagnosis, and treatment of vulvodynia. The evidence was reviewed supporting the therapeutic proposals currently in use and propose the incorporation of novel, minimally invasive, interventional therapies, within the context of a multidisciplinary approach.

METHODS:

This was a systematic review of all relevant studies with no language restrictions. Studies were identified through Medline/PubMed (1998 to March 2013), the Cochrane Library (2001 to 2013), and conference records and book chapters. The keywords used included "chronic pelvic pain," "vulvodynia," "vestibulodynia," and search terms "etiology," "diagnosis," and "treatment" were added. The levels of evidence were assessed using grading system for "Therapy/Prevention/Etiology/Harm" developed by the Centre for Evidence-Based Medicine (CEBM). The grading system assists in clinical decision-making, and we decided to use "The Grading of Recommendations Assessment, Development, and Evaluation (GRADE)."

RESULTS:

A total of 391 papers were assessed. Of these, 215 were analyzed and 175 were excluded, as they pertained to areas not directly related to the disease under review.

CONCLUSION:

The optimal therapy for vulvar pain syndrome remains elusive, with low percentages of therapeutic success, using either local or systemic pharmacological approaches. Surgery involving invasive and often irreversible therapeutic procedures has resulted in success for certain subtypes of vulvodynia. We present a multidisciplinary approach whereby pain treatment units may provide an intermediate level of care between standard medical and surgical treatments.

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KEYWORDS:

chronic pelvic pain; physical therapy; pulsed radiofrequency; radiofrequency ablation; review; spinal cord stimulation; therapeutics; transcutaneous electric nerve stimulation; vestibulodynia; vulvodynia

THORACIC SPINE

TLjunction

Spine (Phila Pa 1976). 2015 Jan 15;40(2):E61-7. doi: 10.1097/BRS.0000000000000676.

Hyperextension injuries of the thoracolumbar spine in diffuse idiopathic skeletal hyperostosis.

Balling H¹, Weckbach A.

Author information

Abstract

STUDY DESIGN:

Retrospective study of a consecutive series of patients with thoracolumbar hyperextension injuries (TLHIs) complicated by diffuse idiopathic skeletal hyperostosis (DISH) presenting to a single institution during a 9-year period.

OBJECTIVE:

Assess epidemiological data, trauma mechanism, injury characteristics in hyperostotic spines, and short-term outcome.

SUMMARY OF BACKGROUND DATA:

An increase in TLHIs complicated by DISH was observed. In current literature, only case reports and small case series touch this topic.

METHODS:

All patients with TLHIs in the setting of DISH between January 2002 and December 2010 were reviewed retrospectively. Clinical and radiographical data during hospitalization including computed tomographic scans of all patients were analyzed as to epidemiological issues, trauma characteristics, neurological deficits, and short-term outcomes. Statistical analysis was performed to assess factors related to trauma characteristics.

RESULTS:

Twenty patients with 23 TLHIs were analyzed. Twelve injuries involved the thoracic region; 1, the lumbar region; and 10, the thoracolumbar junction. A total of 85.7% of injuries were due to high-energy impact. The distribution of transdiscal and transosseous injuries was almost equal (13/10). Patients with DISH with vertebral body fractures were significantly older than those with transdiscal injuries (78.3 yr vs. 69.8 yr, $P < 0.026$). Post-traumatic neurological deficit was present in 22.7% patients. Neurological complications did not occur in low-energy injuries. On average, spines were posteriorly stabilized over 2.1 segments. Twenty percent of the patients died within 3 months (average age, 80.7 ± 5.1 yr, range, 76-88 yr).

CONCLUSION:

To our knowledge, this is the largest series of TLHIs in DISH-altered spines in literature. The study helps to understand controversial findings in literature about morphological properties of TLHIs in DISH-affected spines. Surgeons should be aware of preexisting alterations in traumatized spines and the impact on therapeutic decisions. Because of the "aging population"

Abstracts: January 12, 2015

and implications of metabolic diseases on an "aging spine," the incidence of TLHIs in DISH will probably rise.

LEVEL OF EVIDENCE: 4.

PMID: 5575089

CERVICAL SPINE

Kinematic training

Man Ther. 2015 Feb;20(1):68-78. doi: 10.1016/j.math.2014.06.008. Epub 2014 Jul 5.

Cervical kinematic training with and without interactive VR training for chronic neck pain - a randomized clinical trial.

Sarig Bahat H¹, Takasaki H², Chen X³, Bet-Or Y⁴, Treleaven J⁵.

Author information

Abstract

Impairments in cervical kinematics are common in patients with neck pain. A virtual reality (VR) device has potential to be effective in the management of these impairments. The objective of this study was to investigate the effect of kinematic training (KT) with and without the use of an interactive VR device. In this assessor-blinded, allocation-concealed pilot clinical trial, 32 participants with chronic neck pain were randomised into the KT or kinematic plus VR training (KTVR) group. Both groups completed four to six training sessions comprising of similar KT activities such as active and quick head movements and fine head movement control and stability over five weeks. Only the KTVR group used the VR device. The primary outcome measures were neck disability index (NDI), cervical range of motion (ROM), head movement velocity and accuracy. Kinematic measures were collected using the VR system that was also used for training. Secondary measures included pain intensity, TAMPA scale of kinesiophobia, static and dynamic balance, global perceived effect and participant satisfaction.

The results demonstrated significant ($p < 0.05$) improvements in NDI, ROM (rotation), velocity, and the step test in both groups post-intervention. At 3-month post-intervention, these improvements were mostly sustained; however there was no control group, which limits the interpretation of this. Between-group analysis showed a few specific differences including global perceived change that was greater in the KTVR group. This pilot study has provided directions and justification for future research exploring training using kinematic training and VR for those with neck pain in a larger cohort.

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KEYWORDS: *Kinematics; Neck pain; RCT; Virtual reality*

PMID: 25066503

UPPER C SPINE

Blood flow at end ranges of rotation

Man Ther. 2014 Nov 29. pii: S1356-689X(14)00233-1. doi: 10.1016/j.math.2014.11.012.

The effect of end-range cervical rotation on vertebral and internal carotid arterial blood flow and cerebral inflow: A sub analysis of an MRI study.

Thomas LC¹, McLeod LR², Osmotherly PG², Rivett DA².

Author information

Abstract

INTRODUCTION:

Cervical spine manual therapy has been associated with a small risk of serious adverse neurovascular events, particularly to the vertebral arteries. Sustained end-range rotation is recommended clinically as a pre-manipulative screening tool; however ultrasound studies have yielded conflicting results about the effect of rotation on blood flow in the vertebral arteries. There has been little research on internal carotid arterial flow or utilising the reference standard of angiography.

OBJECTIVES:

To evaluate the mean effect of cervical rotation on blood flow in the craniocervical arteries and blood supply to the brain, as well as individual variation.

DESIGN:

This was an observational study.

METHOD:

Magnetic resonance angiography was used to measure average blood flow volume in the vertebral arteries, internal carotid arteries, and total cerebral inflow, in three neck positions: neutral, end-range left rotation and end-range right rotation in healthy adults.

RESULTS:

Twenty participants were evaluated. There was a decrease in average blood flow volume in the vertebral and internal carotid arteries on contralateral rotation, compared to neutral. This was statistically significant on left rotation only. Ipsilateral rotation had no effect on average blood flow volume in any artery. Total cerebral inflow was not significantly affected by rotation in either direction.

CONCLUSIONS:

It appears that in healthy adults the cerebral vasculature can compensate for decreased flow in one or more arteries by increasing flow in other arteries, to maintain cerebral perfusion. Sustained end-range rotation may therefore reflect the compensatory capacity of the system as a whole rather than isolated vertebrobasilar function.

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KEYWORDS: Carotid artery; MRI; Neck rotation; Vertebral artery
PMID: 25529191

Cervicogenic dizziness

Man Ther. 2015 Feb;20(1):148-56. doi: 10.1016/j.math.2014.08.003. Epub 2014 Aug 27.

Manual therapy for cervicogenic dizziness: Long-term outcomes of a randomised trial.

Reid SA¹, Callister R², Snodgrass SJ², Katekar MG², Rivett DA².

Author information

Abstract

Manual therapy is effective for reducing cervicogenic dizziness, a disabling and persistent problem, in the short term. This study investigated the effects of sustained natural apophyseal glides (SNAGs) and passive joint mobilisations (PJM) on cervicogenic dizziness compared to a placebo at 12 months post-treatment. Eighty-six participants (mean age 62 years, standard deviation (SD) 12.7) with chronic cervicogenic dizziness were randomised to receive SNAGs with self-SNAGs (n = 29), PJMs with range-of-motion (ROM) exercises (n = 29), or a placebo (n = 28) for 2-6 sessions over 6 weeks.

Outcome measures were dizziness intensity, dizziness frequency (rated between 0 [none] and 5 [>once/day]), the Dizziness Handicap Inventory (DHI), pain intensity, head repositioning accuracy (HRA), cervical spine ROM, balance, and global perceived effect (GPE). At 12 months both manual therapy groups had less dizziness frequency (mean difference SNAGs vs placebo -0.7, 95% confidence interval (CI) -1.3, -0.2, p = 0.01; PJMs vs placebo -0.7, -1.2, -0.1, p = 0.02), lower DHI scores (mean difference SNAGs vs placebo -8.9, 95% CI -16.3, -1.6, p = 0.02; PJMs vs placebo -13.6, -20.8, -6.4, p < 0.001) and higher GPE compared to placebo, whereas there were no between-group differences in dizziness intensity, pain intensity or HRA. There was greater ROM in all six directions for the SNAG group and in four directions for the PJM group compared to placebo, and small improvements in balance for the SNAG group compared to placebo. There were no adverse effects.

These results provide evidence that both forms of manual therapy have long-term beneficial effects in the treatment of chronic cervicogenic dizziness.

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KEYWORDS: Cervical vertebrae; Dizziness; Musculoskeletal manipulation; Neck pain

PMID: 25220110

CRANIUM/TMJ

Manual Therapy

Cranio. 2014 Dec 30:2151090314Y0000000039. [Epub ahead of print]

Regional effects of orthopedic manual physical therapy in the successful management of chronic jaw pain.

Sault JD, Emerson Kavchak AJ, Courtney CA, Tow N.

Abstract

Objective and importance: Temporomandibular disorders (TMD) encompass a variety of dysfunction of the maxillofacial region. A strong relationship between TMD and cervical spine pain exists, and widespread hyperalgesia is common in TMD. This case describes the management and reduction in regional hyperalgesia in a patient with chronic TMD. Clinical presentation: A 23-year-old female with a 10-year history of tinnitus and bilateral (B) jaw pain, and 5-year history of intermittent neck pain, presented with pain, which could reach 10/10 on the numeric pain rating scale, locking, tightness and restricted eating habits.

Cervical motion testing did not reproduce her jaw pain. Her mouth opening (MO) and B temporomandibular joint (TMJ) accessory glides were limited and painful. Accessory glides at the upper cervical facet joints reproduced her jaw pain. Pressure pain thresholds (PPT) at her B masseters and thenar eminences at the hand were diminished, indicating hyperalgesia.

Intervention: Treatment included passive mobilizations at her TMJs and cervical spine. Home exercises included self-mobilization of her TMJs and neck. In six sessions, her MO improved from 30 to 45 mm and average pain improved from 4/10 to 0/10.

The jaw pain and function questionnaire improved from 16/52 to 5/52. PPTs at her right/left masseter and thenar eminence improved from 140/106 and 221/230 kPa to 381/389 and 562/519 kPa, respectively. Conclusion: This case described the treatment and reduction of upper extremity hyperalgesia of a patient with chronic jaw and neck pain. Manual therapy may be a valuable intervention in the treatment of chronic TMD with distal hyperalgesia.

KEYWORDS: *Central sensitization,; Hyperalgesia; Mobilization with movement,; Pressure pain threshold,; TMD,; TMJ,; Temporomandibular,*
PMID: 25549797

HEADACHES

Corticosteroids and migraines

Cephalalgia. 2015 Jan 9. pii: 0333102414566200.

The place of corticosteroids in migraine attack management: A 65-year systematic review with pooled analysis and critical appraisal.

Woldeamanuel Y¹, Rapoport A², Cowan R³.

Author information

Abstract

BACKGROUND AND OBJECTIVES:

Headaches recur in up to 87% of migraine patients visiting the emergency department (ED), making ED recidivism a management challenge. We aimed herein to determine the role of corticosteroids in the acute management of migraine in the ED and outpatient care.

METHODS:

Advanced search strategies employing PubMed/MEDLINE, Web of Science, and Cochrane Library databases inclusive of a relevant gray literature search was employed for Clinical Studies and Systematic Reviews by combining the terms "migraine" and "corticosteroids" spanning all previous years since the production of synthetic corticosteroids ca. 1950 until August 30, 2014. Methods were in accordance with MOOSE guidelines.

