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LUMBAR SPINE

Use of US to detect sciatic swelling

Neuromuscular ultrasound imaging in low back pain patients with radiculopathy

Manual Therapy , 05/22/2015 Frost LR, et al.

Abstract

Background

Patients suffering from chronic low back pain with associated radiculopathy (LBP-R), or sciatica, experience neuromuscular symptoms in the lower back and leg; however, research to date has focussed solely on the lower back.

Objectives

To expand neuromuscular research of LBP-R patients into the lower limb, using ultrasound imaging.

Design

Case control study comparing LBP-R patients to matched healthy controls.

Methods

LBP-R patients with disc bulge or herniation (L3/L4 to L5/S1) resulting in unilateral radiculopathy (n = 17) and healthy matched controls (n = 17) were recruited. High-resolution ultrasound imaging was used to investigate sciatic nerve structure, as well as the quality (relative magnitude of fat/fibrosis infiltration) and contraction (muscle thickening) of associated musculature in the lower back (paraspinals) and lower limb (biceps femoris, gastrocnemius, soleus).

Results

LBP-R patients had swollen sciatic nerves (increased cross sectional area), but this was not associated with evidence of reduced lower limb muscle quality. As compared to controls, LBP-R patients demonstrated less soleus muscle thickening during submaximal contraction; however, there were no impairments in the hamstring or lower back musculature.

Conclusions

Ultrasound imaging was an effective method to detect sciatic nerve swelling in mild to moderately affected LBP-R patients. Nerve swelling was not associated with poorer muscle quality, nor consistently impaired muscle contraction.

LBP

Classification system

Pain Physician, 05/22/2015

Low Back Pain: Guidelines for the Clinical Classification of Predominant Neuropathic, Nociceptive, or Central Sensitization Pain

Comprehensive Review

Jo Nijs, PhD, Adri Apeldoorn, PhD, Hank Hallegraeff, PhD, Jacqui Clark, MSc, PT, Rob Smeets, MD, PhD, Annaleen Malfliet, MSc, PT, Enrique L. Girbes, MSc, PT, Margot De Kooning, MSc, and Kelly Ickmans, PhD

BACKGROUND: Low back pain (LBP) is a heterogeneous disorder including patients with dominant nociceptive (e.g., myofascial low back pain), neuropathic (e.g., lumbar radiculopathy), and central sensitization pain. In order to select an effective and preferably also efficient treatment in daily clinical practice, LBP patients should be classified clinically as either predominantly nociceptive, neuropathic, or central sensitization pain.

OBJECTIVE: To explain how clinicians can differentiate between nociceptive, neuropathic, and central sensitization pain in patients with LBP. **STUDY DESIGN:** Narrative review and expert opinion **SETTING:** Universities, university hospitals and private practices

METHODS: Recently, a clinical method for the classification of central sensitization pain versus neuropathic and nociceptive pain was developed. It is based on a body of evidence of original research papers and expert opinion of 18 pain experts from 7 different countries. Here we apply this classification algorithm to the LBP population.

RESULTS: The first step implies examining the presence of neuropathic low back pain. Next, the differential diagnosis between predominant nociceptive and central sensitization pain is done using a clinical algorithm.

LIMITATIONS: The classification criteria are substantiated by several original research findings including a Delphi survey, a study of a large group of LBP patients, and validation studies of the Central Sensitization Inventory. Nevertheless, these criteria require validation in clinical settings.

CONCLUSION: The pain classification system for LBP should be an addition to available classification systems and diagnostic procedures for LBP, as it is focussed on pain mechanisms solely.

Depression and developing LBP

Arthritis Care Res (Hoboken). 2015 May 18. doi: 10.1002/acr.22619.

Symptoms of depression and risk of new episodes of low back pain. A systematic review and meta-analysis.

Pinheiro MB^{1,2}, Ferreira ML^{3,2}, Refshauge K^{1,2}, Ordoñana JR^{4,2}, Machado GC^{3,2}, Prado LR^{1,5,2}, Maher CG^{3,2}, Ferreira PH^{1,2}.

Author information

Abstract

OBJECTIVE:

To investigate the contribution of symptoms of depression to future episodes of low back pain (LBP).

METHODS:

A search was conducted of AMED, CINAHL, EMBASE, H&S, LILACS, MEDLINE, PsycINFO, Scopus, and Web of Science databases. We included cohort studies investigating the effect of symptoms of depression on the development of new episodes of LBP, either lifetime incidence or a recurrent episode, in a population free of LBP at baseline. We accepted the original study's definition for a new episode of LBP and for classifying patients as LBP-free at study entry. Two independent investigators extracted data and assessed methodological quality. Meta-analyses with random effects were used to pool risk estimates.

RESULTS:

We included 19 studies with 11 incorporated in the meta-analyses. Overall pooled results showed that symptoms of depression increased the risk of developing LBP (OR=1.59; 95%CI: 1.26-2.01). The risk was similar in studies that used the diagnostic interview method (OR=1.66; 95%CI: 1.14-2.42) and in studies using self-report screening questionnaires (OR=1.68; 95%CI: 1.05-2.70). No statistically significant relationship was observed when we pooled studies that employed non-specific screening questionnaires (OR=1.17; 95%CI: 0.48-2.87). Three studies provided results in incremental categories of symptoms of depression and the pooled OR for the most severe level of depression (OR=2.51; 95%CI: 1.58-3.99) was higher than for the lowest level (OR=1.51; 95%CI: 0.89-2.56).

CONCLUSIONS:

Individuals with symptoms of depression have an increased risk of developing an episode of LBP in the future with the risk being higher in patients with more severe levels of depression. This article is protected by copyright. All rights reserved.

© 2015, American College of Rheumatology. **KEYWORDS:** Depression; Low back pain; Meta-analysis; Risk factor; Systematic Review PMID:25989342

Depression and LBP

Eur Spine J. 2015 Apr 28.

Core Outcome Measure Index for low back patients: do we miss anxiety and depression?

Cedraschi C¹, Marty M, Courvoisier DS, Foltz V, Mahieu G, Demoulin C, Gierasimowicz Fontana A, Norberg M, de Goumoëns P, Rozenberg S, Genevay S; Section Rachis de la Société Française de Rhumatologie.

Author information

Abstract

PURPOSE:

The Core Outcome Measure Index (COMI) is a multidimensional questionnaire that investigates five dimensions in low back pain (LBP) patients, but does not address the psychological dimension. As the biopsychosocial perspective is recognized as important to capture the entire clinical picture of these patients, this multicenter prospective cohort study was designed to investigate the psychometric properties of a modified version of the COMI (COMI_{AD}) which included 2 additional items, exploring anxiety and depression, respectively.

METHODS:

168 subacute or chronic LBP patients recruited in spine clinics completed a set of questionnaires before and after treatment (follow-up at 6 months). Construct validity was explored by comparing each item of the COMI_{AD} to validated full-length questionnaires. Thus two additional questionnaires were included to assess the construct validity of the anxiety and depression measures. The psychometric properties of the COMI and COMI_{AD} were then compared.

RESULTS:

The two new items showed good internal consistency, high correlations with the corresponding full-length questionnaires, no floor or ceiling effect and good reproducibility (test-retest agreement kappa 0.68 for anxiety, 0.62 for depression). The addition of the 2 items did not alter internal validity (Cronbach's alpha = 0.88 and 0.87, respectively). The smallest detectable difference, the Minimal Clinically Important Improvement and the Patient Acceptable Symptom State were only minimally affected by the changes.

CONCLUSION:

The questions exploring anxiety and depression have good intrinsic and psychometric capacities (i.e., no floor or ceiling effects and high correlations with full-length scales) and did not significantly modify the psychometrics of the original COMI questionnaire. The COMI_{AD} offers the possibility to include the psychological dimension in the multidimensional evaluation without significantly affecting questionnaire length.

PMID: 25917823

Auricular acupressure

Pain Med. 2015 May 19. doi: 10.1111/pme.12789.

Day-to-Day Changes of Auricular Point Acupressure to Manage Chronic Low Back Pain: A 29-day Randomized Controlled Study.

Yeh CH¹, Kwai-Ping Suen L², Chien LC³, Margolis L¹, Liang Z¹, Glick RM^{4,5,6}, Morone NE⁷.

Author information

Abstract

OBJECTIVE:

The purpose of this study was to determine the effects of a 4-week auricular point acupressure (APA) treatment on chronic low back pain (CLBP) outcomes and examine the day-to-day variability of CLBP in individuals receiving APA for CLBP over 29 days.

DESIGN:

This was a prospective, randomized controlled trial (RCT). Data were collected at baseline, during each of the four office visits for APA treatment, after the completion of the 4-week intervention, and 1 month after the last treatment. A daily diary was given to each participant to record his or her APA practices, analgesic use, and pain intensity.

INTERVENTIONS:

APA was used to manage CLBP. The participants received one APA treatment per week for 4 weeks.

PATIENTS AND SETTING:

Sixty-one participants with CLBP were randomized into either a real APA or sham APA treatment group. Participants were recruited from primary care offices and clinics or through the Research Participant Registry at the University of Pittsburgh.

RESULTS:

Among participants in the real APA group, a 30% reduction of worst pain was exhibited after the first day of APA treatment, and continuous reduction in pain (44%) was reported by the completion of the 4-week APA. This magnitude of pain reduction reached the clinically significant level of improvement reported in other clinical trials of chronic pain therapies. Analgesic use by participants in the real APA group also was reduced compared with use by participants in the sham group.

CONCLUSION:

This study shows that APA is a promising pain management strategy that is not invasive and can be self-managed by participants for CLBP. Given the day-to-day fluctuation in ratings, the tighter ecologic assessment of pain scores and other treatment parameters are an important pragmatic aspect of the design of chronic pain studies.

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KEYWORDS:

Analgesic Use; Auricular Point Acupressure; Chronic Low Back Pain; Pain Intensity

PMID: 25988270

Alternative approached to LBP

Spine J. 2015 May 8. pii: S1529-9430(15)00465-9. doi: 10.1016/j.spinee.2015.04.049.

An integrative review of complementary and alternative medicine use for back pain: A focus on prevalence, reasons for use, influential factors, self-perceived effectiveness and communication.

Murthy V¹, Sibbritt D¹, Adams J².

BACKGROUND CONTEXT:

Back pain is the most prevalent of musculoskeletal conditions and back pain sufferers have been identified as high users of Complementary and Alternative Medicine (CAM). Despite lacking evidence, CAM treatments (e.g. acupuncture, chiropractic, massage) and CAM products (e.g. vitamins, supplements, aromatherapy oils) for back pain care has become widely available internationally and CAM use by back pain sufferers has become a significant health services issue. However, to date there has been no integrative review on CAM use for back pain.

PURPOSE:

This study aims to conduct an integrative review on complementary and alternative medicine (CAM) use for back pain focusing on prevalence of use, commonly used CAM, characteristics of users, factors influencing decision-making, self-perceived effectiveness and communication with healthcare providers.