RESULTS:

Twenty-five studies (n = 3989, median age 37.5 years, interquartile range or IQR 35-41 years; median male:female ratio 1:4.23, IQR 1:2.1-6.14; 52% ED-based, 56% randomized-controlled) and four systematic reviews were included. International Classification of Headache Disorders criteria were applied in 64%. Nineteen studies (76%) indicated observed outcome differences favoring benefits of corticosteroids, while six (24%) studies indicated non-inferior outcomes for corticosteroids. Median absolute risk reduction was 30% (range 6%-48.2%), and 11% (6%-48.6%) for 24-, and 72-hour headache recurrence, respectively. Parenteral dexamethasone was the most commonly (56%) administered steroid, at a median single dose of 10 mg (range 4-24 mg). All meta-analyses revealed efficacy of adjuvant corticosteroids to various abortive medications-indicating generalizability. Adverse effects were tolerable. Higher disability, status migrainosus, incomplete pain relief, and previous history of headache recurrence predicted outcome favorability.

CONCLUSIONS:

Our literature review suggests that with corticosteroid treatment, recurrent headaches become milder than pretreated headaches and later respond to nonsteroidal therapy. Single-dose intravenous dexamethasone is a reasonable option for managing resistant, severe, or prolonged migraine attacks.

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Abstracts: January 12, 2015

KEYWORDS: *Corticosteroids; critical appraisal; emergency room management of migraine; migraine; migraine attack management; neurogenic inflammation; pooled analysis; prolonged migraine; recurrent migraine; systematic review*

PMID: 25576463

Cluster headaches and sleep

Cephalalgia. 2015 Jan 8. pii: 0333102414564892.

Sleep and chronobiology in cluster headache.

Barloese M¹, Lund N¹, Petersen A¹, Rasmussen M¹, Jennum P², Jensen R³.

Author information

Abstract

BACKGROUND AND AIM:

M.R. present address: PAIN, National Institutes of Health, Bethesda, MD, USA Cluster headache (CH) is the headache disorder with the strongest chronobiological traits. The severe attacks of pain occur with diurnal and annual rhythmicity but the precise rhythm and involvement of potential zeitgebers is unknown. Patients complain of poor sleep quality yet this has never been studied. We investigated triggers, rhythms, sleep quality and chronotypes in CH.

METHODS:

Patients and controls completed questionnaires and structured interviews composed of new and previously validated parts including the Pittsburgh Sleep Quality Index (PSQI) and Morningness-Eveningness Questionnaire (MEQ). Patients were characterized by a CH index, a unified measure of headache burden.

RESULTS:

A total of 275 CH patients and 145 matched controls were included. The most common trigger was sleep (80%) and a relationship between clusters and daylight was identified. Of the patients, 82.2% reported diurnal and 56% annual rhythmicity. Patients reported impaired sleep quality (PSQI) ($p < 0.0001$) and an inverse relationship between time passed since last attack and sleep quality was identified ($p < 0.0001$). The CH index was positively related to the PSQI ($p < 0.0001$).

CONCLUSION:

Diurnally, CH exhibits a relationship with night-time and annually with daylight hours. Patients' sleep quality is reduced compared with controls. Results suggest a complex relationship as sleep quality improves between clusters, but remains pathological.

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KEYWORDS: *Cluster headache; chronobiology; hypothalamus; pain; sleep*

PMID: 25573893

Migraine and Nitric oxide

Cephalalgia. 2015 Jan 8. pii: 0333102414564888.

A meta-analysis of biomarkers related to oxidative stress and nitric oxide pathway in migraine.

Neri M¹, Frustaci A², Milic M³, Valdiglesias V², Fini M⁴, Bonassi S², Barbanti P⁵.

Author information

Abstract

BACKGROUND:

Oxidative and nitrosative stress are considered key events in the still unclear pathophysiology of migraine.

METHODS:

Studies comparing the level of biomarkers related to nitric oxide (NO) pathway/oxidative stress in the blood/urine of migraineurs vs. unaffected controls were extracted from the PubMed database. Summary estimates of mean ratios (MR) were carried out whenever a minimum of three papers were available. Nineteen studies were included in the meta-analyses, accounting for more than 1000 patients and controls, and compared with existing literature.

RESULTS:

Most studies measuring superoxide dismutase (SOD) showed lower activity in cases, although the meta-analysis in erythrocytes gave null results. On the contrary, plasma levels of thiobarbituric acid reactive substances (TBARS), an aspecific biomarker of oxidative damage, showed a meta-MR of 2.20 (95% CI: 1.65-2.93). As for NOs, no significant results were found in plasma, serum and urine. However, higher levels were shown during attacks, in patients with aura, and an effect of diet was found. The analysis of glutathione precursor homocysteine and asymmetric dimethylarginine (ADMA), an NO synthase inhibitor, gave inconclusive results.

CONCLUSIONS:

The role of the oxidative pathway in migraine is still uncertain. Interesting evidence emerged for TBARS and SOD, and concerning the possible role of diet in the control of NOx levels.

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KEYWORDS:

Biological markers; blood; case-control studies; meta-analysis; migraine; nitric oxide; oxidative stress; superoxide dismutase

PMID: 25573894

CONCUSSIONS

Testing

Br J Sports Med. 2014 Dec 1. pii: bjsports-2014-093901. doi: 10.1136/bjsports-2014-093901.

Cerebrovascular reactivity assessed by transcranial Doppler ultrasound in sport-related concussion: a systematic review.

Gardner AJ¹, Tan CO², Ainslie PN³, van Donkelaar P⁴, Stanwell P⁵, Levi CR¹, Iverson GL⁶.

Author information

Abstract

BACKGROUND:

Traumatic brain injury influences regulation of cerebral blood flow in animal models and in human studies. We reviewed the use of transcranial Doppler ultrasound (US) to monitor cerebrovascular reactivity following sport-related concussion.

REVIEW METHOD:

A narrative and systematic review of articles published in the English language, from December 1982 to October 2013.

DATA SOURCES:

Articles were retrieved via numerous databases using relevant key terms. Observational, cohort, correlational, cross-sectional and longitudinal studies were included.

RESULTS:

Three publications met the criteria for inclusion; these provided data from 42 athletes and 33 controls. All three studies reported reductions in cerebrovascular reactivity via transcranial Doppler US.

CONCLUSIONS:

These initial results support the use of cerebrovascular reactivity as a research tool for identifying altered neurophysiology and monitoring recovery in adult athletes. Larger cross-sectional, prospective and longitudinal studies are required to understand the sensitivity and prognostic value of cerebrovascular reactivity in sport-related concussion.

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KEYWORDS: Concussion

PMID:25452613

SHOULDER GIRDLE

Shrugging exercise

J Electromyogr Kinesiol. 2014 Dec 13. pii: S1050-6411(14)00246-6. doi: 10.1016/j.jelekin.2014.12.001

Shrug exercises combined with shoulder abduction improve scapular upward rotator activity and scapular alignment in subjects with scapular downward rotation impairment.

Choi WJ¹, Cynn HS², Lee CH³, Jeon HS⁴, Lee JH⁵, Jeong HJ⁶, Yoon TL⁷.

Author information

Abstract

The aim of this research was to investigate which shoulder abduction angle (30°, 90°, 150°) during shrug exercise is superior for (1) activating the scapular upward rotators and (2) improving scapular and clavicular position in subjects with scapular downward rotation impairment. Twenty subjects performed shrug exercises at three different shoulder abduction angles (30°, 90°, 150°) which were obtained and maintained actively. Surface EMG data were collected from the levator scapulae (LS), upper trapezius (UT), lower trapezius (LT), and serratus anterior (SA) during shrug exercises. Scapular downward rotation index (SDRI) and clavicular tilt angle (CTA) were measured immediately after each shrug exercise.

Oneway repeated-measures analysis of variance was used to determine the significance. UT muscle activity was greater at 90° and 150° than at 30° of shoulder abduction. UT/LS muscle activity ratio was greater at 90° than at 30°. LT and LT/LS increased as shoulder abduction angle increased. SA was greater at 150° than at 30° or 90°. SA/LS was greater at 150° than at 30°. SDRI was lower at 90° and 150° than at 30°. CTA was greater at 90° and 150° than at 30°. In conclusion, shrug exercises at 90° or 150° of shoulder abduction angle may be advocated to activate scapular upward rotators, decrease SDRI, and increase CTA in patients with scapular downward rotation impairment.

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KEYWORDS: *Scapular downward rotation impairment; Scapular upward rotators; Shrug exercise*

PMID: 25553964

Snapping scapula

Am J Sports Med. 2015 Jan;43(1):236-45. doi: 10.1177/0363546514526373. Epub 2014 Mar 24.

Scapulothoracic bursitis and snapping scapula syndrome: a critical review of current evidence.

Warth RJ¹, Spiegl UJ², Millett PJ³.

Author information

Abstract

BACKGROUND:

Symptomatic scapulothoracic disorders, such as painful scapular crepitus and/or bursitis, are uncommon; however, they can produce significant pain and disability in many patients.

PURPOSE:

To review the current knowledge pertaining to snapping scapula syndrome and to identify areas of further research that may be helpful to improve clinical outcomes and patient satisfaction.

STUDY DESIGN:

Systematic review.

METHODS:

We performed a preliminary search of the PubMed and Embase databases using the search terms "snapping scapula," "scapulothoracic bursitis," "partial scapulectomy," and "superomedial angle resection" in September 2013. All nonreview articles related to the topic of snapping scapula syndrome were included.

RESULTS:

The search identified a total of 167 unique articles, 81 of which were relevant to the topic of snapping scapula syndrome. There were 36 case series of fewer than 10 patients, 16 technique papers, 11 imaging studies, 9 anatomic studies, and 9 level IV outcomes studies. The level of evidence obtained from this literature search was inadequate to perform a formal systematic review or meta-analysis. Therefore, a critical review of current evidence is presented.

CONCLUSION:

Snapping scapula syndrome, a likely underdiagnosed condition, can produce significant shoulder dysfunction in many patients. Because the precise origin is typically unknown, specific treatments that are effective for some patients may not be effective for others. Nevertheless, bursectomy with or without partial scapulectomy is currently the most effective primary method of treatment in patients who fail nonoperative therapy. However, many patients experience continued shoulder disability even after surgical intervention. Future studies should focus on identifying the modifiable factors associated with poor outcomes after operative and nonoperative management for snapping scapula syndrome in an effort to improve clinical outcomes and patient satisfaction.

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Abstracts: January 12, 2015

KEYWORDS: *bursitis; crepitus; partial scapulectomy; scapulothoracic; snapping scapula; superomedial angle resection*
PMID: 24664139

GLENOHUMERAL/SHOULDER

Kinaesthesia after injury

Man Ther. 2015 Feb;20(1):28-37. doi: 10.1016/j.math.2014.08.006. Epub 2014 Sep 3.

The effects of shoulder injury on kinaesthesia: A systematic review and meta-analysis.

Fyhr C¹, Gustavsson L¹, Wassinger C², Sole G³.

Author information

Abstract

The aim of this systematic review was to synthesize the evidence for changes for proprioceptive variables consisting of movement and position sense in participants with glenohumeral musculoskeletal disorders. Five databases were searched until 13th August 2013. Methodological quality was assessed and meta-analyses were performed for active and passive joint reposition sense (AJPS and PJPS) and movement sense, determined with threshold to detection of passive motion (TTDPM). The search yielded 17 studies, four of which were classified as having high methodological quality, seven as moderate and six as low quality. For participants with post-traumatic glenohumeral instability, pooled findings indicate moderate evidence for higher TTDPM for involved shoulders compared to control groups and the contralateral uninvolved side, indicating decreased movement sense. For AJPS and PJPS there was moderate to limited evidence for significant increased errors for involved compared to uninvolved shoulders, but not when compared to the control groups. Limited evidence was found for decreased AJPS acuity for patients with chronic rotator cuff pain and for patients with unspecified shoulder pain compared to healthy controls. Movement sense is most likely to be impaired after shoulder injury involving post-traumatic instability when compared to the contralateral shoulder and to controls, while deficits for AJPS and PJPS are more likely to be evident compared to the contralateral shoulder in participants with glenohumeral musculoskeletal disorders.

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KEYWORDS: *Kinestheasia; Movement sense; Position sense; Proprioception; Shoulder*

PMID: 25241661

Shoulder pain

Int Orthop. 2014 Dec 31.

Consensus for physiotherapy for shoulder pain.

Klintberg IH¹, Cools AM, Holmgren TM, Holzhausen AG, Johansson K, Maenhout AG, Moser JS, Spunton V, Ginn K.

Author information

Abstract

PURPOSE:

Shoulder pain is a common disorder. Despite growing evidence of the importance of physiotherapy, in particular active exercise therapy, little data is available to guide treatment. The aim of this project was to contribute to the development of an internationally accepted assessment and treatment algorithm for patients with shoulder pain.

METHODS:

Nine physiotherapists with expertise in the treatment of shoulder dysfunction met in Sweden 2012 to begin the process of developing a treatment algorithm. A questionnaire was completed prior to the meeting to guide discussions. Virtual conferences were thereafter the platform to reach consensus.

RESULTS:

Consensus was achieved on a clinical reasoning algorithm to guide the assessment and treatment for patients presenting with local shoulder pain, without significant passive range of motion deficits and no symptoms or signs of instability. The algorithm emphasises that physiotherapy treatment decisions should be based on physical assessment findings and not structural pathology, that active exercises should be the primary treatment approach, and that regular re-assessment is performed to ensure that all clinical features contributing to the presenting shoulder pain are addressed. Consensus was also achieved on a set of guiding principles for implementing exercise therapy for shoulder pain, namely, a limited number of exercises, performed with appropriate scapulo-humeral coordination and humeral head alignment, in a graduated manner without provoking the presenting shoulder pain.