STUDY DESIGN/SETTING:

Integrative literature review **METHODS:** A comprehensive search of international literature from 2000 to 2014 in MEDLINE, CINHAI, AMED, DARE, EMBASE, ExcerptaMedica, psycINFO and SCOPUS databases was conducted. The search was limited to peer-reviewed articles published in English language and reporting empirical research findings on CAM use for back pain.

RESULTS:

The review reveals a considerable variation in prevalences of CAM use for back pain internationally. Acupuncture, chiropractic, osteopathy and massage therapy are the commonly used CAM treatments besides a range of self-prescribed CAM and back pain sufferers use CAM alongside conventional medical treatments. Female gender, chronicity of back pain and prior exposure to CAM are key predictors of CAM use for back pain as highlighted from the reviewed literature. Family, friends and recommendation by doctors appear to influence decision-making on CAM use for back pain. The review reveals that users of CAM for back pain tend to report CAM as beneficial but there is little knowledge on communication between CAM users with back pain and health care providers about such use. Existing literature is largely based on research investigating CAM use for back pain amongst a range of other health conditions. Further rigorous research is needed to investigate the use of a wider range of CAM treatments, particularly, self-prescribed CAM for back pain.

CONCLUSIONS:

The review findings provide insights for health care providers and policy makers on the range of CAM treatments used by back pain sufferers. Conventional medical practitioners and CAM practitioners should be aware of back pain sufferers' decision-making regarding a range of CAM treatments and be prepared to communicate with patients on safe and effective CAM treatments for back pain.

Copyright © 2015 Elsevier Inc. All rights reserved. **KEYWORDS:** Complementary and alternative medicine; back pain; review PMID: 25962340

Cognitive behavior therapy

Spine (Phila Pa 1976). 2015 May 15;40(10):725-33. doi: 10.1097/BRS.0000000000000830.

Cost-utility of cognitive behavioral therapy for low back pain from the commercial payer perspective.

Norton G¹, McDonough CM, Cabral H, Shwartz M, Burgess JF.

Author information

Abstract

STUDY DESIGN:

Markov cost-utility model.

OBJECTIVE:

To evaluate the cost-utility of cognitive behavioral therapy (CBT) for the treatment of persistent nonspecific low back pain (LBP) from the perspective of US commercial payers.

SUMMARY OF BACKGROUND DATA:

CBT is widely deemed clinically effective for LBP treatment. The evidence is suggestive of cost-effectiveness.

METHODS:

We constructed and validated a Markov intention-to-treat model to estimate the cost-utility of CBT, with 1-year and 10-year time horizons. We applied likelihood of improvement and utilities from a randomized controlled trial assessing CBT to treat LBP. The trial randomized subjects to treatment but subjects freely sought health care services. We derived the cost of equivalent rates and types of services from US commercial claims for LBP for a similar population. For the 10-year estimates, we derived recurrence rates from the literature. The base case included medical and pharmaceutical services and assumed gradual loss of skill in applying CBT techniques. Sensitivity analyses assessed the distribution of service utilization, utility values, and rate of LBP recurrence. We compared health plan designs. Results are based on 5000 iterations of each model and expressed as an incremental cost per quality-adjusted life-year.

RESULTS:

The incremental cost-utility of CBT was \$7197 per quality-adjusted life-year in the first year and \$5855 per quality-adjusted life-year over 10 years. The results are robust across numerous sensitivity analyses. No change of parameter estimate resulted in a difference of more than 7% from the base case for either time horizon. Including chiropractic and/or acupuncture care did not substantively affect cost-effectiveness. The model with medical but no pharmaceutical costs was more cost-effective (\$5238 for 1 yr and \$3849 for 10 yr).

CONCLUSION:

CBT is a cost-effective approach to manage chronic LBP among commercial health plans members. Cost-effectiveness is demonstrated for multiple plan designs.

LEVEL OF EVIDENCE: 2.

PMID: 25950282

Disability benefits and LBP

Occup Med (Lond). 2015 Jun;65(4):309-16. doi: 10.1093/occmed/kqv012. Epub 2015 Mar 9.

Disability and disability benefit seeking in chronic low back pain.

Gebauer S¹, Scherrer JF², Salas J¹, Burge S³, Schneider FD¹; Residency Research Network of Texas Investigators.

Author information

Abstract

BACKGROUND:

Numerous studies suggest psychosocial factors contribute to functional disability in patients with chronic low back pain (CLBP). However, less is known about the association of psychosocial factors, such as depression, with seeking medical disability benefits and their prevalence in benefit seekers compared with patients already receiving such payments.

AIMS:

To determine if characteristics of disability benefit seekers differ from patients receiving disability benefits and if both differ from patients not dependent on such payments.

METHODS:

Questionnaire data on pain, health-related quality of life, depression, social support, substance abuse, adverse childhood experiences and disability seeking were obtained from CLBP respondents recruited at 10 primary care clinics throughout Texas. A multinomial logistic regression model was computed using variables significantly associated with disability status and pain severity in univariate models.

RESULTS:

There were 213 participants. In full models, compared with those not on disability benefits, only depression symptoms were significantly associated with seeking disability benefits (odds ratio [OR] = 1.13; 95% confidence interval [CI] 1.01-1.26) and only duration of pain was significantly associated with being on such benefits (OR = 1.05; 95% CI 1.01-1.09).

CONCLUSIONS:

Patient characteristics differ between disability benefit seekers and those established on disability benefit payments. Depression may be a modifiable correlate of disability benefit seeking that if treated may reduce the number of patients who eventually come to depend on disability benefits. Additional data collection involving other pain syndromes is warranted to determine if these results are unique to CLBP or apply to other painful conditions.

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KEYWORDS:

Depression; disability; disability benefits; insurance; low back pain; mental ill-health.

PMID: 25754977

DISC**Segmental motions**

Eur Spine J. 2015 Apr 29. [Epub ahead of print]

Kinetic magnetic resonance imaging analysis of lumbar segmental motion at levels adjacent to disc herniation.

Lao L¹, Daubs MD, Takahashi S, Lord EL, Cohen JR, Zhong G, Wang JC.

Author information

Abstract

PURPOSE:

A retrospective radiographic study was carried out to analyze the effect of lumbar disc herniation on the kinetic motion of adjacent segments.

METHODS:

A total of 162 patients with low back pain or radicular pain in the lower limbs without a prior history of surgery were evaluated using kinetic magnetic resonance imaging. Translational motion, angular variation, and disc height were measured at each segment from L1-L2 to L5-S1. Other factors including the degree of disc degeneration, age, gender, and vertebral segment location were analyzed to determine any predisposing risk factors for segmental instability adjacent to disc herniations.

RESULTS:

Spinal levels above the disc herniation exhibited, on average, a 6.4 % increase in translational motion per mm of disc herniation ($P = 0.496$) and a 21.4 % increase in angular motion per mm herniation ($P = 0.447$). Levels below the herniation demonstrated a 5.2 % increase in translational motion per mm of disc herniation ($P = 0.428$) and a decrease of 10.7 % in angular motion per mm ($P = 0.726$). The degree of disc degeneration had no significant correlation with adjacent level motion. Similarly, disc herniation was not significantly correlated with disc height at adjacent levels, although there was a significant relationship between gender and adjacent segment disc height.

CONCLUSIONS:

Although disc height, translational motion, and angular variation are significantly affected at the level of a disc herniation, no significant changes are apparent in adjacent segments. Our results indicate that herniated discs have no effect on range of motion at adjacent levels regardless of the degree of disc degeneration or the size of disc herniation, suggesting that the natural progression of disc degeneration and adjacent segment disease may be separate, unrelated processes within the lumbar spine.

PMID: 25921654

INJECTIONS

Epidurals

Effectiveness of Parasagittal Interlaminar Epidural Local Anesthetic with or without Steroid in Chronic Lumbosacral Pain: A Randomized, Double-Blind Clinical Trial

Randomized Trial Pain Physician, 05/22/2015

Babita Ghai, MD, Kushal Kumar, MD, Dipika Bansal, MD, Saravdeep S Dhatt, MS, Raju Kanukula, MPharma, and Yatindra K Batra, MD

BACKGROUND: Epidural injections (EI) are the most commonly performed minimally invasive intervention to manage chronic low back pain (CLBP) with lumbosacral radicular pain (LRP). Local anesthetic (LA) and/or steroids are frequently used injectates for EI and are reported with variable effectiveness. The majority of earlier studies have used either caudal, transforaminal (TF), or undefined interlaminar approaches for EI. The parasagittal interlaminar (PIL) approach route is reported to have good ventral epidural spread and comparable effectiveness to the TF route. However, there is a lack of head-to-head comparative effectiveness research of LA with or without steroid for managing CLBP with LRP using a PIL approach. **OBJECTIVE:** To compare the effectiveness of EI of LA alone and LA with steroid using a PIL approach for managing CLBP with LRP. **STUDY DESIGN:** Randomized, double blind, active control one year follow-up study. **SETTING:** Interventional pain management clinic in a tertiary care center in India. **METHODS:** Sixty-nine patients were randomized to receive fluoroscopic guided EI of either 8 mL of 0.5% lidocaine (group L, n = 34) or 6 mL of 0.5% lidocaine mixed with 80 mg (2 mL) of methylprednisolone acetate (group LS, n = 35). Patients were evaluated for pain intensity using 0 – 10 numerical rating scale (NRS) and functional disability using Modified Oswestry Disability Questionnaire (MODQ) at baseline; and 2 weeks, one, 2, 3, 6, 9, and 12 months after injection. Patients with inefficacy with the initial injection or response deterioration received an additional injection of the same injectate and dose. Patients were evaluated for achieving effective pain relief (EPR, i.e., = 50% from baseline), overall NRS and MODQ, number of injections, and presence of ventral and perineural spread over one year follow-up. Primary outcome was proportion of patients achieving EPR at 3 months. **RESULTS:** A significantly higher proportion of patients achieved EPR at 3 months in group LS [30 (86%, 90% CI 73% – 93%)] as compared to group L [17 (50%, 90% CI 36% – 64%)] (P = 0.02). Similar results were obtained at 6, 9, and 12 months, respectively. The probability of achieving EPR was significantly higher in group LS at various time-points during the one year follow-up as compared to group L (P = 0.01). A significant reduction in NRS and improvement in MODQ were observed at all time-points post-intervention compared to baseline (P < 0.001) in both groups. NRS and MODQ scores were significantly lower in group LS as compared to group L at all time intervals post baseline. On average patients in group L received 2.0 (0.85) and group LS received 1.7 (0.71) injections annually (P = 0.07). Ventral epidural spread was comparable in both groups (97%). No major complications were encountered in either group; however, intravascular spread of contrast was noted during 2 injections (one in each group) requiring relocation. **LIMITATIONS:** A single center study, lack of documentation of adjuvant therapies like individual analgesic medication, and lack of placebo group.

CONCLUSIONS: Using a PIL approach and the addition of steroid to LA for EI may provide superior effectiveness in terms of extent and duration of pain relief for managing CLBP with unilateral LRP, even though, local anesthetic alone also was effective. Trial registration:

CTRI/2014/04/004572

SURGERY

Cognitive behavioral therapy preoperative – no benefits

Spine (Phila Pa 1976). 2015 Feb 19.

Does a Preoperative Cognitive-behavioural Intervention affect disability, pain behaviour, pain and return to work the first year after Lumbar Spinal Fusion Surgery?

Rolving N¹, Nielsen CV, Christensen FB, Holm R, Bünger CE, Oestergaard LG.

Author information

Abstract

Study Design. A randomized clinical trial including 90 patients.

Objective. To examine the effect of a preoperative cognitive-behavioural intervention (CBT) for patients undergoing lumbar spinal fusion surgery (LSF)

Summary of Background Data. Few published studies have looked at the potential of rehabilitation to improve outcomes following LSF. Rehabilitation programmes using CBT are recommended. Further, initiating interventions preoperatively seems beneficial, but only limited data exists in the field of spine surgery.

Methods. Patients with degenerative disc disease or spondylolisthesis undergoing LSF were randomized to usual care (control group) or preoperative CBT and usual care (CBT group). Primary outcome was change in Oswestry Disability Index (ODI) from baseline to 1-year follow-up. Secondary outcomes were catastrophizing, fear-avoidance belief, work status and back and leg pain.

Results. At 1-year follow-up there was no statistically significant difference between the CBT group and the control group in ODI score ($P = 0.082$). However, the CBT group had achieved a significant reduction of -15 points (-26;-4) already at 3 months (between group difference $P = 0.003$) and this reduction was maintained throughout the year. There were no differences between groups at 1-year follow-up with regards to any of the secondary outcomes.

Conclusions. Participating in a preoperative CBT intervention in addition to usual care did not produce better outcomes at 1-year follow-up for patients undergoing LSF. Although the reduction in disability was achieved much faster in the CBT group, resulting in a significant difference between groups already three months after surgery, it did not translate into a faster return to work. Our findings support the need for further research into the use of targeted rehabilitation interventions among patients with elevated levels of catastrophizing and fear avoidance beliefs.

PMID: 25705964

PELVIC ORGANS

Sexual function following delivery and C section

Depressive symptoms, pain, and sexual dysfunction over the first year following vaginal or cesarean delivery: A prospective longitudinal study

International Journal of Nursing Studies,

05/20/2015 Chang SR, et al.

The authors examined the associations between vaginal and cesarean delivery and depressive symptoms, pain, and sexual function during the 1-year postpartum period. Cesarean delivery was associated with an increased prevalence of depressive symptoms at 3 months and higher pain levels that persisted at 6 months postpartum in Taiwan. They found no difference in sexual function between vaginal and cesarean delivery after 6 weeks postpartum, and no differences in the trends related to depressive symptoms or in sexual functioning (except for desire) within 1 year postpartum.

Methods

- A prospective, five-time-point longitudinal study.
- Maternity unit at a medical center.
- A total of 351 of 736 women completed a questionnaire that described demographic characteristics, depressive symptoms, and pain levels at 3–5 days postpartum, and updated personal data, depressive symptoms, pain levels, and sexual function at 4–6 weeks and at 3, 6, and 12 months after delivery.
- Differences between the vaginal and cesarean groups in depressive symptoms, pain, and sexual function and trends of changes in these factors over the first postpartum year were examined.

Results

- Compared with the vaginal birth group, the cesarean birth group had a significantly higher prevalence of depressive symptoms at 3 months ($p = 0.03$); higher scores for non-localized pain at 3–5 days ($p < 0.001$), 4–6 weeks ($p = 0.03$), and 3 months ($p = 0.046$); higher scores for abdominal pain at 3–5 days ($p < 0.001$), 4–6 weeks ($p < 0.001$), and 6 months ($p = 0.01$); lower perineal pain scores at 3–5 days ($p < 0.001$); and higher sexual desire scores ($p = 0.04$) but lower sexual satisfaction scores ($p = 0.02$) at 4–6 weeks.
- Differences between the vaginal and cesarean groups were significant ($p = 0.01$, $p = 0.049$, respectively) in terms of the decrease in non-localized pain from 3–5 days to 4–6 weeks postpartum and the increase in sexual desire from 4–6 weeks to 3 months postpartum.

Chronic pain

Arch Womens Ment Health. 2015 May 5.

When treating the pain is not enough: a multidisciplinary approach for chronic pelvic pain.

Miller-Matero LR¹, Saulino C, Clark S, Bugenski M, Eshelman A, Eisenstein D.

Author information

Abstract

Chronic pelvic pain (CPP) is related to psychological distress and interference in daily activities; however, CPP is not as extensively researched as other forms of chronic pain. Therefore, the purpose of this study was to investigate the relationships among pain, psychological distress, and functional impairment in patients with CPP. There were chart reviews conducted of 107 female patients who completed a psychiatric evaluation at a specialty, CPP clinic as a part of a multidisciplinary evaluation. Results suggest that psychological distress and impairment in daily activities are common in CPP patients. Most areas of functional impairment were not associated with pain variables. Rather, several forms of functional impairment were related to higher levels of depression and anxiety.

Results from this study suggest the possibility that psychiatric symptoms are contributing to functional impairment in this population. These findings highlight the importance of a multidisciplinary approach in the evaluation and treatment of CPP patients to help decrease functional impairment in these patients.

PMID: 25941014

VISCERA

Impact of constipation

J Gastroenterol Hepatol. 2015 May 13. doi: 10.1111/jgh.13011.

Constipation prophylaxis reduces length of stay in elderly hospitalized heart failure patients with home laxative use.

Staller K^{1,2}, Khalili H^{1,2}, Kuo B^{1,2}.

Author information

Abstract

BACKGROUND AND AIM:

Elderly, hospitalized patients suffer disproportionately from constipation, however little data suggests that constipation prophylaxis reduces length of stay (LOS). We performed a retrospective analysis of elderly patients admitted to our hospital with congestive heart failure (CHF) to determine the effects of constipation prophylaxis on LOS.

METHODS:

Patients ≥ 65 years old admitted with the diagnosis of CHF in 2012 were evaluated for home and hospital laxative use on admission. Our primary outcome was LOS. We used linear regression modeling to independently evaluate the impact of constipation prophylaxis on LOS.

RESULTS:

Among 618 patients who were eligible for our study, 201 (32.5%) were using laxatives at home whereas 254 (41.1%) were started on a prophylactic laxative on admission. There was no significant difference in LOS between patients receiving prophylaxis vs. those that did not ($P=0.32$). Patients with home laxative use had a 1 day longer LOS compared to those without laxative use (6 vs. 5, $P=0.03$). Among patients with home laxative use, there was 2 day longer LOS in those who were not given constipation prophylaxis on admission (8 vs. 6, $P=0.002$). After multivariate adjustment, failure to use constipation prophylaxis in patients with home laxative use was the only independent predictor of increased LOS ($P=0.03$).

CONCLUSIONS:

Among elderly patients admitted for CHF exacerbations, failure to use constipation prophylaxis in patients with home laxative use is associated with a significantly-longer LOS. Our data suggest that routine use of bowel prophylaxis for elderly CHF patients with preexisting constipation may reduce LOS.

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KEYWORDS:

bowel protocols; congestive heart failure; constipation; hospitalization; laxatives

PMID: 25969162

Seasonal impact on Crohns disease

Int J Colorectal Dis. 2015 May 15.

Seasonal variation in onset and relapse of IBD and a model to predict the frequency of onset, relapse, and severity of IBD based on artificial neural network.

Peng JC¹, Ran ZH, Shen J.

Author information

Abstract

BACKGROUND:

Previous research has yielded conflicting data as to whether the natural history of inflammatory bowel disease follows a seasonal pattern. The purpose of this study was (1) to determine whether the frequency of onset and relapse of inflammatory bowel disease follows a seasonal pattern and (2) to establish a model to predict the frequency of onset, relapse, and severity of inflammatory bowel disease (IBD) with meteorological data based on artificial neural network (ANN).

METHOD:

Patients with diagnosis of ulcerative colitis (UC) or Crohn's disease (CD) between 2003 and 2011 were investigated according to the occurrence of onset and flares of symptoms. The expected onset or relapse was calculated on a monthly basis over the study period. For artificial neural network (ANN), patients from 2003 to 2010 were assigned as training cohort and patients in 2011 were assigned as validation cohort. Mean square error (MSE) and mean absolute percentage error (MAPE) were used to evaluate the predictive accuracy.

RESULTS:

We found no seasonal pattern of onset ($P = 0.248$) and relapse ($P = 0.394$) among UC patients. But, the onset ($P = 0.015$) and relapse ($P = 0.004$) of CD were associated with seasonal pattern, with a peak in July and August. ANN had average accuracy to predict the frequency of onset (MSE = 0.076, MAPE = 37.58 %) and severity of IBD (MSE = 0.065, MAPE = 42.15 %) but high accuracy in predicting the frequency of relapse of IBD (MSE = 0.009, MAPE = 17.1 %).

CONCLUSION:

The frequency of onset and relapse in IBD showed seasonality only in CD, with a peak in July and August, but not in UC. ANN may have its value in predicting the frequency of relapse among patients with IBD.

PMID: 25976931

Constipation

Relamorelin relieves constipation and accelerates colonic transit in a phase 2, placebo-controlled, randomized trial

Clinical Gastroenterology and Hepatology , 05/21/2015 Acosta A, et al.

The authors aimed to evaluate effects of relamorelin on bowel movements (BM) and gastrointestinal and colonic transit (CT) in patients with chronic constipation. Relamorelin acts in the colon to significantly reduce symptoms of constipation and accelerate CT in patients with chronic constipation, compared with placebo.

Methods

- The authors performed study of 48 female patients with chronic constipation who fulfilled Rome III criteria and had 4 or less spontaneous BMs (SBMs)/week.
- In a randomized (1:1), double-blind, parallel-group, placebo-controlled trial, the effects of relamorelin (100 µg, given subcutaneously daily) were tested during 14 days after a 14-day baseline, single-blind phase in which patients were given placebo at 2 Mayo Clinic sites.
- Participants were a mean age of 40.6±1.5y, with a mean body mass index of 25.7±0.6 kg/m², 1.7±0.1 SBM/week, and mean stool consistency of 1.2±0.1 on the Bristol scale during this baseline period.
- The effect of treatment on transit was measured in 24 participants with colonic transit <2.4 (geometric center at 24 hrs) during the baseline period.
- Gastric emptying (GE), small bowel transit, and colonic transit (CT) were measured during the last 2 days that patients received relamorelin or placebo.
- Bowel function was determined from daily diaries kept by patients from days 1 through 28.
- Study endpoints were time to first BM, SBMs/week, complete SBMs/week, stool form, and ease of stool passage.
- Effects of relamorelin were assessed by analysis of covariance.

Results

- Compared to placebo, relamorelin accelerated GE T ½ (P=.027), SBT (P=.051), and CT at 32 hrs (P=.040) and 48 hrs (P=.017).
- Relamorelin increased the number of SBMs (P<.001) and accelerated time to first BM after the first dose was given (P=.004) compared to placebo, but did not affect stool form.
- Adverse events associated with relamorelin included increased appetite, fatigue, and headache.