CONCLUSION:

The assessment and treatment algorithm presented could contribute to a more formal, extensive process aimed at achieving international agreement on an algorithm to guide physiotherapy treatment for shoulder pain.

PMID: 25548127

ROTATOR CUFF

Acromial morphology

Knee Surg Sports Traumatol Arthrosc. 2014 Dec 30. [Epub ahead of print]

Differences in acromial morphology of shoulders in patients with degenerative and traumatic supraspinatus tendon tears.

Balke M¹, Liem D, Greshake O, Hoehner J, Bouillon B, Banerjee M.

Author information

Abstract

PURPOSE:

Distinct characteristics of acromial morphology seem to be one factor for the development of degenerative supraspinatus tendon tears. Thus, it is questionable whether patients with traumatic tendon tears also present these parameters. The hypothesis of the present study was that the acromial morphology of patients with degenerative supraspinatus tendon tears differs from patients with traumatic tears.

METHODS:

One hundred and thirty-six patients that were treated by arthroscopic rotator cuff repair from 2010 to 2013 were included in this study. Seventy-two patients had degenerative (group 1), and 64 had traumatic (group 2) supraspinatus tendon tears. On preoperative radiographs the Bigliani type, acromial slope, acromiohumeral (AH) distance, lateral acromial angle (LAA), acromion index (AI), and critical shoulder angle (CSA) were measured. Medians of these parameters as well as of age of both groups were compared using the t test.

RESULTS:

The percentaged distribution of the Bigliani type differed (group 1 vs. 2: type 1: 18/38, type 2: 56/55, type 3: 26/8). All parameters showed significant differences between degenerative and traumatic tears. Slope: 21.2° (SD 7.6°) versus 19.2° (SD 7.9°, $p = 0.026$), AH distance: 8.4 mm (SD 2.3 mm) versus 9.9 mm (SD 1.9 mm, $p = 0.0006$), LAA: 77.0° (SD 4.0°) versus 82.5° (SD 4.7°, $p < 0.0001$), AI: 0.77 (SD 0.07) versus 0.73 (0.06, $p = 0.0239$), and CSA: 36.8° (SD 3.6°) versus 35.3° (SD 2.9°, $p = 0.007$). An LAA $< 70^\circ$ or an AH distance of < 5 mm only occurred in degenerative tears. Patients with degenerative tears were significantly older (60 vs. 54 years).

CONCLUSIONS:

The hypothesis that the acromial morphology of patients with degenerative supraspinatus tendon tears differs from patients with traumatic tears was confirmed. Shoulders with degenerative tears show a narrower subacromial space and a larger lateral extension as well as a steeper angulation of the acromion than with traumatic tears. Thus, the results of this study support the theory of external impingement as a cause for degenerative rotator cuff tears. LEVEL OF EVIDENCE: IV.

PMID: 25547273

Tears

J Orthop Sci. 2014 Dec 27.

Monitoring of progression of nonsurgically treated rotator cuff tears by magnetic resonance imaging.

Nakamura Y¹, Yokoya S, Mochizuki Y, Harada Y, Kikugawa K, Ochi M.

Author information

Abstract

BACKGROUND:

Nonsurgically treated rotator cuff tears sometimes become irreparable in the lead up to surgical repair. The purposes of our study were to identify predictive factors in the progression of tear size, and determine the changes in tear location.

METHODS:

Eighty shoulders from 71 patients (mean age 69.4 years) diagnosed with rotator cuff tears by MRI were treated nonsurgically. MRI was repeated after more than 1 year of initial diagnosis. Tear size was measured from the edge of the tear to the lateral aspect of the greater tuberosity. Tears were classified into 5 groups based on tear size and 4 groups based on tear location. Changes in tear size and location were examined.

RESULTS:

The mean follow-up period was 22.3 months. The average progression of tear size was 5 mm during follow-up, averaging 3 mm per year. Tears that were initially <1 or \geq 4 cm were unlikely to progress in tear size. On the other hand, 1- to 2-cm tears on the initial MRI exhibited the greatest progression in tear size, followed by 2- to 3-cm tears. Furthermore, 62.5 % of localized tears in the posterior of the superior facet spread anteriorly, whereas 88.9 % of localized tears in the anterior of the superior facet did not change.

CONCLUSIONS:

Medium-sized tears are at high risk of tear progression. In contrast, there is little risk of early development of irreparable damage in partial tear or small full-thickness tears. In addition, typical tears may start in the posterior of the superior facet, and subsequently spread anteriorly. Our present findings may serve as a useful reference in determining the treatment course for rotator cuff tears.

LEVEL OF EVIDENCE: Level IV, Case Series, Prognosis Study.

PMID: 25542221

ADHESIVE CAPSULITIS

Management

Man Ther. 2015 Feb;20(1):2-9. doi: 10.1016/j.math.2014.07.006. Epub 2014 Jul 18.

Frozen shoulder contracture syndrome - Aetiology, diagnosis and management.

Lewis J¹.

Author information

- ¹Department of Allied Health Professions and Midwifery, School of Health and Social Work, Wright Building, College Lane Campus, University of Hertfordshire, Hatfield AL10 9AB, Hertfordshire, UK. Electronic address: jeremy.lewis@LondonShoulderClinic.com.

Abstract

Frozen shoulder is a poorly understood condition that typically involves substantial pain, movement restriction, and considerable morbidity. Although function improves overtime, full and pain free range, may not be restored in everyone. Frozen shoulder is also known as adhesive capsulitis, however the evidence for capsular adhesions is refuted and arguably, this term should be abandoned. The aim of this Masterclass is to synthesise evidence to provide a framework for assessment and management for Frozen Shoulder. Although used in the treatment of this condition, manipulation under anaesthetic has been associated with joint damage and may be no more effective than physiotherapy. Capsular release is another surgical procedure that is supported by expert opinion and published case series, but currently high quality research is not available. Recommendations that supervised neglect is preferable to physiotherapy have been based on a quasi-experimental study associated with a high risk of bias.

Physiotherapists in the United Kingdom have developed dedicated care pathways that provide; assessment, referral for imaging, education, health screening, ultrasound guided corticosteroid and hydro-distension injections, embedded within physiotherapy rehabilitation. The entire pathway is provided by physiotherapists and evidence exists to support each stage of the pathway. Substantial on-going research is required to better understand; epidemiology, patho-aetiology, assessment, best management, health economics, patient satisfaction and if possible prevention.

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KEYWORDS: *Assessment; Frozen shoulder; Management*

PMID: 25107826

WRIST AND HAND

Thumb CM OA

Disabil Rehabil. 2015 Jan 5:1-19.

Investigation of the effect of conservative interventions in thumb carpometacarpal osteoarthritis: systematic review and meta-analysis.

Bertozzi L¹, Valdes K, Vanti C, Negrini S, Pillastrini P, Villafañe JH.

Author information

Abstract

Abstract Purpose: The purpose of this study was to conduct a current review of randomized controlled trials regarding the effect of conservative interventions on pain and function in people with thumb carpometacarpal (CMC) osteoarthritis (OA), perform a meta-analysis of the findings and summarize current knowledge. **Method:** Data were obtained from MEDLINE, CINAHL, Embase, PEDro and CENTRAL databases from their inception to May 2014. Reference lists of relevant literature reviews were also searched. All published randomized trials without restrictions to time of publication or language were considered for inclusion. Study subjects were symptomatic adults with thumb CMC OA. Two reviewers independently selected studies, conducted quality assessment and extracted results. Data were pooled in a meta-analysis, when possible, using a random-effects model. Quality of the body evidence was assessed using GRADE approach. **Results:** Sixteen RCTs involving 1145 participants met the inclusion criteria. Twelve were of high quality (PEDro score > 6). We found moderate quality evidence that manual therapy and therapeutic exercise combined with manual therapy improve pain in thumb CMC OA at short- and intermediate-term follow-up, and from low to moderate quality evidences that magneto therapy improves pain and function at short-term follow-up.

Orthoses (splints) were found to improve function at long-term follow-up and pinch strength at short-term follow-up. Finally, we found from very low to low-quality evidence that other conservative interventions provide no significant improvement in pain and in function at short- and long-term follow-up. **Conclusions:** Some of the commonly performed conservative interventions performed in therapy have evidence to support their use to improve hand function and decrease hand pain. Additional research is required to determine the efficacy of other therapeutic interventions that are performed with patients with thumb CMC OA. Implications for Rehabilitation Manual therapy and exercise are an effective means of improving pain and function at short-term follow-up by patients with thumb CMC OA. Magneto therapy, manual therapy, manual therapy and exercise and Orthoses (splints) were found to have clinically significant results. Very few of the included studies showed a clinically significant effect size in favor of treatment.

KEYWORDS: *Carpometacarpal joints; hand joints; osteoarthritis; physical therapy modalities; thumb carpometacarpal*

PMID: 25559974

IMPINGEMENT

Testing for HI

Br J Sports Med. 2014 Dec 16. pii: bjsports-2014-094302. doi: 10.1136/bjsports-2014-094302.

Diagnostic accuracy of clinical tests for the diagnosis of hip femoroacetabular impingement/labral tear: a systematic review with meta-analysis.

Reiman MP¹, Goode AP², Cook CE², Hölmich P³, Thorborg K⁴.

Author information

Abstract

BACKGROUND:

Surgery for hip femoroacetabular impingement/acetabular labral tear (FAI/ALT) is exponentially increasing despite lacking investigation of the accuracy of various diagnostic measures. Useful clinical utility of these measures is necessary to support diagnostic imaging and subsequent surgical decision-making.

OBJECTIVE:

Summarise/evaluate the current diagnostic accuracy of various clinical tests germane to hip FAI/ALT pathology.

METHODS:

A computer-assisted literature search of MEDLINE, CINAHL and EMBASE databases using keywords related to diagnostic accuracy of the hip joint, as well as the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used for the search and reporting phases of the study. Quality assessment of bias and applicability was conducted using the Quality of Diagnostic Accuracy Studies-2 (QUADAS-2). Random effects models were used to summarise sensitivities (SN), specificities (SP), diagnostic odds ratio (DOR) and respective confidence intervals (CI).

RESULTS:

The employed search strategy revealed 21 potential articles, with one demonstrating high quality. Nine articles qualified for meta-analysis. The meta-analysis demonstrated that flexion-adduction-internal rotation (pooled SN ranging from 0.94 (95% CI 0.90 to 0.97) to 0.99 (95% CI 0.98 to 1.00); DOR 5.71 (95% CI 0.84 to 38.86) to 7.82 (95% CI 1.06 to 57.84)) and flexion-internal rotation (pooled SN 0.96 (95% CI 0.81 to 0.99); DOR 8.36 (95% CI 0.41 to 171.3) tests possess only screening accuracy.

CONCLUSIONS:

Few hip physical examination tests for diagnosing FAI/ALT have been investigated in enough studies of substantial quality to direct clinical decision-making. Further high-quality studies

Abstracts: January 12, 2015

across a wider spectrum of hip pathology patients are recommended to discern the confirmed clinical utility of these tests.

TRIALS REGISTRATION NUMBER:

PROSPERO Registration # CRD42014010144.

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KEYWORDS: *Evaluation; Evidence based review; Groin; Hip; Injury*

PMID: 25515771

[KNEE](#)

Testing

Br J Sports Med. 2014 Dec 10. pii: bjsports-2014-094094. doi: 10.1136/bjsports-2014-094094.

Clinician-friendly lower extremity physical performance measures in athletes: a systematic review of measurement properties and correlation with injury, part 1. The tests for knee function including the hop tests.

Hegedus EJ¹, McDonough S², Bleakley C³, Cook CE⁴, Baxter GD⁵.

Author information

Abstract

OBJECTIVE:

To review the measurement properties of physical performance tests (PPTs) of the knee as each pertain to athletes, and to determine the relationship between PPTs and injury in athletes age 12 years to adult.

METHODS:

A search strategy was constructed by combining the terms 'lower extremity' and synonyms for 'performance test', and names of performance tests with variants of the term 'athlete'. In this, part 1, we report on findings in the knee. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines were followed and the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist was used to critique the methodological quality of each paper. A second measure was used to analyse the quality of the measurement properties of each test.

RESULTS:

In the final analysis, we found 29 articles pertinent to the knee detailing 19 PPTs, of which six were compiled in a best evidence synthesis. The six tests were: one leg hop for distance (single and triple hop), 6 m timed hop, crossover hop for distance, triple jump and single leg vertical jump. The one leg hop for distance is the most often studied PPT. There is conflicting evidence regarding the validity of the hop and moderate evidence that the hop test is responsive to changes during rehabilitation. No test has established reliability or measurement error as assessed by the minimal important change or smallest detectable change. No test predicts knee injury in athletes.

CONCLUSIONS:

Despite numerous published articles addressing PPTs at the knee, there is predominantly limited and conflicting evidence regarding the reliability, agreement, construct validity, criterion validity and responsiveness of commonly used PPTs. There is a great opportunity for further study of these tests and the measurement properties of each in athletes.

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KEYWORDS: *Anterior cruciate ligament; Evidence based review; Knee; Lower extremity; Reliability*

PMID: 25497489

KNEE/ACL

Does meniscectomy with ACL repair help

Knee Surg Sports Traumatol Arthrosc. 2015 Jan;23(1):184-7. doi: 10.1007/s00167-014-2960-2. Epub 2014 Mar 30.

Short-term effects of partial meniscectomy on the clinical results of anterior cruciate ligament reconstruction.

Sofu H¹, Yildirim T, Gürsu S, Issin A, Şahin V.

Author information

Abstract

PURPOSE:

This study aims to analyse the short-term effects of partial meniscectomy on the clinical results of anterior cruciate ligament reconstruction surgery.

METHODS:

Clinical outcomes of 19 patients who had partial medial meniscectomy and anterior cruciate ligament reconstruction during the same surgery (Group 1) were compared with the outcomes of 25 patients who had also reconstruction but did not have any meniscal lesion (Group 2). Median follow-up time was 29 months (range 12-67 months) in Group 1 and 27 months (range 12-70 months) in Group 2. Feeling of apprehension in sports activities, International Knee Documentation Committee (IKDC) score, KT-2000 Arthrometer(®) measurements and post-operative time to return to sports activity were the criteria for data analysis.

RESULTS:

Eight patients (42 %) in Group 1 and 5 patients (20 %) in Group 2 stated feeling of apprehension in sports activities. IKDC score improved to A in 11 patients (58 %) from Group 1, and 18 patients (72 %) from Group 2. Mean anterior translation according to KT-2000 arthrometer measurements was 5.2 ± 1.3 mm in Group 1, and 4.6 ± 1.3 mm in Group 2. Post-operative time to return to sports activity was 8.5 ± 3.0 months in Group 1, and 6.5 ± 2.2 months in Group 2.

CONCLUSION:

Partial meniscectomy for irreparable medial meniscal tears, applied during the same surgery with anterior cruciate ligament reconstruction, negatively affects the clinical outcomes in the short-term follow-up. This study may be a reference for long-term clinical trials and also future investigations of new methods in the treatment of similar cases.

LEVEL OF EVIDENCE: IV.

PMID: 24682517

Exercises for ACL

Br J Sports Med. 2014 Dec 1. pii: bjsports-2014-093461. doi: 10.1136/bjsports-2014-093461.

Specific exercise effects of preventive neuromuscular training intervention on anterior cruciate ligament injury risk reduction in young females: meta-analysis and subgroup analysis.

Sugimoto D¹, Myer GD², Barber Foss KD³, Hewett TE⁴.

Author information

Abstract

CONTEXT:

Clinical trials have demonstrated that preventive neuromuscular training (PNMT) can be effective to reduce ACL injuries in young females. However, the magnitude of the overall effect of PNMT for ACL injury reduction has not reached consensus. In addition, the effects of individual exercises in PNMT that optimise ACL injury reduction are unknown.

OBJECTIVE:

The purpose of this project was to systematically review previously published clinical trials and evaluate types of exercises that best support ACL injury reduction in young females.

DATA SOURCES:

The key words 'knee', 'anterior cruciate ligament', 'ACL', 'prospective', 'neuromuscular', 'training', 'female', and 'prevention' were used for studies published from 1995 to May 2012 in PubMed and EBSCO host.

STUDY SELECTION:

Inclusion criteria for the current analysis were: (1) documented number of ACL injuries, (2) employed a PNMT intervention that aimed to reduce ACL injuries, (3) had a comparison group, (4) used a prospective controlled study design, (5) recruited female athletes and (6) recorded exercises implemented in the PNMT.

DATA EXTRACTION:

The number of ACL injuries and female athletes in each group (control and intervention) were extracted. In addition, exercises were categorised into four types and analysed for each investigation.

DATA SYNTHESIS:

A total of 14 clinical trials met the inclusion criteria. The subgroup analyses identified fewer ACL injuries in PNMT that focused on strengthening (OR 0.32, 95% CI 0.23 to 0.46, p=0.001), proximal control exercises (OR 0.33, 95% CI 0.23 to 0.47, p=0.001) and multiple exercise interventions (OR 0.32, CI 0.22 to 0.46, p=0.001).

Abstracts: January 12, 2015

CONCLUSIONS:

The current subgroup analyses indicate strengthening, proximal control exercises and multi exercise genres increased efficacy in PNMT intervention designed to reduce ACL injury in young female athletes.

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KEYWORDS:

Evidence based review; Exercise; Intervention effectiveness; Knee ACL PMID:25452612

Impact on gait

Int Orthop. 2014 Dec 31.

Gait knee kinematics after ACL reconstruction: 3D assessment.

Shabani B¹, Bytyqi D, Lustig S, Cheze L, Bytyqi C, Neyret P.

Author information

Abstract

PURPOSE:

While many studies about anterior-cruciate-ligament-deficient (ACLD) patients have demonstrated functional adaptations to protect the knee joint, an increasing number of patients undergo ACL reconstruction (ACLR) surgery in order to return to their desired level of activity. The purpose of this study was to compare 3D kinematic patterns between individuals having undergone ACLR with their healthy contralateral knee and a control group.

METHODS:

Three-dimensional kinematic data were obtained from 15 patients pre- and post-ACLR, 15 contralateral knees and 15 healthy controls. Data were recorded during treadmill walking at self-selected speed. Flexion/extension, external/internal tibial rotation, adduction/abduction and anterior/posterior tibial translation were compared between groups.

RESULTS:

ACLR knees showed a significantly higher knee-joint extension during the entire stance phase compared with ACLD knees. However, ACLR knees still showed a deficit of extension compared with healthy control knees. In the axial plane, there was no significant difference in pre- and postoperative kinematic data. Significant difference was achieved between ACLR knees and healthy control knees, specifically between 28 and 34 % and 44 and 54 % of the gait cycle. There was no significant difference in anterior-posterior translation or coronal plane between groups.

CONCLUSION:

Following ACL reconstruction, patients have better clinical and kinematic parameters. Despite improvements, knee kinematics during gait in the ACLR group differed from the control group. These kinematic changes could lead to abnormal loading in the knee joint and initiate the process for future chondral degeneration.

PMID:25549917

Lever sign

Knee Surg Sports Traumatol Arthrosc. 2014 Dec 25.

The "Lever Sign": a new clinical test for the diagnosis of anterior cruciate ligament rupture.

Lelli A¹, Di Turi RP, Spenciner DB, Dòmini M.

Author information

Abstract

PURPOSE:

A new clinical test for the diagnosis of ACL rupture is described: the so-called "Lever Sign". This prospective study on four groups of patients divided subjects on the basis of MRI findings (complete or partial ACL lesion) and the clinical phase of the injury (acute or chronic). The hypothesis was that this manual test would be diagnostic for both partial and complete tears of the ACL regardless of the elapsed time from injury.

METHODS:

A total of 400 patients were evaluated and divided into four, equal-sized groups based on time elapsed from injury and MRI findings: Group A (acute phase with positive MRI for complete ACL rupture), Group B (chronic phase with positive MRI for complete ACL rupture), Group C (acute phase with positive MRI for partial ACL rupture), and Group D (chronic phase with positive MRI for partial ACL rupture). Clinical assessment was performed with the Lachman test, the Anterior Drawer test, the Pivot Shift test, and the Lever Sign test. The Lever Sign test involves placing a fulcrum under the supine patient's calf and applying a downward force to the quadriceps. Depending on whether the ACL is intact or not, the patient's heel will either rise off of the examination table or remain down. Additionally, the Lever Sign test was performed on the un-injured leg of all 400 patients as a control.

RESULTS:

All tests were nearly 100 % sensitive for patients with chronic, complete tears of the ACL. However, for patients with acute, partial tears, the sensitivity was much lower for the Lachman test (0.42), Anterior Drawer test (0.29), and Pivot Shift test (0.11), but not the Lever Sign test (1.00).

CONCLUSION:

In general, chronic, complete tears were most successfully diagnosed but acute, partial tears were least successfully diagnosed. The Lever Sign test is more sensitive to correctly diagnosing both

acute and partial tears of the ACL compared with other common manual tests. The clinical relevance is that some ACL ruptures may be more accurately diagnosed.

PMID: 25536951

Risk factors

Br J Sports Med. 2015 Jan;49(2):118-22. doi: 10.1136/bjsports-2013-092536. Epub 2014 Mar 31.

High knee abduction moments are common risk factors for patellofemoral pain (PFP) and anterior cruciate ligament (ACL) injury in girls: Is PFP itself a predictor for subsequent ACL injury?

Myer GD¹, Ford KR², Di Stasi SL³, Foss KD⁴, Micheli LJ⁵, Hewett TE⁶.

Author information

Abstract

BACKGROUND:

Identifying risk factors for knee pain and anterior cruciate ligament (ACL) injury can be an important step in the injury prevention cycle.

OBJECTIVE:

We evaluated two unique prospective cohorts with similar populations and methodologies to compare the incidence rates and risk factors associated with patellofemoral pain (PFP) and ACL injury.

METHODS:

The 'PFP cohort' consisted of 240 middle and high school female athletes. They were evaluated by a physician and underwent anthropometric assessment, strength testing and three-dimensional landing biomechanical analyses prior to their basketball season. 145 of these athletes met inclusion for surveillance of incident (new) PFP by certified athletic trainers during their competitive season. The 'ACL cohort' included 205 high school female volleyball, soccer and basketball athletes who underwent the same anthropometric, strength and biomechanical assessment prior to their competitive season and were subsequently followed up for incidence of ACL injury. A one-way analysis of variance was used to evaluate potential group (incident PFP vs ACL injured) differences in anthropometrics, strength and landing biomechanics. Knee abduction moment (KAM) cut-scores that provided the maximal sensitivity and specificity for prediction of PFP or ACL injury risk were also compared between the cohorts.

RESULTS:

KAM during landing above 15.4 Nm was associated with a 6.8% risk to develop PFP compared to a 2.9% risk if below the PFP risk threshold in our sample. Likewise, a KAM above 25.3 Nm was associated with a 6.8% risk for subsequent ACL injury compared to a 0.4% risk if below the established ACL risk threshold. The ACL-injured athletes initiated landing with a greater knee abduction angle and a reduced hamstrings-to-quadriceps strength ratio relative to the incident PFP

Abstracts: January 12, 2015

group. Also, when comparing across cohorts, the athletes who suffered ACL injury also had lower hamstring/quadriceps ratio than the players in the PFP sample ($p < 0.05$).

CONCLUSIONS:

In adolescent girls aged 13.3 years, >15 Nm of knee abduction load during landing is associated with greater likelihood of developing PFP. Also, in girls aged 16.1 years who land with >25 Nm of knee abduction load during landing are at increased risk for both PFP and ACL injury.

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KEYWORDS: *ACL; Biomechanics; Children's injuries; Epidemiology; Knee injuries*
PMID: 2468701

Genetic variances

J Bone Joint Surg Am. 2015 Jan 7;97(1):71-9. doi: 10.2106/JBJS.N.00246.

Gene expression differences between ruptured anterior cruciate ligaments in young male and female subjects.

Johnson JS¹, Morscher MA², Jones KC², Moen SM¹, Klonk CJ², Jacquet R³, Landis WJ³.

Author information

Abstract

BACKGROUND:

The incidence of anterior cruciate ligament (ACL) injuries is two to eightfold greater in female compared with male athletes. Anatomic, hormonal, and neuromuscular factors have been associated with this disparity. This study compared gene expression and structural features in ruptured but otherwise normal ACL tissue from young female and male athletes.

METHODS:

A biopsy sample of ruptured ACL tissue (which would normally have been discarded) was obtained intraoperatively from seven female and seven male athletes (12.7 to 22.6 years old). Each sample was divided into portions for histological and gene expression analyses. Specimens for gene analysis were frozen and ground, and RNA was extracted and purified. Microarray analysis was performed on RNA isolated from four female and three male study participants (13.9 to 18.5 years old) who had a noncontact injury. Genes with an expression level that differed significantly between these female and male athletes were grouped into functionally associated networks with use of IPA software (Qiagen). Three genes of interest were chosen for further validation by RT-qPCR (reverse transcription-quantitative polymerase chain reaction) analysis of the samples from all fourteen patients. Several statistical methods were used to examine sex-related differences.

RESULTS:

Microarray analysis of the RNA isolated from the ruptured ACL tissue from the female and male athletes identified thirty-two genes with significant differential expression. Fourteen of these genes were not linked to the X or Y chromosome. IPA analysis grouped these genes into pathways involving development and function of skeletal muscle and growth, maintenance, and proliferation of cells. RT-qPCR confirmed significant differences in expression of three selected genes: ACAN (aggrecan) and FMOD (fibromodulin) were upregulated in female compared with male study participants, and WISP2 (WNT1 inducible signaling pathway protein 2) was downregulated. No morphological differences among the ruptured tissue from the various participants were apparent on histological examination.

CONCLUSIONS:

The genes identified in this study as differing distinctly according to sex produce major molecules in the ACL extracellular matrix. Significant upregulation of ACAN and FMOD (which regulate the matrix) and downregulation of WISP2 (which is involved in collagen turnover and production) may account for the weaker ACLs in female compared with male individuals.

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PMID: 25568397

MENISCUS

Posterior root tears

Knee Surg Sports Traumatol Arthrosc. 2015 Jan;23(1):119-25. doi: 10.1007/s00167-014-2904-x. Epub 2014 Feb 15.

Posterior root tears of the lateral meniscus.

Feucht MJ¹, Salzmann GM, Bode G, Pestka JM, Kühle J, Südkamp NP, Niemeyer P.

Author information

Abstract

PURPOSE:

To summarize and discuss the current knowledge on posterior lateral meniscus root tears.