CERVICAL SPINE**Central sensitization and neck pain****Lack of Evidence for Central Sensitization in Idiopathic, Non-Traumatic Neck Pain: A Systematic Review**

Systematic Review Pain Physician, 05/22/2015

Annaleen Malfliet, MSc, PT, Jeroen Kregel, MSc, Barbara Cagnie, PhD, Mandy Kuipers, BSc, Mieke Dolphens, PhD, Nathalie Roussel, PhD, Mira Meeus, PhD, Lieven Danneels, PhD, Wichor M Bramer, BSc, and Jo Nijs, PhD

BACKGROUND: Chronic neck pain is a common problem with a poorly understood pathophysiology. Often no underlying structural pathology can be found and radiological imaging findings are more related to age than to a patient's symptoms. Besides its common occurrence, chronic idiopathic neck pain is also very disabling with almost 50% of all neck pain patients showing moderate disability at long-term follow-up. Central sensitization (CS) is defined as "an amplification of neural signaling within the central nervous system that elicits pain hypersensitivity," "increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input," or "an augmentation of responsiveness of central neurons to input from unimodal and polymodal receptors." There is increasing evidence for involvement of CS in many chronic pain conditions. Within the area of chronic idiopathic neck pain, there is consistent evidence for the presence and clinical importance of CS in patients with traumatic neck pain, or whiplash-associated disorders. However, the majority of chronic idiopathic neck pain patients are unrelated to a traumatic injury, and hence are termed chronic idiopathic non-traumatic neck pain. When comparing whiplash with idiopathic non-traumatic neck pain, indications for different underlying mechanisms are found. **OBJECTIVE:** The goal of this article was to review the existing scientific literature on the role of CS in patients with chronic idiopathic non-traumatic neck pain. **STUDY DESIGN:** Systematic review. **SETTING:** All selected studies were case control studies. **METHODS:** A systematic search of existing, relevant literature was performed via the electronic databases Medline, Embase, Web of Science, Cinahl, PubMed, and Google Scholar. All titles and abstracts were checked to identify relevant articles. An article was considered eligible if it met following inclusion criteria: (1) participants had to be human adults (> 18 years) diagnosed with idiopathic non-traumatic chronic (present for at least 3 months) neck pain; (2) papers had to report outcomes related to CS; and (3) articles had to be full-text reports or original research (no abstracts, case-reports, reviews, meta-analysis, letters, or editorials). **RESULTS:** Six articles were found eligible after screening the title, abstract and – when necessary – the full text for in- and exclusion criteria. All selected studies were case-control studies. Overall, results regarding the presence of CS were divergent. While the majority of patients with chronic traumatic neck pain (i.e. whiplash) are characterized by CS, this is not the case for patients with chronic idiopathic neck pain. The available evidence suggests that CS is not a major feature of chronic idiopathic neck pain. Individual cases might have CS pain, but further work should reveal how they can be characterized. **LIMITATIONS:** Very few studies available. **CONCLUSIONS:** Literature about CS in patients with chronic idiopathic non-traumatic neck pain is rare and results from the available studies provide an inconclusive message. CS is not a characteristic feature of chronic idiopathic and non-traumatic neck pain, but can be present in some individuals of the population. In the future a subgroup with CS might be defined, but based on current knowledge it is not possible to characterize this subgroup.

Such information is important in order to provide targeted treatment.

UPPER C SPINE

VA and age

Spine J. 2015 Apr 27. pii: S1529-9430(15)00412-X. doi: 10.1016/j.spinee.2015.04.031.

Age related morphological changes of the vertebral artery in the transverse process. Analysis by MDCT angiography.

Alicioglu B¹, Gulekon N², Akpinar S³.

Author information

Abstract

BACKGROUND CONTEXT:

The V2 segment of the VA ascends and passes through the TF of the C6-C1 vertebrae. Atherosclerosis of the VA and degenerative changes in the cervical spine are likely to occur with aging, and subsequent morphological changes may alter the normal anatomy.

PURPOSE:

To determine the morphologic changes of transverse foramen and vertebral artery in relation to aging.

STUDY DESIGN/ SETTING:

A retrospective cross sectional study.

PATIENT SAMPLE:

110 consecutive patients who had undergone computed tomography angiography.

METHODS:

The subjects were then divided into three groups according to age: Group A, less than 45 years; group B, from 45 to 65 years; and group C, over 65 years. Cases with stenosis and dissection of the VA were excluded from the quantitative analysis. The area of the VA and TF was measured, and the VA/TF OR was calculated accordingly. The presence of VAs tortuosity within the TF was also noted.

RESULTS:

The TF was larger in the oldest group, but the difference was not statistically significant. There was also no significant statistical difference between the age groups in terms of the VA and VA/TF ORs ($p > 0.05$). In the group C, the rate of overall tortuosity of the VA was 73%, arterial tortuosity in the TF was 28.6%. In cases with tortuous VA, C6 and C4 TFs were found to be significantly larger.

CONCLUSIONS:

Tortuous VAs tends to be associated with enlargement of C6 and C4 TFs. Knowledge of such changes in the anatomy is crucial during instrumentation used for cervical spine surgeries, to prevent serious complications in >65 years-old patients.

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KEYWORDS:

Anatomy; aging; cervical spondylosis; cervical vertebrae; computed tomography angiography

PMID: 25931427

CRANIUM/TMJ

TMJ tissue

Bone. 2015 Apr 22;77:98-106. doi: 10.1016/j.bone.2015.04.024.

Regional variation of bone tissue properties at the human mandibular condyle.

Kim DG¹, Jeong YH², Kosel E², Agnew AM³, McComb DW⁴, Bodnyk K⁵, Hart RT⁵, Kim MK², Han SY², Johnston WM⁶.

Author information

Abstract

The temporomandibular joint (TMJ) bears different types of static and dynamic loading during occlusion and mastication.

As such, characteristics of mandibular condylar bone tissue play an important role in determining the mechanical stability of the TMJ under the macro-level loading. Thus, the objective of this study was to examine regional variation of the elastic, plastic, and viscoelastic mechanical properties of human mandibular condylar bone tissue using nanoindentation. Cortical and trabecular bone were dissected from mandibular condyles of human cadavers (9 males, 54-96 years). These specimens were scanned using microcomputed tomography to obtain bone tissue mineral distribution. Then, nanoindentation was conducted on the surface of the same specimens in hydration. Plastic hardness (H) at a peak load, viscoelastic creep (Creep/P_{max}), viscosity (η), and tangent delta ($\tan \delta$) during a 30 second hold period, and elastic modulus (E) during unloading were obtained by a cycle of indentation at the same site of bone tissue. The tissue mineral and nanoindentation parameters were analyzed for the periosteal and endosteal cortex, and trabecular bone regions of the mandibular condyle.

The more mineralized periosteal cortex had higher mean values of elastic modulus, plastic hardness, and viscosity but lower viscoelastic creep and $\tan \delta$ than the less mineralized trabecular bone of the mandibular condyle. These characteristics of bone tissue suggest that the periosteal cortex tissue may have more effective properties to resist elastic, plastic, and viscoelastic deformation under static loading, and the trabecular bone tissue to absorb and dissipate time-dependent viscoelastic loading energy at the TMJ during static occlusion and dynamic mastication.

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KEYWORDS:

Human mandibular condyle; Nanoindentation; Regional variation; Temporomandibular joint; Viscoelastic

PMID: 25913634

Lip positions

Sagittal lip positions in different skeletal malocclusions: a cephalometric analysis

Progress in Orthodontics, 05/05/2015 Joshi M, et al.

Background

The objectives of this paper are to (1) study use of soft tissue analyses advocated by Steiner, Ricketts, Burstone, Sushner and Holdway to develop soft tissue cephalometric norms as baseline data for sagittal lip position in Northeast Chinese adult population, (2) compare the sagittal lip positions in different skeletal malocclusions and (3) compare the sagittal lip positions in Northeast Chinese adults with other reported populations.

Methods

Lateral cephalometric radiographs of subjects were taken in natural head position. Radiographs were manually traced and five reference lines - Sushner, Steiner, Burstone, Holdway and Ricketts, were used. The linear distance between the tip of the lips and the five reference lines were measured. Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) 21. Descriptive analysis was done for each variable for each subject. Coefficient of variation between lip positions as assessed by reference lines was determined. *Post hoc* Tukey's test was used for comparison of the mean cephalometric values of three skeletal malocclusions. The level of significance for the analysis was set at $p < 0.05$.

Results

The findings showed significant difference in the sagittal lip positions in different skeletal malocclusions. There was variation in consistent reference line in each skeletal malocclusion. The S2 line was the most consistent reference line in skeletal class I and class II group. The B line was the most consistent line in skeletal class III. In skeletal class II group, upper lips were the most protrusive and lower lips were retrusive than in skeletal class I and class III groups. In case of skeletal class III group, upper lips were retrusive and lower lips were more protrusive than in skeletal class I and class II groups.

Conclusions

The sagittal lip positions were found to be associated with the skeletal malocclusion pattern. Northeast Chinese population has protrusive upper and lower lip in comparison to Caucasians. Each skeletal malocclusion group showed different preferable reference lines for analysis of sagittal lip position.

Keywords:

Northeast Chinese population; Skeletal class; Reference lines; Sagittal; Lip

HEADACHES**Alternative approach to HA****Complementary and alternative medicine for the prevention and treatment of migraine headache: an overview of systematic reviews**

Focus on Alternative and Complementary Therapies, 05/20/2015 Posadzki P, et al.

The aim of this article is to summarise and critically evaluate the evidence from systematic reviews (SRs) of complementary and alternative medicine (CAM) for the prevention and treatment of migraine headache. The evidence from SRs evaluating the effectiveness of CAM for the prevention or treatment of migraine headache is mostly positive. However, several caveats should be taken into account, and only for acupuncture and biofeedback are the conclusions unanimously positive.

Methods

- Ten electronic databases were searched from 1946 to August 2014.
- Retrieved papers were also hand-searched for relevant references.
- Systematic reviews were eligible for inclusion if they reported the prevention and treatment of migraine headache using any type of CAM.
- Oxman criteria were used to appraise the methodological quality of the included SRs.

Results

- Thirty-three SRs, with a total of 45 886 migraine sufferers, were included in the analyses.
- The majority (64%) of the SRs were of high methodological quality (mean Oxman score=4.87, SD=3.96).
- Most (60.6%) SRs arrived at positive conclusions (16 of which were of high quality); two (6.0%) SRs arrived at negative conclusions (of which one was of high quality), and 11 (33.3%) arrived at equivocal conclusions (of which four were of high quality).
- The majority of the high-quality SRs (Oxman score=6–9) were based on moderate-quality RCTs.
- For multiple SRs, unanimously positive conclusions were reached for acupuncture and biofeedback.
- There was conflicting evidence regarding the effectiveness of homeopathy, herbal medicines such as *Petasites hybridus* and *Tanacetum parthenium* L., and spinal manipulative therapy.

Suicide

J Headache Pain. 2015 Dec;16(1):529. doi: 10.1186/s10194-015-0529-1. Epub 2015 May 12.

Osmophobia and allodynia are critical factors for suicidality in patients with migraine.

Park SP¹, Seo JG, Lee WK.

Author information

Abstract

BACKGROUND:

Sensory hypersensitivities are common phenomena in migraine. We examined the role of sensory hypersensitivities on suicidality in patients with migraine.

METHODS:

Patients with migraine (with or without aura) were consecutively recruited from our headache clinic. We asked them if they experienced photophobia, phonophobia, osmophobia, and allodynia during migraine attack. The Mini International Neuropsychiatric Interview was used to diagnose current major depressive disorder (MDD), current generalized anxiety disorder (GAD) and suicidality.

RESULTS:

Among 220 subjects, 25.5 % had current MDD, 17.3 % had current GAD, and 31.8 % had suicidality. Patients with suicidality were more like to have a low household income, chronic migraine (CM), medication overuse headache, high headache intensity, osmophobia, allodynia, high disability, MDD, and GAD than those without suicidality. The strongest risk factor for suicidality by multivariate analyses was osmophobia (adjusted Odds Ratio [AOR] 3.12, 95 % confidence interval [CI] 1.57-6.21, $p = 0.001$), followed by current MDD (AOR 2.99, 95 % CI 1.33-6.76, $p = 0.008$), CM (AOR 2.48, 95 % CI 1.21-5.09, $p = 0.013$), current GAD (AOR 3.11, 95 % CI 1.22-7.91, $p = 0.017$), and allodynia (AOR 2.72, 95 % CI 1.19-6.21, $p = 0.018$).

CONCLUSIONS:

Osmophobia and allodynia are critical factors for suicidality in patients with migraine, after controlling for depression, anxiety, and CM.

PMID: 25968102

Brain activity and migraines

J Headache Pain. 2015 Dec;16(1):525. doi: 10.1186/s10194-015-0525-5. Epub 2015 May 7.

Resting state brain activity in patients with migraine: a magnetoencephalography study.

Liu H¹, Ge H, Xiang J, Miao A, Tang L, Wu T, Chen Q, Yang L, Wang X.

Author information

Abstract

BACKGROUND:

Recent advances in migraine research have shown that the cerebral cortex serves a primary role in the pathogenesis of migraine. Since aberrant brain activity in migraine can be noninvasively detected with magnetoencephalography (MEG), The object of this study was to investigate the resting state cortical activity differences between migraineurs and controls and its related clinical characteristics.

METHODS:

Twenty-two subjects with an acute migraine and twenty-two age- and gender-matched controls were studied using MEG. MEG recordings were recorded 120 seconds during the headache attack. Analyze MEG signals from low (1-4 Hz) to high (200-1000 Hz)-frequency ranges.

RESULTS:

In comparison with the controls, brain activity in migraine subjects was significantly different from that of the controls both in two frequency ranges (55-90 Hz, $p < 0.001$) and (90-200 Hz, $p < 0.004$). But the power value showed no significant differences between control and migraines in all frequency ranges ($p > 0.05$). All the clinical characteristics had no significant correlation with aberrant brain activity.

CONCLUSIONS:

The results demonstrated that migraine subjects in resting state had significantly aberrant ictal brain activity that can be measured with neuromagnetic imaging techniques. The findings may facilitate the development of new therapeutic strategies in migraine treatment via alterations in cortical excitability with TMS and other medications in the future.

PMID: 25968099

SHOULDER GIRDLE**Scapula dyskinesia/ac joint and rehabilitation**

Knee Surg Sports Traumatol Arthrosc. 2015 May;23(5):1473-80. doi: 10.1007/s00167-014-2844-5. Epub 2014 Jan 24.

Scapular dyskinesia and SICK syndrome in patients with a chronic type III acromioclavicular dislocation. Results of rehabilitation.

Carbone S¹, Postacchini R, Gumina S.

Author information

- ¹Department of Orthopaedics and Traumatology, Sapienza University of Rome, Rome, Italy, stefcarbone@yahoo.it.

Abstract**PURPOSE:**

Scapular dyskinesia has been related to acromioclavicular injuries. A rehabilitation protocol has been studied in order to treat scapular dyskinesia, but it has not yet been evaluated. This rehabilitation programme was adopted to improve the shoulder function, thereby improving the scapular dyskinesia in patients with chronic acromioclavicular dislocation.

METHOD:

Twenty-four patients diagnosed with chronic type III acromioclavicular dislocation and scapular dyskinesia that have already been conservatively treated were enrolled in the rehabilitation protocol and analysed. Fourteen of these patients had a Scapular Inferior Coracoid dysKinesis (SICK) Syndrome. The adopted rehabilitation protocol consisted of 12 strengthening and stretching exercises of the scapulae. The final follow-ups were performed after 6 weeks, 6 months and 12 months using clinical measurements of scapular position and clinical evaluation of the scapular motion. In order to evaluate the SICK scapula syndrome, we used the SICK Scapula Rating Scale. The shoulder function was evaluated with a Constant Score and a Subjective Shoulder Value.

RESULTS:

After 12 months, the follow-up concluded that the scapular dyskinesia was no longer present in 18/23 patients (78.2 %). SICK scapula syndrome was observed in 4/8 patients with a scapular malposition. The Scapula Rating Scale score in 4 patients with SICK scapula was 7.5 points. After 12 months of rehabilitation, the mean Constant Score and Subjective Shoulder Value grew up to 85 points.

CONCLUSION:

The scapular dyskinesia and SICK syndrome secondary to chronic type III AC dislocation can be treated with the proposed rehabilitation protocol resulting in positive improvements of the shoulder function within 6 weeks; however, patients that do not respond to the rehabilitation programme will not improve with extended rehabilitation time. It is important to advise patients of the specific exercises for the prevention/treatment of scapular dyskinesia in the rehabilitation programme after AC joint dislocation.

LEVEL OF EVIDENCE: IV.

PMID: 24458335

CLAVICLE

Repair of dislocation

Knee Surg Sports Traumatol Arthrosc. 2015 May;23(5):1498-505. doi: 10.1007/s00167-014-2895-7. Epub 2014 Feb 21.

Value of additional acromioclavicular cerclage for horizontal stability in complete acromioclavicular separation: a biomechanical study.

Saier T¹, Venjakob AJ, Minzlaff P, Föhr P, Lindell F, Imhoff AB, Vogt S, Braun S.

Author information

Abstract

PURPOSE:

To evaluate whether isolated anatomical coracoclavicular (CC) ligament reconstruction with two suture-button devices provides equal horizontal acromioclavicular joint (ACJ) stability compared to additional ACJ suture tape cerclage.

METHODS:

A servohydraulic testing machine was used to assess horizontal ACJ translation in 12 fresh-frozen human shoulders during 5,000 cycles of dynamic anteroposterior directed loading (70 N). Horizontal ACJ stability was assessed for native specimen (n = 6) and compared to specimen with dissected AC ligaments but intact CC ligaments (n = 6). After complete AC/CC dissection, an anatomical CC reconstruction was performed with two suture-button devices (n = 6) and compared to the additional ACJ suture tape cerclage (n = 6).

RESULTS:

Native specimen showed an mean horizontal amplitude of 10.8 mm [standard deviation (SD) 3.29]. After 5,000 cycles of horizontal loading (70 N), mean amplitude increased by 1.5 mm (SD 0.75, p = 0.005). Specimen with dissected AC ligaments started at an mean amplitude of 14.1 mm (SD 4.11), which was increased by 0.9 mm (SD 0.56, n.s.) after loading. Initially, amplitude of specimen with anatomical CC reconstruction was 13.2 mm (SD 2.75), which increased by 2.9 mm (SD 1.45, p = 0.001) after loading. The specimen with additional AC cerclage initially showed an amplitude of 10.6 mm (SD 2.35). After loading, translation was increased by 3.0 mm (SD 0.97, p = 0.001). There was no failure of any surgical reconstruction in the tests.

CONCLUSION:

The results of this study suggest that only combined AC and CC reconstruction can adequately re-establish physiological horizontal ACJ stability. Therefore, it is likely that a combined surgical procedure with double suture-button devices and AC suture tape cerclage can adequately re-establish horizontal AC joint stability in case of an acute injury (\geq type Rockwood IV and may allow superior clinical outcomes for patients, especially if early functional rehabilitation is intended).

PMID: 24554242

GLENOHUMERAL/SHOULDER

Man Ther. 2015 Jun;20(3):433-9. doi: 10.1016/j.math.2014.10.020. Epub 2014 Nov 11.

Development of a novel index of shoulder's mobility based on the configuration space volume and its link to mono-axial amplitudes.

Crétual A¹, Bonan I², Ropars M³.

Author information

Abstract

At first sight, shoulder mobility is frequently evaluated through mono-axial amplitude. Interestingly, for diagnosing shoulder hyperlaxity or frozen shoulder, external rotation of the arm whilst at the side (ER1) is commonly used. However, by definition, a mono-axial amplitude does not fully reflect shoulder global mobility. Our goal was to propose a novel index for measuring shoulder global mobility and secondly to evaluate the link between main mono-axial amplitudes and this new index. Twenty-eight female subjects (mean age 24.8 years) without upper limb pathology participated in the study. The movements of their right dominant arm were measured with an opto-electronic motion capture system. They performed 5 mono-axial maximal amplitude motions (axial rotations in three different postures, flexion/extension and abduction from rest) and a global range of motion exploring all the reachable space around the three axes of rotation. From this, we computed the correlation coefficient between the volume of the reachable space and each possible linear combination of the 5 mono-axial amplitudes. Even though ER1 is often chosen to assess global mobility, it demonstrated the lowest correlation with measured joint mobility. To assess shoulder global mobility, clinical routine examination should more take into account external/internal rotation with the shoulder abducted, then abduction and finally flexion/extension. However, further clinical testing in other populations has to be done to evaluate the potential generalization of this result.

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KEYWORDS:

Biomechanics; Hyperlaxity; Motion capture analysis; Range of motion; Reachable space; Shoulder

PMID: 25466499

ROTATOR CUFF**Impact of fatty infiltration**

Knee Surg Sports Traumatol Arthrosc. 2015 May;23(5):1481-8. doi: 10.1007/s00167-014-2857-0. Epub 2014 Jan 31.

Correlation of clinical symptoms and function with fatty degeneration of infraspinatus in rotator cuff tear.

Seo JB¹, Yoo JS, Jang HS, Kim JS.

Author information

Abstract

PURPOSE:

The aim of this study was to analyse the correlation of clinical symptoms and function with the fatty degeneration of the infraspinatus in rotator cuff tears.

METHODS:

A total of 152 patients who had rotator cuff tears was enrolled retrospectively. The infraspinatus muscle was divided into two compartments according to the bundle of fibres, and the patients were divided into four groups that reflected fatty degeneration. The muscle strength of the shoulder and clinical symptoms was investigated.