METHODS:

A comprehensive review of the MEDLINE database was carried out to identify relevant articles using different keywords (e.g. "meniscus root", "root tear", "meniscus avulsion", "radial tear" and "lateral meniscus"). The reference lists of the reviewed articles were searched for additional relevant articles.

RESULTS:

Posterior lateral meniscus root tears are found in 7-12 % of patients with a tear of the anterior cruciate ligament (ACL). Biomechanical studies have found an increase in lateral compartment contact pressure of approximately 50 % after creation of a posterior lateral meniscus root tear. There is some evidence that the biomechanical consequences of these injuries are significantly influenced by the presence and integrity of the meniscomfemoral ligaments. Clinical studies have found encouraging results after repair of posterior lateral meniscus root tears. Whether root repair can prevent the development of osteoarthritis is currently unknown.

CONCLUSION:

A posterior lateral meniscus root tear is a clinically relevant but most likely underrecognized concomitant injury in patients with a tear of the ACL. This article may support clinicians in diagnosing and treating this unique type of meniscus tear.

LEVEL OF EVIDENCE: V.

PMID: 24531361

Exercises post surgery

Med Sci Sports Exerc. 2014 Dec 23.

Neuromuscular Exercise Post Partial Medial Meniscectomy: Randomized Controlled Trial.

Hall M¹, Hinman RS, Wrigley TV, Roos EM, Hodges PW, Staples MP, Bennell KL.

Author information

Abstract

PURPOSE:

To evaluate the effects of a 12-week, home-based, physiotherapist-guided neuromuscular exercise program on the knee adduction moment (an indicator of mediolateral knee load distribution) in people with a medial arthroscopic partial meniscectomy within the past 3-12 months.

METHODS:

An assessor-blinded, randomised controlled trial including people aged 30-50 years with no to mild pain following medial arthroscopic partial meniscectomy was conducted. Participants were randomly allocated to either a 12-week neuromuscular exercise program that targeted neutral lower limb alignment or a control group with no exercise. The exercise program included eight individual sessions with one of seven physiotherapists in private clinics, together with home exercises. Primary outcomes were the peak external knee adduction moment during normal pace walking and during a one-leg sit-to-stand. Secondary outcomes included additional measures of knee joint load distribution, patient-reported outcomes, maximal knee and hip muscle strength, and physical function measures.

RESULTS:

60 out of 62 randomized participants (97%) completed the trial. There were no significant between-group differences in the change in the peak knee adduction moment during normal pace walking (mean difference (95% CI), 0.22 (-0.11 to 0.55) Nm/BW×HT %, p=0.19), or during one-leg sit-to-stand (-0.01 (-0.33 to 0.31) Nm/BW×HT %, p = 0.95). There were also no significant between-group differences for any of the secondary outcomes.

CONCLUSIONS:

In patients 3-12 months following a medial arthroscopic partial meniscectomy, a neuromuscular exercise program did not alter the peak knee adduction moment, a key predictor of osteoarthritis structural disease progression. Australia and New Zealand Clinical Trials Registry (#ACTRN12612000542897).

PATELLA

PF pain and changes in trunk mechanics

Man Ther. 2015 Feb;20(1):189-93. doi: 10.1016/j.math.2014.08.013. Epub 2014 Sep 9.

Trunk biomechanics and its association with hip and knee kinematics in patients with and without patellofemoral pain.

Nakagawa TH¹, Maciel CD², Serrão FV³.

Author information

Abstract

Patellofemoral pain (PFP) is a common lower extremity condition observed in sports clinics. Recently, it has been suggested that trunk motion could affect hip and knee biomechanics in the frontal plane. Thus, the purpose of the study was compare trunk kinematics, strength and muscle activation between people with PFP and healthy participants. In addition, the associations among trunk biomechanics, hip and knee kinematics were analysed. Thirty people with PFP and thirty pain-free individuals participated. The peak ipsilateral trunk lean, hip adduction, and knee abduction were evaluated with an electromagnetic tracking system, and the surface electromyographic signals of the iliocostalis and external oblique muscle were recorded during single-leg squats. Trunk extension and trunk flexion with rotation isometric strength and side bridge tests were quantified using a handheld dynamometer.

Compared with the control group, the PFP group demonstrated increased ipsilateral trunk lean, hip adduction and knee abduction ($p = 0.02-0.04$) during single-leg squat accompanied with decreased trunk isometric strength ($p = < 0.001-0.009$). There was no between-group difference in trunk muscle activation. Only in the control group, ipsilateral trunk lean was significantly correlated with hip adduction ($r = -0.66$) and knee abduction ($r = 0.49$); also, the side bridge test correlated with knee abduction ($r = -0.51$). Differences in trunk, hip and knee biomechanics were found in people with PFP. No relationship among trunk, hip and knee biomechanics was found in the PFP group, suggesting that people with PFP show different movement patterns compared to the control group.

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KEYWORDS: *Electromyography; Hip joint; Muscle strength; Patella*
PMID: 25261089

KNEE/TOTAL

Tibial rotation

Knee Surg Sports Traumatol Arthrosc. 2015 Jan 11.

Influence of tibial rotation in total knee arthroplasty on knee kinematics and retropatellar pressure: an in vitro study.

Steinbrück A¹, Schröder C, Woiczinski M, Müller T, Müller PE, Jansson V, Fottner A.

Author information

Abstract

PURPOSE:

Although continuous improvements have been made, there is still a considerable amount of unsatisfied patients after total knee arthroplasty (TKA). A main reason for this high percentage is anterior knee pain, which is supposed to be provoked by post-operative increased retropatellar peak pressure. Since rotational malalignment of the implant is believed to contribute to post-operative pain, the aim of this study was to examine the influence of tibial component rotation on knee kinematics and retropatellar pressure.

METHODS:

Eight fresh-frozen knee specimens were tested in a weight-bearing knee rig after fixed-bearing TKA under a loaded squat from 20° to 120° of flexion. To examine tibial components with different rotations, special inlays with 3° internal rotation and 3° external rotation were produced and retropatellar pressure distribution was measured with a pressure-sensitive film. The kinematics of the patella and the femorotibial joint were recorded with an ultrasonic-based motion analysis system.

RESULTS:

Retropatellar peak pressure decreased significantly from 3° internal rotation to neutral position and 3° external rotation of the tibial component (8.5 ± 2.3 vs. 8.2 ± 2.4 vs. 7.8 ± 2.5 MPa). Regarding knee kinematics femorotibial rotation and anterior-posterior translation, patella rotation and tilt were altered significantly, but relative changes remained minimal.

CONCLUSION:

Changing tibial rotation revealed a high in vitro influence on retropatellar peak pressure. We recommend the rotational alignment of the tibial component to the medial third of the tibial tuberosity or even more externally beyond that point to avoid anterior knee pain after TKA.

PMID: 25577221

OSTEOARTHRITIS/KNEE

Platelet rich injections

Br J Sports Med. 2014 Nov 21. pii: bjsports-2014-094036. doi: 10.1136/bjsports-2014-094036.

Efficacy of platelet-rich plasma injections in osteoarthritis of the knee: a systematic review and meta-analysis.

Laudy AB¹, Bakker EW², Rekers M³, Moen MH⁴.

Author information

Abstract

BACKGROUND:

The effectiveness of platelet-rich plasma (PRP) injections for osteoarthritis (OA) is still controversial. We investigated the effect of PRP injections in patients with knee OA based on decreasing pain, improving function, global assessment and changes regarding joint imaging.

METHODS:

We performed a comprehensive, systematic literature search in computerised databases (MEDLINE, EMBASE, CINAHL, CENTRAL, Web of Science and PEDro) until June 2014 for randomised or non-randomised controlled trials. These were graded for risk of bias and a level of evidence was provided. If possible, meta-analysis was performed.

RESULTS:

Ten trials were included. In these, intra-articular PRP injections were more effective for pain reduction (mean difference (MD) -2.45; 95% CI -2.92 to -1.98; p value <0.00001 and MD -2.07; 95% CI -2.59 to -1.55; p value <0.00001, single and double PRP injections, respectively) compared with placebo at 6 months postinjection. Intra-articular PRP injections were compared with hyaluronic acid and showed a statistically significant difference in favour of PRP on pain reduction based on the visual analogue scale and numeric rating scale (standardised mean difference -0.92; 95% CI -1.20 to -0.63; p value <0.00001) at 6 months postinjection. Almost all trials revealed a high risk of bias.

CONCLUSIONS:

On the basis of the current evidence, PRP injections reduced pain more effectively than did placebo injections in OA of the knee (level of evidence: limited due to a high risk of bias). This significant effect on pain was also seen when PRP injections were compared with hyaluronic acid injections (level of evidence: moderate due to a generally high risk of bias). Additionally, function improved significantly more when PRP injections were compared with controls (limited to moderate evidence). More large randomised studies of good quality and low risk of bias are needed to test whether PRP injections should be a routine part of management of patients with OA of the knee.

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KEYWORDS: *Cartilage; Muscle; Sports medicine; Tendon*

PMID: 25416198

FOOT POSTURE

LOWER LIMB overuse injury

J Foot Ankle Res. 2014 Dec 19;7(1):55. doi: 10.1186/s13047-014-0055-4. eCollection 2014.

Foot posture as a risk factor for lower limb overuse injury: a systematic review and meta-analysis.

Neal BS¹, Griffiths IB², Dowling GJ³, Murley GS⁴, Munteanu SE⁴, Franettovich Smith MM⁵, Collins NJ⁶, Barton CJ⁷. [Author information](#)

Abstract

BACKGROUND:

Static measures of foot posture are regularly used as part of a clinical examination to determine the need for foot level interventions. This is based on the premise that pronated and supinated foot postures may be risk factors for or associated with lower limb injury. This systematic review and meta-analysis investigates foot posture (measured statically) as a potential risk factor for lower limb overuse injuries.

METHODS:

A systematic search was performed using Medline, CINAHL, Embase, SportDiscus in April 2014, to identify prospective cohort studies that investigated foot posture and function as a risk factor for lower limb overuse injury. Eligible studies were classified based on the method of foot assessment: (i) static foot posture assessment; and/or (ii) dynamic foot function assessment. This review presents studies evaluating static foot posture. The methodological quality of included studies was evaluated by two independent reviewers, using an adapted version of the Epidemiological Appraisal Instrument (EAI). Where possible, effects were expressed as standardised mean differences (SMD) for continuous scaled data, and risk ratios (RR) for nominal scaled data. Meta-analysis was performed where injuries and outcomes were considered homogenous.

RESULTS:

Twenty-one studies were included (total n = 6,228; EAI 0.8 to 1.7 out of 2.0). There was strong evidence that a pronated foot posture was a risk factor for medial tibial stress syndrome (MTSS) development and very limited evidence that a pronated foot posture was a risk factor for patellofemoral pain development, although associated effect sizes were small (0.28 to 0.33). No relationship was identified between a pronated foot posture and any other evaluated pathology (i.e. foot/ankle injury, bone stress reactions and non-specific lower limb overuse injury).

CONCLUSION:

This systematic review identified strong and very limited evidence of small effect that a pronated foot posture is a risk factor for MTSS and patellofemoral pain respectively. Evaluation of static foot posture should be included in a multifactorial assessment for both MTSS and patellofemoral pain, although only as a part of the potential injury risk profile. Whilst the included measures are clinically applicable, further studies are required to determine their relationship with dynamic foot function.

KEYWORDS:

Foot; Lower extremity; Musculoskeletal diseases; Pronation; Prospective studies; Review; Risk factors; Supination

PMID: 25558288

ACHILLES TENDON

Management

Sports Med. 2015 Jan;45(1):95-110. doi: 10.1007/s40279-014-0237-z.

Effectiveness of orthotic devices in the treatment of achilles tendinopathy: a systematic review.

Scott LA¹, Munteanu SE, Menz HB.

Author information

Abstract

Orthotic devices such as foot orthoses, splints, taping and bracing are recommended for Achilles tendinopathy (AT). This systematic review was conducted to review the current evidence for the effectiveness of orthotic devices for the treatment of mid-portion or insertional AT. Electronic bibliographic databases (MEDLINE, EMBASE, Current Contents, CINAHL and SPORTDiscus) were searched in May 2014. The methodological quality of included studies was evaluated using the Quality Index. Where possible, effects were determined using standardised mean differences. The strength of evidence for each intervention was determined according to the quality and number of studies. Twelve studies satisfied the inclusion criteria; nine studies investigated mid-portion AT, whilst three studies did not distinguish between mid-portion and insertional pathology.

Weak evidence showed that foot orthoses were equivalent to physical therapy, and equivalent to no treatment. Very weak evidence supported the use of adhesive taping alone or when combined with foot orthoses. Moderate evidence showed that the AirHeel™ brace was as effective as a calf muscle eccentric exercise programme, and weak evidence showed that this intervention was not beneficial when added to a calf muscle eccentric exercise programme. Weak evidence showed that an ankle joint dorsiflexion night splint was equally effective to a calf muscle eccentric exercise programme, and strong evidence showed that this intervention was not beneficial when

added to a calf muscle eccentric exercise programme. These findings may aid clinical decision making in the context of AT, however further high-quality studies are required.

PMID:25108348

PLANTAR SURFACE

Factors for heel pain

Foot Ankle Int. 2015 Jan;36(1):37-45. doi: 10.1177/1071100714551021. Epub 2014 Sep 18.