RESULTS:

The severity of the rotator cuff tear and retraction increased with fatty degeneration of both the superior and inferior parts in the infraspinatus muscles. Because of the increasing fatty degeneration of the superior part of the infraspinatus, the shoulder strength index (SSI) of abduction had poor results. Additionally, as the fatty degeneration of the inferior part of the infraspinatus increased, the SSI of abduction and external rotation had worse results.

CONCLUSIONS:

Fatty degeneration of the superior part of the infraspinatus has no correlation with the power of external rotation but has a negative correlation with the power of abduction. Moreover, fatty degeneration of the inferior part of the infraspinatus has a negative correlation with both the power of abduction and external rotation.

LEVEL OF EVIDENCE:

Retrospective study, Level IV.

PMID: 24482211

WRIST AND HAND

The function of the distal interosseous membrane and its relevance to the stability of the distal radioulnar joint: an anatomical and biomechanical review

Handchir Mikrochir Plast Chir. 2015 May 4

Die Funktion des distalen Anteils der Membrana interossea und ihre Bedeutung für die Stabilität des distalen Radioulnargelenks: ein anatomischer und biomechanischer Überblick.

Moritomo H¹.

[Author information](#)

Abstract

The purpose of this article is to review functional anatomy and biomechanics of the distal interosseous membrane (DIOM) and its relevance to the stability of the distal radioulnar joint. The intact DIOM constrained dorsal dislocation of the radius, but it seldom constrained palmar dislocation. A residual ulnar translation deformity of the radial shaft in distal radius fractures has the potential to cause the distal radioulnar joint instability when the triangular fibrocartilage complex injury is also present, because it may result in detensioning of DIOM. Ulnar shortening with the osteotomy performed proximal to the attachment of the DIOM had a more favorable effect on stability of the DRUJ compared with the effect of distal osteotomy, especially in the presence of the distal oblique bundle (DOB).

The longitudinal resistance to ulnar shortening was significantly greater in proximal shortening than in distal shortening.

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PMID: 25938817

HIP

Gluteal Tendinopathy

Sports Med. 2015 May 13.

Gluteal Tendinopathy: A Review of Mechanisms, Assessment and Management.

Grimaldi A¹, Mellor R, Hodges P, Bennell K, Wajswelner H, Vicenzino B.

Author information

- ¹Physiotec, 23 Weller Road, Tarragindi, QLD, 4121, Australia.

Abstract

Tendinopathy of the gluteus medius and gluteus minimus tendons is now recognized as a primary local source of lateral hip pain. The condition mostly occurs in mid-life both in athletes and in subjects who do not regularly exercise. Females are afflicted more than males. This condition interferes with sleep (side lying) and common weight-bearing tasks, which makes it a debilitating musculoskeletal condition with a significant impact. Mechanical loading drives the biological processes within a tendon and determines its structural form and load-bearing capacity. The combination of excessive compression and high tensile loads within tendons are thought to be most damaging. The available evidence suggests that joint position (particularly excessive hip adduction), together with muscle and bone elements, are key factors in gluteal tendinopathy. These factors provide a basis for a clinical reasoning process in the assessment and management of a patient presenting with localized lateral hip pain from gluteal tendinopathy. Currently, there is a lack of consensus as to which clinical examination tests provide best diagnostic utility. On the basis of the few diagnostic utility studies and the current understanding of the pathomechanics of gluteal tendinopathy, we propose that a battery of clinical tests utilizing a combination of provocative compressive and tensile loads is currently best practice in its assessment. Management of this condition commonly involves corticosteroid injection, exercise or shock wave therapy, with surgery reserved for recalcitrant cases.

There is a dearth of evidence for any treatments, so the approach we recommend involves managing the load on the tendons through exercise and education on the underlying pathomechanics.

PMID: 25969366

IMPINGEMENT

In athletes

Sports Medicine May 2015, Date: 22 May 2015

Etiology of Femoroacetabular Impingement in Athletes: A Review of Recent Findings

- Amir A. Zadpoor

Abstract

The relationship between hip deformities and osteoarthritis has recently received a lot of attention. In particular, it has been shown that both osteoarthritis and its precursors, such as the hip deformities that lead to femoroacetabular impingement (FAI), are more prevalent in elite athletes compared with the general population. However, the etiology of the above-mentioned types of hip deformity is not currently well understood.

Many recent studies have attempted to shed light on the etiology of this disease. In this article, the main clinical, radiological, mechanobiological, and biomechanical findings of relevance to understanding the etiology of hip deformities leading to FAI are reviewed. Based on these findings, a consistent biomechanical theory explaining the development of hip deformities in athletes is then presented.

According to the presented theory, the repetitive, impact-like musculoskeletal loads that athletes experience, particularly when they undertake extreme ranges of hip motion, cause the development of hip deformities. According to this theory, these musculoskeletal loads trigger abnormal growth patterns during the years of skeletal development and cause the formation of hip deformities.

A number of hypotheses based on the proposed theory are then formulated that could be tested in future studies to ascertain whether the proposed theory could sufficiently describe the development of hip deformities in athletes.

KNEE

KNEE/ACL

Evaluation of ACL tear

Man Ther. 2015 Jun;20(3):402-411. doi: 10.1016/j.math.2014.11.003. Epub 2014 Nov 13.

The reliability of physical examination tests for the diagnosis of anterior cruciate ligament rupture - A systematic review.

Lange T¹, Freiberg A², Dröge P², Lützner J³, Schmitt J⁴, Kopkow C⁵.

Author information

Abstract

STUDY DESIGN:

Systematic literature review.

BACKGROUND:

Despite their frequent application in routine care, a systematic review on the reliability of clinical examination tests to evaluate the integrity of the ACL is missing.

OBJECTIVES:

To summarize and evaluate intra- and interrater reliability research on physical examination tests used for the diagnosis of ACL tears.

METHODS:

A comprehensive systematic literature search was conducted in MEDLINE, EMBASE and AMED until May 30th 2013. Studies were included if they assessed the intra- and/or interrater reliability of physical examination tests for the integrity of the ACL. Methodological quality was evaluated with the Quality Appraisal of Reliability Studies (QAREL) tool by two independent reviewers.

RESULTS:

110 hits were achieved of which seven articles finally met the inclusion criteria. These studies examined the reliability of four physical examination tests. Intrarater reliability was assessed in three studies and ranged from fair to almost perfect (Cohen's $k = 0.22-1.00$). Interrater reliability was assessed in all included studies and ranged from slight to almost perfect (Cohen's $k = 0.02-0.81$). The Lachman test is the physical tests with the highest intrarater reliability (Cohen's $k = 1.00$), the Lachman test performed in prone position the test with the highest interrater reliability (Cohen's $k = 0.81$). Included studies were partly of low methodological quality. A meta-analysis could not be performed due to the heterogeneity in study populations, reliability measures and methodological quality of included studies.

CONCLUSION:

Systematic investigations on the reliability of physical examination tests to assess the integrity of the ACL are scarce and of varying methodological quality.

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KEYWORDS: Anterior cruciate ligament; Lachman test; Reliability; Systematic review

PMID: 25466498

NMC and return to sports after ACL

Knee Surg Sports Traumatol Arthrosc. 2015 May;23(5):1283-91. doi: 10.1007/s00167-015-3546-3. Epub 2015 Feb 28.

Functional assessments for decision-making regarding return to sports following ACL reconstruction. Part II: clinical application of a new test battery.

Herbst E¹, Hoser C, Hildebrandt C, Raschner C, Hepperger C, Pointner H, Fink C.

Author information

Abstract

PURPOSE:

The purpose of this study was to utilize a novel functional test system to facilitate determining the time of return to sports following ACL reconstruction.

METHODS:

Sixty-nine patients with unilateral ACL reconstruction were included in this pilot study. All the patients performed a standardized test battery consisting of one- and two-legged stability tests, counter movement jumps, speedy jumps, plyometric jumps and a quick feed test. The first test was administered on average 170.7 ± 75.1 days post-operatively, and the retest was administered on average 239.1 ± 79.7 days post-operatively. The values of the subtests were compared with the normative data of healthy gender- and age-matched controls to determine the functional capacities of patients following ACL reconstruction.

RESULTS:

After the first and second test, 15.9 and 17.4 % of the patients met the criteria for a "return to non-competitive sports". One patient fulfilled the criteria for a "return to competitive sports" after the second test battery. The most limiting factor was a poor LSI value of <90 % if the dominant leg was involved and <80 % if the non-dominant leg was involved.

CONCLUSION:

This test battery demonstrates that, in terms of neuromuscular abilities, most patients, compared to healthy controls, are most likely not ready for a safe return to sports, even 8 months post-operatively. This should be considered in the future to determine when it is safe to return to sports and should avoid a premature return to competitive sports.

LEVEL OF EVIDENCE: III.

PMID: 25724802

MENISCUS

Exercise

Am J Phys Med Rehabil. 2015 Jun;94(6):460-73. doi: 10.1097/PHM.0000000000000209.

Effect of Exercise Therapy Compared with Arthroscopic Surgery on Knee Muscle Strength and Functional Performance in Middle-Aged Patients with Degenerative Meniscus Tears: A 3-Mo Follow-up of a Randomized Controlled Trial.

Stensrud S¹, Risberg MA, Roos EM.

[Author information](#)

Abstract

OBJECTIVE:

The aim of this study was to compare the effect of a 12-wk exercise therapy program and arthroscopic partial meniscectomy on knee strength and functional performance in middle-aged patients with degenerative meniscus tears.

DESIGN:

A total of 82 patients (mean age, 49 yrs; 35% women) with a symptomatic, unilateral, magnetic resonance imaging-verified degenerative meniscus tear and no or mild radiographic osteoarthritis were randomly assigned to a supervised neuromuscular and strength exercise program or arthroscopic partial meniscectomy. Outcomes assessed 3 mos after intervention initiation were isokinetic knee muscle strength, lower extremity performance, and self-reported global rating of change.

RESULTS:

Mean difference in isokinetic knee extension peak torque between the two groups was 16% (95% confidence interval, 7.1-24.0) ($P < 0.0001$), favoring the exercise group. Patients in the exercise group improved isokinetic knee extension peak by a mean of 25 Nm (range, 18-33 Nm) from baseline to follow-up. Furthermore, patients assigned to exercise therapy showed statistically significant improvements ($P \leq 0.002$) in all other measured variables, with moderate to large effect sizes (0.5-1.3). Patients reported a similar and positive effect of both interventions.

CONCLUSION:

A 12-wk supervised exercise therapy program yielded clinically relevant and statistically significant improvement in isokinetic quadriceps strength immediately after completion of the program, as compared with treatment with arthroscopic partial meniscectomy.

PMID: 25299520

Scaffolding replacement

Arthroscopy. 2015 Apr 29. pii: S0749-8063(15)00082-1. doi: 10.1016/j.arthro.2015.01.025.

Two-Year Clinical Results of Lateral Collagen Meniscus Implant: A Multicenter Study.

Zaffagnini S¹, Grassi A², Marcheggiani Muccioli GM¹, Holsten D³, Bulgheroni P⁴, Monllau JC⁵, Berbig R⁶, Lagae K⁷, Crespo R⁸, Marcacci M¹.

Author information

Abstract

PURPOSE:

To present the 2-year results of the use of the lateral Collagen Meniscus Implant (CMI) for the treatment of irreparable lateral meniscal lesions or partial lateral meniscal defects, to investigate the potential predictors of clinical results, and to monitor device safety.

METHODS:

Forty-three patients with a mean age of 30.1 ± 12.0 years were clinically evaluated 24 months after treatment of partial lateral meniscal defects with the CMI (Ivy Sports Medicine, Gräfelfing, Germany). We used the Lysholm score, the Tegner Activity Scale, a visual analog scale for pain (during strenuous activity, during routine activity, and at rest), a functional questionnaire, and a satisfaction questionnaire for the evaluation. All demographic and surgical parameters were used for multiple regression analysis to find outcome predictors. Serious adverse events and reoperations were monitored.

RESULTS:

All clinical scores significantly improved from preoperatively to final evaluation at 24.2 ± 1.9 months' follow-up. The Lysholm score improved significantly from 64.3 ± 18.4 preoperatively to 93.2 ± 7.2 at final follow-up ($P = .0001$). Functional improvement was detected from 6 months after surgery, whereas strenuous activities and knee swelling reached optimal results after 12 months. The highest pain ratings experienced during strenuous activity, during routine activity, and at rest significantly improved from 59 ± 29 , 29 ± 25 , and 20 ± 25 , respectively, preoperatively to 14 ± 18 , 3 ± 5 , and 2 ± 6 , respectively, at 2 years' follow-up ($P = .0001$). At final follow-up, 58% of patients reported activity levels similar to their preinjury values whereas 95% of patients reported that they were satisfied with the procedure. A higher body mass index, the presence of concomitant procedures, and a chronic injury pattern seemed to negatively affect the final outcomes. Serious adverse events with a known or unknown relation to the scaffold, such as pain, swelling, and scaffold resorption, were reported in 6% of patients, leading to CMI explantation, debridement, or synovectomy.

CONCLUSIONS:

The lateral CMI scaffold could be considered a potentially effective and safe procedure to treat both irreparable lateral meniscal tears and post-meniscectomy syndrome in appropriately selected patients. Chronic injury, high body mass index, and concomitant procedures have been shown to negatively affect the short-term results; however, the results appeared to slowly improve through the 24-month follow-up period. Thus patience is needed when evaluating the expectations for and results of the described procedure.

LEVEL OF EVIDENCE:

Level IV, therapeutic case series.

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PMID: 25935606

Use of US for assessment

J Orthop Sci. 2015 Apr 28.

Diagnostic accuracy of ultrasonography in assessing meniscal injury: meta-analysis of prospective studies.

Dai H¹, Huang ZG, Chen ZJ, Liu JX.

Author information

Abstract

BACKGROUND:

The accuracy of ultrasonography for diagnosing meniscal injury remains controversial. The aim of the present meta-analysis was to establish the role of ultrasonography in the diagnosis of meniscal injury by analyzing the data from prospectively designed studies.

METHODS:

A systematic review was performed by searching electronic bibliographic databases prior to November 2014. Studies with diagnostic results that fulfilled the inclusion criteria were included. The methodological quality of the studies was assessed. Sensitivity, specificity and other measures of the accuracy of ultrasonography in the diagnosis of meniscal injury were summarized. Summary receiver-operating characteristic (SROC) curves were used to summarize overall test performance. Publication bias was assessed used Deek's funnel plot asymmetry test.

RESULTS:

Seven prospective studies with 551 patients were eligible for the meta-analysis. The Quality Assessment of Diagnostic Accuracy Studies scores for the included studies ranged from 10-13. The summary estimates of the sensitivity, specificity, positive likelihood ratio, negative likelihood ratio and diagnostic odds ratio of ultrasonography in the diagnosis of meniscal injury were 0.88 (95 % CI 0.84-0.91), 0.90 (95 % CI 0.86-0.93), 7.07 (95 % CI 4.34-11.52), 0.17 (95 % CI 0.10-0.26) and 58.13 (95 % CI 24.38-138.62), respectively. There was moderate to significant heterogeneity across the above measures ($P < 0.05$). The area under the curve of the SROC was 0.948, indicating a high overall diagnostic accuracy. No publication bias was noted across the studies ($P = 0.393$), which suggested little influence of publication bias on the overall results.

CONCLUSION:

Our results suggest that the diagnostic accuracy of ultrasonography for diagnosing meniscal injury is acceptable, with a high specificity but moderate sensitivity.

PMID: 25916746

PATELLA**Exercise and dislocation**

Knee. 2015 Apr 24. pii: S0968-0160(15)00065-4. doi: 10.1016/j.knee.2015.03.013

Rehabilitation following first-time patellar dislocation: A randomised controlled trial of purported vastus medialis obliquus muscle versus general quadriceps strengthening exercises.

Smith TO¹, Chester R², Cross J², Hunt N³, Clark A⁴, Donell ST⁵.

Author information

Abstract

BACKGROUND:

We aimed to define whether distal vastus medialis (VM) muscle strengthening improves functional outcomes compared to general quadriceps muscle strengthening following first-time patellar dislocation (FTPD).

METHODS:

Fifty patients post-FTPD were randomised to either a general quadriceps exercise or rehabilitation programme (n=25) or a specific-VM exercise and rehabilitation regime (n=25). The primary outcome was the Lysholm knee score, and secondary outcomes included the Tegner Level of Activity score, the Norwich Patellar Instability (NPI) score, and isometric knee extension strength at various knee flexion ranges of motion. Outcomes were assessed at baseline, six weeks, six months and 12months.

RESULTS:

There were statistically significant differences in functional outcome and activity levels with the Lysholm knee score and Tegner Level of Activity score at 12months in the general quadriceps exercise group compared to the VM group (p=0.05; 95% confidence interval (CI): -14.0 to 0.0/p=0.04; 95% CI: -3.0 to 0.0). This did not reach a clinically important difference. There was no statistically significant difference between the groups for the NPI score and isometric strength at any follow-up interval. The trial experienced substantial participant attrition (52% at 12months).

CONCLUSIONS:

Whilst there was a statistical difference in the Lysholm knee score and Tegner Level of Activity score between general quadriceps and VM exercise groups at 12months, this may not have necessarily been clinically important. This trial highlights that participant recruitment and retention are challenges which should be considered when designing future trials in this population.

LEVEL OF EVIDENCE:

Therapeutic study, Level I.

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KEYWORDS:

Exercise; Patellar dislocation; Quadriceps; Trial; Vastus medialis oblique

PMID: 25921095

KNEE/TOTAL**Prenueromuscular training provides minimal benefits**

BMC Musculoskelet Disord. 2015 Apr 25;16:101. doi: 10.1186/s12891-015-0556-8.

Effect of preoperative neuromuscular training (NEMEX-TJR) on functional outcome after total knee replacement: an assessor-blinded randomized controlled trial.

Huber EO^{1,2,3}, Roos EM⁴, Meichtry A⁵, de Bie RA⁶, Bischoff-Ferrari HA^{7,8}.

Author information

Abstract

BACKGROUND:

Improving functional status preoperatively through exercise may improve postoperative outcome. Previous knowledge on preoperative exercise in knee osteoarthritis is insufficient. The aim of the study was to compare the difference in change between groups in lower extremity function from baseline to 3 months after Total Knee Replacement (TKR) following a neuromuscular exercise programme (NEMEX-TJR) plus a knee school educational package (KS) or KS alone.

METHODS:

45 patients (55-83 years, 53% male, waiting for TKR) were randomized to receive a minimum of 8 sessions of NEMEXTJR plus 3 sessions of KS or 3 sessions of KS alone. Function was assessed with the Chair Stand Test (CST, primary endpoint) and the Knee Injury and Osteoarthritis Outcome Score (KOOS) subscales focusing on daily living function (ADL) and pain (secondary endpoints). Assessments were performed immediately before and after the intervention, and at 6 weeks, 3 months and 12 months after surgery by a physiotherapist, blinded to group allocation.

RESULTS:

After intervention before surgery we observed a small improvement for primary and secondary endpoints in both groups, which did not differ significantly between groups: comparing the exercise to the control group the treatment effect for the CST was -1.5 seconds (95% CI: -5.3, 2.2), for KOOS ADL and KOOS pain the treatment effect was 1.3 points (-10.1, 12.8) and -2.3 (-12.4, 7.9) respectively. At 3 months after surgery we observed a small improvement in the primary endpoint in the control group and a significant improvement in the secondary endpoints in both exercise and control groups, which did not differ significantly between groups: comparing the exercise group to the control group the treatment effect in the CST was 2.0 seconds (-1.8, 5.8), for KOOS ADL and KOOS pain the treatment effect was -4.9 points (-16.3, 6.5) and -3.3 points (-13.5, 6.8) respectively.

CONCLUSIONS:

A median (IQR) of 10 (8, 14) exercise sessions before surgery showed an additional small but non-significant improvement in all functional assessments compared to patient education alone. These benefits were not sustained after TKR. Our trial doesn't give a conclusive answer to whether additional preoperative exercise on postoperative functional outcomes is beneficial.

PMID: 25925404

OSTEOARTHRITIS/KNEE

Central sensitization

Pain Pract. 2015 May 16. doi: 10.1111/papr.12311.

Influence of Centrally Mediated Symptoms on Postoperative Pain in Osteoarthritis Patients Undergoing Total Knee Arthroplasty: A Prospective Observational Evaluation.

Kim SH¹, Yoon KB¹, Yoon DM¹, Yoo JH¹, Ahn KR².

Author information

Abstract

BACKGROUND:

Central sensitization plays an important role in the chronic pain experienced by osteoarthritis (OA) patients. In this prospective observational study, we investigated the influence of the level of preoperative centrally mediated symptoms measured by the Central Sensitization Inventory (CSI) on pain intensity after total knee arthroplasty (TKA) for OA.

METHODS:

Ninety-eight female OA patients undergoing TKA were enrolled in this study. We assessed CSI scores, pain-related data, and other clinical data preoperatively. All patients received spinal anesthesia and postoperative epidural analgesia. Pain intensity (at rest and on movement) and rescue meperidine requirements were assessed during postoperative days 1 and 2. Also, pain intensity and patient satisfaction were assessed 1 month and 3 months after surgery. After the completion of all postoperative assessments, we separated the study population into a preoperative CSI score ≥ 40 and < 40 group. We assessed pain-related data between the 2 groups at each assessment time.