Musculoskeletal and activity-related factors associated with plantar heel pain.

Sullivan J¹, Burns J², Adams R³, Pappas E³, Crosbie J⁴.

Author information

Abstract

BACKGROUND:

Despite the prevalence and impact of plantar heel pain, its etiology remains poorly understood, and there is no consensus regarding optimum management. The identification of musculoskeletal factors related to the presence of plantar heel pain could lead to the development of better targeted intervention strategies and potentially improve clinical outcomes. The aim of this study was to investigate relationships between a number of musculoskeletal and activity-related measures and plantar heel pain.

METHODS:

In total, 202 people with plantar heel pain and 70 asymptomatic control participants were compared on a variety of musculoskeletal and activity-related measures, including body mass index (BMI), foot and ankle muscle strength, calf endurance, ankle and first metatarsophalangeal (MTP) joint range of motion, foot alignment, occupational standing time, exercise level, and generalized hypermobility. Following a comparison of groups for parity of age, analyses of covariance were performed to detect differences between the 2 groups for any of the variables measured.

RESULTS:

The plantar heel pain group displayed a higher BMI, reduced ankle dorsiflexion range of motion, reduced ankle evor and toe flexor strength, and an altered inversion/eversion strength ratio.

Abstracts: January 12, 2015

There were no differences between groups for foot alignment, dorsiflexor or invertor strength, ankle inversion or eversion range of motion, first MTP joint extension range of motion, generalized hypermobility, occupational standing time, or exercise level.

CONCLUSION:

Plantar heel pain is associated with higher BMI and reductions in some foot and ankle strength and flexibility measures. Although these factors could be either causal or consequential, they are all potentially modifiable and could be targeted in the management of plantar heel pain.

LEVEL OF EVIDENCE:

Level III, comparative study.

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KEYWORDS: *Strength; flexibility; foot alignment; obesity*

PMID: 25237175

MANUAL THERAPY

Thoracic manipulation and shoulder pain

Man Ther. 2014 Dec 2. pii: S1356-689X(14)00232-X. doi: 10.1016/j.math.2014.11.011.

Thoracic spinal manipulation for musculoskeletal shoulder pain: Can an instructional set change patient expectation and outcome?

Riley SP¹, Bialosky J², Cote MP³, Swanson BT⁴, Tafuto V⁵, Sizer PS⁶, Brismée JM⁶.

Author information

Abstract

STUDY DESIGN:

Planned secondary analysis of a randomized clinical trial.

OBJECTIVES:

To examine: 1) patients' baseline expectations for treatment outcome of thoracic high velocity low amplitude thrust manipulations (HVLATM) to the thoracic spine for shoulder pain; 2) if the message conveyed by the clinician changed the patients' expectation; 3) any differences in outcome based on expectation independent of messaging.; and 4) any differences in outcome for those patients whose expectations significantly changed as a result of the messaging.

BACKGROUND:

Thoracic HVLATM may be an effective intervention for patients suffering from musculoskeletal shoulder pain. The role of expectation in the treatment effectiveness of this intervention has not been established.

METHODS:

Subjects' expectations regarding the effectiveness of HVLATM on shoulder pain were recorded at baseline. This was reassessed immediately following the provision of positive or neutral instructional set. The subjects then received a thoracic or scapular HVLATM. The Shoulder Pain

and Disability Index (SPADI) and the numeric pain rating scale (NPRS) were used as outcomes measures.

RESULTS:

There was a 10 subject change (23%) in positive expectation that was statistically significant ($p = 0.019$) following a positive message. There was no statistically significant difference in pain and function when these subjects were compared to all other subjects.

CONCLUSION:

Although patients' expectations of positive outcome significantly changed when providing a positive instructional set, these changes did not translate into clinically significant short term changes in shoulder pain and function. Level of Evidence: 1b.

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KEYWORDS:

Expectation; Manipulation; Physical therapy; Shoulder pain; Thoracic spine

PMID: 25543999

Ankle dorsi flexion and MT

Phys Ther Sport. 2015 Feb;16(1):10-5. doi: 10.1016/j.ptsp.2014.02.001. Epub 2014 Feb 14.

The effect of two mobilization techniques on dorsiflexion in people with chronic ankle instability.

Marrón-Gómez D¹, Rodríguez-Fernández ÁL², Martín-Urrialde JA³.

Author information

Abstract

OBJECTIVE:

To compare the effect of two manual therapy techniques, mobilization with movement (WB-MWM) and talocrural manipulation (HVLA), for the improvement of ankle dorsiflexion in people with chronic ankle instability (CAI) over 48 h.

DESIGN:

Randomized controlled clinical trial.

SETTING:

University research laboratory.

PARTICIPANTS:

Fifty-two participants (mean \pm SD age, 20.7 ± 3.4 years) with CAI were randomized to WB-MWM ($n = 18$), HVLA ($n = 19$) or placebo group ($n = 15$).

MAIN OUTCOME MEASURES:

Weight-bearing ankle dorsiflexion measured with the weight-bearing lunge. Measurements were obtained prior to intervention, immediately after intervention, and 10 min, 24 h and 48 h post-intervention.

RESULTS:

There was a significant effect \times time ($F_{4,192} = 20.65$; $P < 0.001$) and a significant time \times group interactions ($F_{8,192} = 6.34$; $P < 0.001$). Post hoc analysis showed a significant increase of ankle dorsiflexion in both WB-MWM and HVLA groups with respect to the placebo group with no differences between both active treatment groups.

CONCLUSION:

A single application of WB-MWM or HVLA manual technique improves ankle dorsiflexion in people with CAI, and the effects persist for at least two days. Both techniques have similar effectiveness for improving ankle dorsiflexion although WB-MWM demonstrated greater effect sizes.

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KEYWORDS: *Ankle dorsiflexion; Chronic ankle instability; Manual therapy*

PMID: 24679362

Joint position sense

J Phys Ther Sci. Dec 2014; 26(12): 1985–1987.

Published online Dec 25, 2014. doi: [10.1589/jpts.26.1985](https://doi.org/10.1589/jpts.26.1985)

PMCID: PMC4273073

The Influence of Lumbar Joint Mobilization on Joint Position Sense in Normal Adults

Wontae Gong, PhD, PT¹

[Purpose] The purpose of this study was to determine the effects of lumbar joint mobilization on the joint position sense (JPS) of normal adults. [Subjects] A total of 30 normal adults were divided into an experimental group ($n = 15$) and a control group ($n = 15$). [Methods] The experimental group received lumbar joint mobilization and massage, and the control group received massage only. Both the experimental and control groups were evaluated for joint position error (JPE) by using a digital dual inclinometer before and after the experiment. [Results] In the before and after comparison for the experimental group, statistically significant differences were found in flexion, extension, left lateral flexion, and right lateral flexion.

There was no statistically significant difference in the before and after comparison for the control group. [Conclusion] Because lumbar joint mobilization can reduce JPE and improve JPS, its use in the treatment of patients with lumbar problems is recommended.

Key words: Gong's mobilization, Joint position sense, Joint position error

Manipulation vs exercise

J Can Chiropr Assoc. 2014 Dec;58(4):456-66.

Effects of spinal manipulation versus therapeutic exercise on adults with chronic low back pain: a literature review.

Merepeza A¹.

Author information

Abstract

BACKGROUND CONTEXT:

Chronic low back pain (CLBP) is a prevalent disorder that has a significant burden to society in terms of loss of work time and increased economic cost. Two common treatment choices of intervention for CLBP are spinal manipulation and prescribed exercise.

PURPOSE:

The purpose of this systematic review was to examine the effectiveness of spinal manipulation vs prescribed exercise for patients diagnosed with CLBP. Studies that compared head-to-head spinal manipulation to an exercise group were included in this review.

METHODS:

A search of the current literature was conducted using a keyword process in CINAHL, Cochrane Register of Controlled Trials Database, Medline, and Embase. The search was conducted on, and included studies available up to August 29(th) 2014. Studies were included based on PICOS criteria 1) individuals with CLBP defined as lasting 12 weeks or longer; 2) spinal manipulation performed by a health care practitioner; 3) prescribed exercise for the treatment of CLBP and monitored by a health care practitioner; 4) measurable clinical outcomes for reducing pain, disability or improving function; 5) randomized controlled trials. The quality of included articles

Abstracts: January 12, 2015

was determined by the author using the criteria developed and used by the Physiotherapy Evidence Database (PEDro).

RESULTS:

Three randomized controlled trials met the inclusion criteria of this systematic review and were included in this review. The outcomes used in these studies included Disability Indexes, Pain Scales and function improvement scales. The results included a mix of effects with one study finding spinal manipulation as more effective and another finding the exercises more so. The third study found both interventions offering equal effects in the long term.

CONCLUSION:

Based on the findings of this systematic review there is no conclusive evidence that clearly favours spinal manipulation or exercise as more effective in treatment of CLBP. More studies are needed to further explore which intervention is more effective.

KEYWORDS:

back pain; chiropractic; chronic; exercise; spinal manipulation

PMID: 2555067

STRETCHING/MUSCLES

Strengthening hamstrings

Scand J Med Sci Sports. 2014 Dec 30. doi: 10.1111/sms.12388. [Epub ahead of print]

Effects of hamstring-emphasized neuromuscular training on strength and sprinting mechanics in football players.

Mendiguchia J¹, Martinez-Ruiz E, Morin JB, Samozino P, Edouard P, Alcaraz PE, Esparza-Ros F, Mendez-Villanueva A.

Author information

Abstract

The objective of this study was to examine the effects of a neuromuscular training program combining eccentric hamstring muscle strength, plyometrics, and free/resisted sprinting exercises on knee extensor/flexor muscle strength, sprinting performance, and horizontal mechanical properties of sprint running in football (soccer) players. Sixty footballers were randomly assigned to an experimental group (EG) or a control group (CG).

Twenty-seven players completed the EG and 24 players the CG. Both groups performed regular football training while the EG performed also a neuromuscular training during a 7-week period. The EG showed a small increases in concentric quadriceps strength (ES = 0.38/0.58), a moderate to large increase in concentric (ES = 0.70/0.74) and eccentric (ES = 0.66/0.87) hamstring strength, and a small improvement in 5-m sprint performance (ES = 0.32). By contrast, the CG presented lower magnitude changes in quadriceps (ES = 0.04/0.29) and hamstring (ES = 0.27/0.34) concentric muscle strength and no changes in hamstring eccentric muscle strength (ES = -0.02/0.11).

Thus, in contrast to the CG (ES = -0.27/0.14), the EG showed an almost certain increase in the hamstring/quadriceps strength functional ratio (ES = 0.32/0.75). Moreover, the CG showed small magnitude impairments in sprinting performance (ES = -0.35/-0.11). Horizontal mechanical properties of sprint running remained typically unchanged in both groups. These results indicate that a neuromuscular training program can induce positive hamstring strength and maintain sprinting performance, which might help in preventing hamstring strains in football players.

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KEYWORDS: *Hamstring strength; football; isokinetic; soccer; sprint biomechanics*

PMID: 25556888

STM

Trigger points

Clin J Pain. 2009 Jan;25(1):80-9. doi: 10.1097/AJP.0b013e31817e13b6.

Reliability of physical examination for diagnosis of myofascial trigger points: a systematic review of the literature.

Lucas N¹, Macaskill P, Irwig L, Moran R, Bogduk N.

Author information

Abstract

BACKGROUND:

Trigger points are promoted as an important cause of musculoskeletal pain. There is no accepted reference standard for the diagnosis of trigger points, and data on the reliability of physical examination for trigger points are conflicting.

OBJECTIVES:

To systematically review the literature on the reliability of physical examination for the diagnosis of trigger points.

METHODS:

MEDLINE, EMBASE, and other sources were searched for articles reporting the reliability of physical examination for trigger points. Included studies were evaluated for their quality and applicability, and reliability estimates were extracted and reported.

RESULTS:

Nine studies were eligible for inclusion. None satisfied all quality and applicability criteria. No study specifically reported reliability for the identification of the location of active trigger points

Abstracts: January 12, 2015

in the muscles of symptomatic participants. Reliability estimates varied widely for each diagnostic sign, for each muscle, and across each study. Reliability estimates were generally higher for subjective signs such as tenderness (kappa range, 0.22-1.0) and pain reproduction (kappa range, 0.57-1.00), and lower for objective signs such as the taut band (kappa range, -0.08-0.75) and local twitch response (kappa range, -0.05-0.57).

CONCLUSIONS:

No study to date has reported the reliability of trigger point diagnosis according to the currently proposed criteria. On the basis of the limited number of studies available, and significant problems with their design, reporting, statistical integrity, and clinical applicability, physical examination cannot currently be recommended as a reliable test for the diagnosis of trigger points. The reliability of trigger point diagnosis needs to be further investigated with studies of high quality that use current diagnostic criteria in clinically relevant patients.

PMID: 19158550

Dry needling for neck pain

Effectiveness of dry needling for myofascial trigger points associated with neck and shoulder pain: a systematic review and meta-analysis

Archives of Physical Medicine and Rehabilitation, 01/12/2015 Evidence Based Medicine Review Article

Objective

This study aimed to evaluate current evidence on the effectiveness of dry needling for myofascial trigger points (MTrPs) associated with neck and shoulder pain.

Data Sources

PubMed, EBSCO, Physiotherapy Evidence Database, ScienceDirect, The Cochrane Library, Clinical Key, Wangfang Data, CNKI, Chinese VIP Information, and Springer Link databases were searched from database inception to January 2014.

Study Selection

Randomized controlled trials (RCTs) were performed to determine if dry needling was used as main treatment and if pain intensity was included as an outcome. Participants were diagnosed with MTrPs associated with neck and shoulder pain.

Data extraction

Two reviewers independently screened the articles, scored methodological quality, and extracted data. Results regarding pain intensity were extracted in the form of mean and standard deviation data. Twenty RCTs involving 839 patients were obtained for meta-analysis.

Data Synthesis

Meta-analyses were performed using RevMan 5.2 and Stata 12.0. Results suggested that compared with control/sham group, dry needling to MTrPs was effective in short term [SMD=-1.91, 95% CI (-3.10, -0.73), P=0.002] and medium term [SMD=-1.07, 95% CI (-1.87, -0.27), P=0.009]; however, wet needling (including lidocaine) was superior to dry needling in relieving MTrP pain in medium term [SMD=1.69, 95% CI (0.40, 2.98), P=0.01]. Other therapies (including physiotherapy) were more effective than dry needling to treat MTrP pain in medium term [SMD=0.62, 95% CI (0.02, 1.21), P=0.04].

Conclusions

Dry needling can be recommended to relieve MTrP pain of neck and shoulders in short and medium terms, but wet needling is more effective than dry needling in reducing MTrP pain in neck and shoulders in medium term (9 days to 28 days).

Chinese massage

Chinese massage combined with core stability exercises for nonspecific low back pain: A randomized controlled trial

Complementary Therapies in Medicine, 01/12/2015 Clinical Article

Zhang Y, et al. – The aim of this study is to determine the effect of Chinese massage combined with core stability exercises on nonspecific low back pain. Core stability exercises can improve the therapeutic effect of Chinese massage in treating nonspecific low back pain.

Methods

- In the prospective study, ninety-two participants with nonspecific low back pain were divided into experimental and control group at random, and 46 in each.
- The experimental group were treated using Chinese massage combined with core stability exercises, while the control group were treated using Chinese massage alone.
- The two groups were evaluated using visual analogue scale and Oswestry disability index at baseline, immediately after two and eight weeks.
- In addition, the recurrence rate of nonspecific low back pain was evaluated one year after the last intervention.

Results

- Two weeks after treatment, both VAS and ODI scores decreased significantly in two groups ($p < 0.05$), when compared with the values before treatment, but no difference between the two groups ($p > 0.05$).

- Eight weeks later, the VAS and ODI scores decreased significantly in both groups ($p < 0.05$); at the same time, both VAS and ODI scores were significantly lower ($p < 0.05$) in the experimental group than those in the control group.
- At the final follow-up, five cases recurred in the experimental group and nineteen cases in the control group, the control group has a significantly higher recurrence rate ($p < 0.05$)

EXERCISE

CPR for LBP exercise

Trials. 2015 Jan 6;16(1):4.

Derivation and validation phase for the development of clinical prediction rules for rehabilitation in chronic nonspecific low back pain patients: study protocol for a randomized controlled trial.

Denteneer L, Stassijns G, De Hertogh W, Truijen S, Jansen N, Van Daele U.

Abstract

BACKGROUND:

There is a consensus that exercise therapy should be used as a therapeutic approach in chronic low back pain (CLBP) but little consensus has been reached about the preferential type of therapy. Due to the heterogeneity of the population no clear effect of specific therapy interventions are found, probably a specific subgroup of the investigated population will benefit from the intervention and another subgroup will not benefit, looking at the total investigated population no significant effects can be found. Therefore there is a need for the development of clinical prediction rules (CPRs). Objectives for this trial are first, the derivation of CPRs to predict treatment response to three forms of exercise therapy for patients with nonspecific CLBP. Secondly, we aim to validate a CPR for the three forms of exercise therapy for patients with nonspecific CLBP.

METHODS:

The study design is a randomized controlled trial. Patients with nonspecific CLBP of more than three months duration are recruited at the Antwerp University Hospital (Belgium) and Apra

Rehabilitation Hospital. After examination, patients are randomly assigned to one of three intervention groups: motor control therapy, general active exercise therapy and isometric training therapy. All patients will undergo 18 treatment sessions during nine weeks. Measurements will be taken at baseline, nine weeks, six months and at one year. The primary outcome used is the Modified Oswestry Disability Questionnaire score. For each type of exercise therapy a CPR will be derived and validated. For validation, the CPR will be applied to divide each treatment group into two subgroups (matched and unmatched therapy) using the baseline measurements. We predict a better therapeutic effect for matched therapy.

DISCUSSION:

A randomized controlled trial has not previously been performed for the development of a CPR for exercise therapy in CLBP patients. Only one CPR was described in a single-arm design for motor control therapy in sub-acute non-radicular LBP patients. In this study, a sufficiently large sample will be included in both the derivation and validation phase. Trial registration: This trial was registered with Clinicaltrials.gov on 10 February 2014, registration number: NCT02063503.

PMID:25558975

Mitochondrial changes

Med Sci Sports Exerc. 2014 Dec 23.

Resistance Exercise Training Alters Mitochondrial Function in Human Skeletal Muscle.

Porter C¹, Reidy PT, Bhattarai N, Sidossis LS, Rasmussen BB.

Author information

Abstract

INTRODUCTION:

Loss of mitochondrial competency is associated with several chronic illnesses. Therefore, strategies that maintain or increase mitochondrial function will likely be of benefit in a number of clinical settings. Endurance exercise has long been known to increase mitochondrial function in skeletal muscle. Comparatively little is known regarding the impact of resistance exercise training on skeletal muscle mitochondrial respiratory function.

PURPOSE:

The purpose of the current study was to determine the impact of chronic resistance training on skeletal muscle mitochondrial respiratory capacity and function.

METHODS:

Here, we studied the impact of a 12-week resistance exercise training program on skeletal muscle mitochondrial function in eleven young healthy men. Muscle biopsies were collected before and after the 12-week training program and mitochondrial respiratory capacity determined in permeabilized myofibers by high-resolution respirometry.

RESULTS:

Resistance exercise training increased lean body mass and quadriceps muscle strength by 4 and 15%, respectively ($P<0.001$). Coupled mitochondria respiration supported by complex I, and complex I and II substrates, increased by 2- and 1.4-fold, respectively ($P<0.01$). The ratio of coupled complex I supported respiration to maximal respiration increased with resistance exercise training ($P<0.05$), as did complex I protein abundance ($P<0.05$), while the substrate control ratio for succinate was reduced after resistance exercise training ($P<0.001$). Transcripts responsible for proteins critical to electron transfer and NAD production increased with training ($P<0.05$), while transcripts involved in mitochondrial biogenesis were unaltered.

CONCLUSION:

Collectively, 12-weeks of resistance exercise training resulted in qualitative and quantitative changes in skeletal muscle mitochondrial respiration. This adaptation occurs with modest changes in mitochondrial proteins and transcript expression. Resistance exercise training appears to be a means to augment the respiratory capacity and intrinsic function of skeletal muscle mitochondria.

PMID:25539479

CORE

Core study

Trials. 2014 Dec 26;15:511. doi: 10.1186/1745-6215-15-511.

A core outcome set for clinical trials on non-specific low back pain: study protocol for the development of a core domain set.

Chiarotto A¹, Terwee CB, Deyo RA, Boers M, Lin CW, Buchbinder R, Corbin TP, Costa LO, Foster NE, Grotle M, Koes BW, Kovacs FM, Maher CG, Pearson AM, Peul WC, Schoene ML, Turk DC, van Tulder MW, Ostelo RW.

Author information

Abstract

BACKGROUND:

Low back pain (LBP) is one of the most disabling and costly disorders affecting modern society, and approximately 90% of patients are labelled as having non-specific LBP (NSLBP). Several interventions for patients with NSLBP have been assessed in clinical trials, but heterogeneous reporting of outcomes in these trials has hindered comparison of results and performance of meta-analyses. Moreover, there is a risk of selective outcome reporting bias. To address these issues, the development of a core outcome set (COS) that should be measured in all clinical trials for a specific health condition has been recommended. A standardized set of outcomes for LBP was proposed in 1998, however, with evolution in COS development methodology, new instruments, interventions, and understanding of measurement properties, it is appropriate to update that

Abstracts: January 12, 2015

proposal. This protocol describes the methods used in the initial step in developing a COS for NSLBP, namely, establishing a core domain set that should be measured in all clinical trials.

METHODS/DESIGN:

An International Steering Committee including researchers, clinicians, and patient representatives from four continents was formed to guide the development of this COS. The approach of initiatives like Core Outcome Measures in Effectiveness Trials (COMET) and Outcome Measures in Rheumatology (OMERACT) was followed. Participants were invited to participate in a Delphi study aimed at generating a consensus-based core domain set for NSLBP. A list of potential core domains was drafted and presented to the Delphi participants who were asked to judge which domains were core. Participant suggestions about overlap, aggregation, or addition of potential core domains were addressed during the study. The patients' responses were isolated to assess whether there was substantial disagreement with the rest of the Delphi panel. A priori thresholds for consensus were established before each Delphi round. All participants' responses were analysed from a quantitative and qualitative perspective to ascertain that no substantial discrepancies between the two approaches emerged.

DISCUSSION:

We present the initial step in developing a COS for NSLBP. The next step will be to determine which measurement instruments adequately cover the domains.

PMID: 25540987

POSTURE

Lordosis and C spine

Eur Spine J. 2015 Jan 9.

Cervical spine alignment following lumbar pedicle subtraction osteotomy for sagittal imbalance.

Obeid I¹, Boniello A, Boissiere L, Bourghli A, Pointillart V, Gille O, Lafage V, Vital JM.

Author information

Abstract

PURPOSE:

The alignment of the cervical spine is of primary importance to maintain horizontal gaze and contributes to the functional outcome of patients. Cervical spine alignment after correction of major sagittal imbalance has rarely been reported in the literature.

METHODS:

Retrospective review of 31 consecutive patients with sagittal plane deformities operated by lumbar pedicle subtraction osteotomy. Pre-operative and 3 months post-operative full-length radiographies were analyzed for spinopelvic and cervical-specific parameters.

RESULTS:

There was a significant increase in lumbar lordosis (LL), thoracic kyphosis, and sacral slope. There was also a significant decrease in pelvic tilt, pelvic incidence minus LL, knee flexion and

sagittal vertical axis. The cervical analysis revealed that there was no significant difference between pre- and post-operative global cervical lordosis (CL) angle and external auditory meatus (EAM) tilt. There was a significant decrease of C7 slope and distal CL, while a significant increase in occipito-C2 (OC2) angle was observed.

CONCLUSION:

LL restoration decreased the need of compensation at the pelvis and thoracic spine. The distal CL and C7 slope decreased because there was no need for compensation at this level after the surgery, but the proximal cervical spine takes a slightly flexed position to maintain horizontal sight. EAM tilt measures the head position toward C7, and is close to 0° even in severe cases. Changes of this parameter after surgery are insignificant, probably due to the balance between upper and lower cervical segments; when one of these segments shifts backward the other shifts forward and the result is a balanced head over C7.

PMID: 25572147

GAIT

Walking exercise and pain

Arch Phys Med Rehabil. 2014 Dec 18. pii: S0003-9993(14)01314-8. doi: 10.1016/j.apmr.2014.12.003.

Walking Exercise for Chronic Musculoskeletal Pain: Systematic Review and Meta-Analysis.

O'Connor SR¹, Tully MA², Ryan B³, Bleakley CM⁴, Baxter GD³, Bradley JM⁵, McDonough SM⁶.

Author information

Abstract

OBJECTIVE:

To systematically review the evidence examining effects of walking interventions on pain and self-reported function in individuals with chronic musculoskeletal pain.

DATA SOURCES:

Six electronic databases (Medline, CINAHL, PsychINFO, PEDro, Sport Discus and the Cochrane Central Register of Controlled Trials) were searched from January 1980 up to March 2014.

STUDY SELECTION:

Randomized and quasi-randomized controlled trials in adults with chronic low back pain, osteoarthritis or fibromyalgia comparing walking interventions to a non-exercise or non-walking exercise control group.

DATA EXTRACTION:

Data were independently extracted using a standardized form. Methodological quality was assessed using the United States Preventative Services Task Force (USPSTF) system.

DATA SYNTHESIS:

Twenty-six studies (2384 participants) were included and suitable data from 17 were pooled for meta-analysis with a random effects model used to calculate between group mean differences and 95% confidence intervals. Data were analyzed according to length of follow-up (short-term: ≤ 8 weeks post randomization; medium-term: > 2 months - 12 months; long-term: > 12 months). Interventions were associated with small to moderate improvements in pain at short (mean difference (MD) -5.31, 95% confidence interval (95% CI) -8.06 to -2.56) and medium-term follow-up (MD -7.92, 95% CI -12.37 to -3.48). Improvements in function were observed at short (MD -6.47, 95% CI -12.00 to -0.95), medium (MD -9.31, 95% CI -14.00 to -4.61) and long-term follow-up (MD -5.22, 95% CI 7.21 to -3.23).

CONCLUSIONS:

Evidence of fair methodological quality suggests that walking is associated with significant improvements in outcome compared to control interventions but longer-term effectiveness is uncertain. Using the USPSTF system, walking can be recommended as an effective form of exercise or activity for individuals with chronic musculoskeletal pain but should be supplemented with strategies aimed at maintaining participation. Further work is also required examining effects on important health related outcomes in this population in robustly designed studies.

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KEYWORDS:

Meta-analysis; chronic musculoskeletal pain; exercise; walking

PMID: 25529265

PAIN

Cortical inflammation and chronic pain

Imaging study finds first evidence of neuroinflammation in brains of chronic pain patients

Massachusetts General Hospital, 01/14/2015

A new study from Massachusetts General Hospital (MGH) investigators has found, for the first time, evidence of neuroinflammation in key regions of the brains of patients with chronic pain. By showing that levels of an inflammation-linked protein are elevated in regions known to be involved in the transmission of pain, the study published online in the journal *Brain* paves the way for the exploration of potential new treatment strategies and identifies a possible way around one of the most frustrating limitations in the study and treatment of chronic pain – the lack of an objective way to measure the presence or intensity of pain. “Finding increased levels of the translocator protein in regions like the thalamus – the brain’s sensory gateway for pain and other stimuli – is important, since we know that this protein is highly expressed in microglia and astrocytes, the immune cells of the central nervous system, when they are activated in response to some pathologic event,” says Marco Loggia, PhD, of the MGH-based Martinos Center for Biomedical Imaging, lead author of the report. Demonstrating glial activation in chronic pain suggests that these cells may be a therapeutic target, and the consistency with which we found

glial activation in chronic pain patients suggests that our results may be an important step towards developing biomarkers for pain conditions.”

FIBROMYALGIA

Management

Eur J Pain. 2014 Sep;18(8):1067-80. doi: 10.1002/ejp.564.

More ubiquitous effects from non-pharmacologic than from pharmacologic treatments for fibromyalgia syndrome: a meta-analysis examining six core symptoms.

Perrot S¹, Russell IJ.

Author information

Abstract

This study aimed to characterize and compare the efficacy profile on six fibromyalgia syndrome (FM) core symptoms associated with pharmacologic and non-pharmacologic treatments. We screened PubMed, Embase and the Cochrane Library for FM articles from 1990 to September 2012 to analyse randomized controlled trials comparing pharmacologic or non-pharmacologic treatments to placebo or sham. Papers including assessments of at least 2 of the 6 main FM symptom domains - pain, sleep disturbance, fatigue, affective symptoms (depression/anxiety), functional deficit and cognitive impairment - were selected for analysis. Studies exploring pharmacologic approaches (n = 21) were mainly dedicated to treating a small number of

dimensions, mostly pain. They were of good quality but were not prospectively designed to simultaneously document efficacy for the management of multiple core FM symptom domains. Only amitriptyline demonstrated a significant effect on as many as three core FM symptoms, but it exhibited many adverse effects and was subject to early tachyphylaxis. Studies involving non-pharmacologic approaches (n = 64) were typically of poorer quality but were more often dedicated to multidimensional targets. Pool therapy demonstrated significant effects on five symptom domains, repetitive transcranial magnetic stimulation on four domains, balneotherapy on three domains and exercise, cognitive behaviour therapy and massage on two domains each. Differences between pharmacologic and non-pharmacologic approaches may be related to different modes of action, tolerability profiles and study designs.

Very few drugs in well-designed clinical trials have demonstrated significant relief for multiple FM symptom domains, whereas non-pharmacologic treatments with weaker study designs have demonstrated multidimensional effects. Future therapeutic trials for FM should prospectively examine each of the core domains and should attempt to combine pharmacologic and non-pharmacologic therapies in well-designed clinical trials.

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PMID: 25139817

Transcranial Magnetic Electrical stim

Pain Pract. 2015 Jan 12. doi: 10.1111/papr.12276.

Repetitive Transcranial Magnetic Stimulation for Fibromyalgia: Systematic Review and Meta-Analysis.

Knijnik LM¹, Dussán-Sarria JA, Rozisky JR, Torres IL, Brunoni AR, Fregni F, Caumo W.

Author information

Abstract

BACKGROUND:

Fibromyalgia (FM) is a prevalent chronic pain syndrome with few effective therapeutic options available. Repetitive transcranial magnetic stimulation (rTMS) is an emerging therapeutic alternative for this condition; however, results have been mixed.

OBJECTIVES:

To evaluate the efficacy of rTMS on FM, a comprehensive systematic review and meta-analysis were performed.

METHODS:

Relevant published, English and Portuguese language, randomized clinical trials (RCT) comparing rTMS (irrespective of the stimulation protocol) to sham stimulation for treating FM pain intensity, depression, and/or quality of life (QoL) were identified, considering only those with low risk for bias. Trials available until April 2014 were searched through MEDLINE, EMBASE, the Cochrane Library Databases, and other 26 relevant medical databases covering from every continent. The outcomes for pain, depression, and QoL assessed closest to the 30th day after rTMS treatment were extracted, and changes from baseline were calculated to compare the effects of rTMS vs. placebo.

RESULTS:

One hundred and sixty-three articles were screened, and five with moderate to high quality were included. rTMS improved QoL with a moderate effect size (Pooled SMD = -0.472 95%CI = -0.80 to -0.14); it showed a trend toward reducing pain intensity (SMD = -0.64 95%CI = -0.31 to 0.017), but did not change depressive symptoms.

CONCLUSION:

In comparison with sham stimulation, rTMS demonstrated superior effect on the QoL of patients with FM 1 month after starting therapy. However, further studies are needed to determine optimal treatment protocols and to elucidate the mechanisms involved with this effect, which does not seem to be mediated by changes in depression, but that may involve pain modulation. Level of evidence 1b.

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KEYWORDS: *depression; fibromyalgia; meta-analysis; neuromodulation; pain; quality of life; repetitive transcranial magnetic stimulation*

PMID: 25581213

NUTRITION/VITAMINS

Meat and cancer

Int J Cancer. 2015 Jan 12. doi: 10.1002/ijc.29423.

Meat subtypes and their association with colorectal cancer: systematic review and meta-analysis.

Carr PR¹, Walter V, Brenner H, Hoffmeister M.

Author information

Abstract

Associations between specific red meat subtypes and risk of colorectal cancer (CRC) have been investigated in a number of epidemiological studies. However, no publication to date has summarised the overall epidemiological evidence. We conducted a systematic review and meta-analysis of prospective studies (cohort, nested case-control or case-cohort studies) which reported relative risk (RR) estimates and 95% confidence intervals (CI) for the association between intake

of meat subtypes with colorectal, colon or rectal cancer, or colorectal adenoma risk. PubMed and ISI Web of Science were searched up until 1 August 2014. Nineteen studies examined meat subtypes (5 beef, 5 pork, 2 lamb, 1 veal, 19 poultry) and associations with colorectal, colon or rectal cancer risk, and 4 studies examined associations with adenoma risk (1 beef, 4 poultry). Comparing highest versus lowest intake, beef consumption was associated with an increased risk of CRC (RR=1.11, 95% CI=1.01 to 1.22) and colon cancer (RR=1.24, 95% CI=1.07 to 1.44), but no association was found with rectal cancer (RR=0.95, 95% CI=0.78 to 1.16). Higher consumption of lamb was also associated with increased risk of CRC (RR=1.24, 95% CI=1.08 to 1.44).

No association was observed for pork (RR=1.07, 95% CI=0.90 to 1.27), but some between study heterogeneity was observed. No association was observed for poultry consumption and risk of colorectal adenomas or cancer. This meta-analysis suggests that red meat subtypes differ in their association with CRC and its sub sites. Further analysis of data from prospective cohort studies is warranted, especially regarding the role of pork. This article is protected by copyright. All rights reserved.

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KEYWORDS: *colorectal cancer; meat subtypes; meta-analysis; poultry; red meat*

PMID:25583132

Omega 3's and NSAIDS

J Gastroenterol. 2015 Jan 13.

Omega-3 polyunsaturated fatty acids as an angelus custos to rescue patients from NSAID-induced gastroduodenal damage.

Park JM¹, Han YM, Jeong M, Kim EH, Ko WJ, Cho JY, Hahm KB.

Author information

Abstract

Nonsteroidal anti-inflammatory drugs (NSAIDs) are one of the drug types frequently prescribed for their analgesic, anti-inflammatory, and antithrombotic actions, but carry a risk of major gastroduodenal damage from mild erosive changes to serious ulceration leading to fatal outcomes. From the long history of willow tree bark and its extracts being applied for the relief of pain and fever, the synthesis of acetylsalicylic acid, the development of selective cyclooxygenase 2 inhibitors (coxibs), and the identification of a G-protein-coupled receptor for prostaglandin, the popular combination regimen of an NSAID and a proton pump inhibitor was invented, but development was continued for further improvement. With regard to major NSAID

adverse effects, gastrointestinal (GI) and cardiovascular (CV) risks still remained as problems to be solved. In this review, it is shown that n-3 polyunsaturated fatty acid (PUFA) based NSAIDs can be an angelus custos, supported with facts that an intake of essential n-3 PUFAs orchestrates concerted protective actions against two notorious side effects of NSAIDs, the aforementioned GI risk and CV risk of NSAIDs.

Since pills containing n-3 PUFAs, omega-3-acid ethyl ester capsules (Lovaza, Omacor), have already been safely prescribed to prevent atherosclerosis through lessening lipid burdening, the introduction of a drug delivery system such as a gastroretentive form of n-3 PUFA based NSAIDs will highlight newer hope for GI safety under the guarantee of reduced CV risk. Because n-3 PUFAs have been proven to attenuate cytotoxicity, inhibit lipid-raft-associated harmful signaling, and relieve oxidative stress relevant to NSAIDs, n-3 PUFA based NSAIDs will be next-generation GI-safe NSAIDs.

PMID: 25578017

Soy and infant health

Fertil Steril. 2015 Jan 7. pii: S0015-0282(14)02529-1. doi: 10.1016/j.fertnstert.2014.12.104.

Soy food intake and treatment outcomes of women undergoing assisted reproductive technology.

Vanegas JC¹, Afeiche MC², Gaskins AJ³, Mínguez-Alarcón L², Williams PL⁴, Wright DL⁵, Toth TL⁵, Hauser R⁶, Chavarro JE⁷.

Author information

Abstract

OBJECTIVE:

To study the relation of dietary phytoestrogens intake and clinical outcomes of women undergoing infertility treatment with the use of assisted reproductive technology (ART).

DESIGN:

Prospective cohort study.

Abstracts: January 12, 2015

SETTING:

Fertility center.

PATIENT(S):

A total of 315 women who collectively underwent 520 ART cycles from 2007 to 2013.

INTERVENTION(S):

None.

MAIN OUTCOME MEASURE(S):

Implantation, clinical pregnancy, and live birth rates per initiated cycle.

RESULT(S):

Soy isoflavones intake was positively related to live birth rates in ART. Compared with women who did not consume soy isoflavones, the multivariable-adjusted odds ratios of live birth (95% confidence interval) for women in increasing categories of soy isoflavones intake were 1.32 (0.76-2.27) for women consuming 0.54-2.63 mg/d, 1.87 (1.12-3.14) for women consuming 2.64-7.55 mg/d, and 1.77 (1.03-3.03) for women consuming 7.56-27.89 mg/d.

CONCLUSION(S):

Dietary soy intake was positively related to the probability of having a live birth during infertility treatment with ART.

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KEYWORDS: *Cohort studies; assisted reproductive techniques; isoflavones; phytoestrogens; soy foods*

PMID: 25577465

Vit. D and RA

Am J Med Sci. 2015 Jan;349(1):46-9. doi: 10.1097/MAJ.0000000000000340.

Vitamin d serum level, disease activity and functional ability in different rheumatic patients.

Grazio S¹, Naglić DB, Anić B, Grubišić F, Bobek D, Bakula M, Kavanagh HS, Kuna AT, Cvijetić S.

Author information

Abstract

BACKGROUND:

The aim of the study was to determine the serum vitamin D levels in patients with psoriatic arthritis (PsA) and compare it with patients with rheumatoid arthritis (RA) and with osteoarthritis (OA), as well as to explore the relationship of the vitamin D level with indices of disease activity and functional ability in a real-life setting in a South-European country.

METHODS:

In a cross-sectional study, 120 adult patients with established diagnosis of PsA, RA and OA were consecutively enrolled. Serum 25-hydroxyvitamin D and intact parathyroid hormone were determined. Parameters of disease activity and functional ability were obtained using standard instruments.

RESULTS:

Serum vitamin D insufficiency (≤ 75 nmol/L) was found in 74% of patients with PsA, 94% patients with RA and 97% of patients with OA, whereas vitamin D deficiency (≤ 25 nmol/L) was found in 13% of patients with PsA, 39% of patients with RA and in 38% of patients with OA. Compared with RA, patients with PsA had significantly higher serum vitamin D ($P = 0.002$), and when controlling for age and gender, their serum vitamin D level was significantly associated with disease activity and functional activity.

CONCLUSIONS:

In the group of rheumatic patients, a high prevalence of serum vitamin D insufficiency/deficiency was found regardless of the type of arthritis. Patients with PsA might have higher levels of vitamin D than patients with RA, and this was associated with disease activity and functional ability. The results of this study indicate that prophylactic supplementation with vitamin D might be recommended for all rheumatic patients.

PMID: 25310509