RESULTS:

Ninety-one patients completed the postoperative assessments (a preoperative CSI ≥ 40 group; n = 44, CSI < 40 group; n = 47). Patients with preoperative CSI ≥ 40 complained of a greater pain intensity (P = 0.001) during postoperative days 1 and 2 and required a higher dose of meperidine rescue (P = 0.003) than those with a preoperative CSI < 40 . The high CSI score group also showed a less favorable outcome in terms of pain relief on follow-up at 1 month (P = 0.006) and 3 months (P = 0.002) after surgery. In multivariate analysis, a preoperative CSI score ≥ 40 was the strongest determinant with 5.091 of the highest odds ratio (95% CI 1.324 to 19.523, P = 0.016) for predicting a persistent pain 3 months after surgery among demographic and pain-related variables.

CONCLUSIONS:

OA patients with high levels of comorbid centrally mediated symptoms showed severe pain and increased analgesic requirements after TKA in the early postoperative period. Moreover, these patients seemed to be at higher risk of persistent pain, and a high CSI score was predictive of low patient satisfaction in terms of pain relief after surgery.

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KEYWORDS:

arthroplasty; central sensitization; central sensitization inventory; hyperalgesia; knee; osteoarthritis; pain; postoperative

PMID: 25980527

FOOT AND ANKLE

Lumbricals

Surg Radiol Anat. 2015 May 12.

New insights into the origin of the lumbrical muscles of the foot: tendinous slip of the flexor hallucis longus muscle.

Hur MS¹, Kim JH, Gil YC, Kim HJ, Lee KS.

Author information

Abstract

PURPOSE:

The aim of this study was to clarify the origins of the lumbricals of the foot toward a better understanding of its precise action in the gait.

METHODS:

The lumbricals in the foot were investigated in 66 specimens of embalmed Korean adult cadavers.

RESULTS:

The first lumbrical arose as two muscle bellies from both the tendon of the FDL and the tendinous slip of the FHL in 83.3 %, and as one muscle belly from the tendon of the FDL or the tendinous slip of the FHL in 16.7 %. These two muscle bellies subsequently merged to form the muscle belly of the first lumbrical. The second lumbrical arose from the tendinous slips of the FHL for the second and third toes as well as the tendon of the FDL in all specimens. The third lumbrical arose from the tendinous slips of the FHL for the third and fourth toes in 69.7 %, and the fourth lumbrical arose from the tendinous slip of the FHL for the fourth toe in 18.2 %. Some deep muscle fibers of the fourth lumbrical arose from the tendinous slip of the FHL for the second toe in 4.5 %, for the third toe in 28.8 %, and for the fourth toe in 15.2 %.

CONCLUSIONS:

The results of this study constitute new anatomical knowledge regarding the origin of the lumbricals, and provide insight into their specific role in production of gait. These findings will be useful for various types of surgery, biomechanics research, and rehabilitation programs.

PMID: 25963118

RHUMATOID ARTHRITIS**Exercise and balance**

Am J Phys Med Rehabil. 2015 Jun;94(6):417-28. doi: 10.1097/PHM.0000000000000279.

Effect of strengthening versus balance-proprioceptive exercises on lower extremity function in patients with juvenile idiopathic arthritis: a randomized, single-blind clinical trial.

Baydogan SN¹, Tarakci E, Kasapcopur O.
Author information

Abstract

OBJECTIVE:

The aim of this study was to investigate the effects of two exercise programs on lower extremity function in patients with juvenile idiopathic arthritis.

DESIGN:

Thirty patients with juvenile idiopathic arthritis participated in this study. Pain, passive range of motion, muscle strength, balance, and functional abilities were assessed with the Numeric Rating Scale, goniometer, handheld dynamometer, Flamingo Balance Test, Functional Reach Test, 10-meter walking test, 10-stair climbing test, and Childhood Health Assessment Questionnaire. Participants were randomly assigned to the strengthening exercise group (group 1, n = 15) or the proprioceptive-balance exercise group (group 2, n = 15).

RESULTS:

Intragroup analysis showed statistically significant improvements in all outcome measures except muscle strength in the hip and ankle after strengthening exercises in group 1. However, statistically significant improvements were found in all outcome measures after the proprioceptive-balance exercises in group 2. Intergroup analysis showed statistically significant improvement in all outcome measures in group 2 except for the Numeric Rating Scale, Childhood Health Assessment Questionnaire, and passive range of motion scores and hip extension and knee flexion muscle strengths.

CONCLUSIONS:

This study demonstrates that exercise treatment significantly improves musculoskeletal symptoms in patients with juvenile idiopathic arthritis. However, balance-proprioceptive exercises prove to be effective more than strengthening exercises for improving lower extremity function such as walking, climbing stairs, and balance in patients with juvenile idiopathic arthritis.

PMID: 25802953

MANUAL THERAPY**End range rotation and blood flow**

Man Ther. 2015 Jun;20(3):475-80. doi: 10.1016/j.math.2014.11.012. Epub 2014 Nov 29.

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

Thoracic manipulation for shoulder pain perception

Man Ther. 2015 Jun;20(3):469-74. doi: 10.1016/j.math.2014.11.011. Epub 2014 Dec 2.

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

Algorithm

Man Ther. 2015 Jun;20(3):499-502. doi: 10.1016/j.math.2014.11.006. Epub 2014 Nov 20.

Articular dysfunction patterns in patients with mechanical low back pain: A clinical algorithm to guide specific mobilization and manipulation techniques.

Dewitte V¹, Cagnie B², Barbe T¹, Beernaert A¹, Vanthillo B¹, Danneels L¹.

Author information

Abstract

Recent systematic reviews have demonstrated reasonable evidence that lumbar mobilization and manipulation techniques are beneficial. However, knowledge on optimal techniques and doses, and its clinical reasoning is currently lacking. To address this, a clinical algorithm is presented so as to guide therapists in their clinical reasoning to identify patients who are likely to respond to lumbar mobilization and/or manipulation and to direct appropriate technique selection. Key features in subjective and clinical examination suggestive of mechanical nociceptive pain probably arising from articular structures, can categorize patients into distinct articular dysfunction patterns. Based on these patterns, specific mobilization and manipulation techniques are suggested.

This clinical algorithm is merely based on empirical clinical expertise and complemented through knowledge exchange between international colleagues. The added value of the proposed articular dysfunction patterns should be considered within a broader perspective.

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KEYWORDS:

Articular dysfunction patterns; Clinical reasoning; Lumbar spine; Mechanical low back pain; Spinal manipulation

PMID: 25487344

Oscillations for disc herniation

Man Ther. 2015 Jun;20(3):481-6. doi: 10.1016/j.math.2014.11.013. Epub 2014 Nov 29.

"Effectiveness of continuous vertebral resonant oscillation using the POLD method in the treatment of lumbar disc hernia". A randomized controlled pilot study.

López-Díaz JV¹, Arias-Buría JL², Lopez-Gordo E³, Lopez Gordo S⁴, Aros Oyarzún AP⁵.

Author information

Abstract

This study analyses the efficacy of manual oscillatory therapy, following the POLD technique, for acute Lumbar Disc Hernia (LDH) and compares it to usual treatment. A randomised, controlled, triple-blind pilot clinical trial. The sample of 30 patients was divided into two homogeneous groups to receive usual treatment (A) or treatment with the POLD technique (B). We analysed range of motion and subjective variables such as the severity (visual analogue pain scale (VAS)) and extension of the pain. With the application of POLD therapy, patients presented significant changes on range of motion (forward flexion with $p < 0.05$) at completion of the trial in comparison with the control group. They showed a significant reduction in the severity of pain with a mean VAS scale for lumbar, gluteus and thigh pain, which improved from 5.09 to 0.79, 5.07 to 0.97 and 4.43 to 0.49 respectively ($p < 0.05$), and also when compared to usual treatment ($p < 0.05$) for all body regions. Moreover, we observed a reduction in pain extension (centralization phenomena) ($p < 0.001$) in comparison with usual treatment.

In our study the POLD Method was shown to be an effective manual therapy approach for reducing the severity and irradiation of the pain in LDH patients with sciatica, and more efficient than usual treatment.

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KEYWORDS:

Lumbar disc hernia; Manual therapy; POLD; Resonant oscillation

PMID: 25511449

Comparable signs

Man Ther. 2015 Jun;20(3):451-5. doi: 10.1016/j.math.2014.11.007. Epub 2014 Nov 22.

The relationship between chief complaint and comparable sign in patients with spinal pain: An exploratory study.

Cook C¹, Learman K², Showalter C³, O'Halloran B⁴.

Author information

Abstract

Many musculoskeletal management philosophies advocate the exploration of the relationship between the patient's chief complaint (CC) and the physical examination findings that reproduce/reduce/change that CC. Geoffrey Maitland developed the concept "comparable sign(s) (CS), which are physical examination findings related to the CC(s) that are reproduced during an examination/treatment. These include observed abnormalities of movement, postures or motor control, abnormal responses to movement, static deformities, and abnormal joint assessment findings. There are no studies that have explored the potential clinical relationships between the patient's CC and a CS, thus this exploratory study evaluated the associations, outcomes, and prevalence of the findings. This cohort study involved 112 subjects age 54.3 years (SD = 13.4 years), with neck (25.9%) or low back pain (74.1%) who were treated with physiotherapy for an average of 42 days. Data analysis revealed 88.4% identified a CC at baseline. There was a moderate statistical association between CC and the active physiological finding of a CS ($r = 0.36$), and small-moderate associations between all examination phases ($r = 0.25-0.37$).

There were no statistical differences in pain and disability outcomes for those with and without a CC or CS; however, baseline pain levels were higher for those without CC ($p = 0.04$). Further, rate of recovery was lower in those without a CS during passive physiological examination. The results would suggest that there may be content validity to the concept of CS but further research with larger samples sizes is required to explore the extent of the validity is warranted.

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KEYWORDS:

Comparable sign; Low back pain; Manual therapy; Neck pain

PMID: 25498410

MUSCLES

Hamstrings insertion

Man Ther. 2015 Jun;20(3):445-50. doi: 10.1016/j.math.2014.11.005. Epub 2014 Nov 21.

An anatomical and histological study of the structures surrounding the proximal attachment of the hamstring muscles.

Pérez-Bellmunt A¹, Miguel-Pérez M², Brugué MB³, Cabús JB⁴, Casals M⁵, Martinoli C⁶, Kuisma R⁷.

Author information

Abstract

INTRODUCTION:

The proximal attachment of hamstring muscles has a very high incidence of injuries due to a wide number of factors and its morphology may be one of the underlying factors as scientific literature points out. The connective tissue component of the attachment of hamstring muscles is not well known. For this reason the aim of this study is to describe the anatomy and histology surrounding the proximal attachment of the hamstring muscles (PAHM) and its direct anatomic relations.

METHODS:

Forty-eight cryopreserved lower limbs have sequentially been studied by means of dissection, anatomical sections and histology.

RESULTS:

All specimens studied presented an annular connective tissue structure that resembles a retinaculum, which covers and adapts to the attachment of hamstring muscles on the ischial tuberosity.

CONCLUSION:

The results show how this retinaculum is continuous with the long head of biceps femoris muscle, however there is a layer of loose connective tissue between the retinaculum and the semitendinosus muscle. Furthermore, this structure receives expansions of the anterior epimysium of the gluteus maximus muscle (GIM).

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KEYWORDS:

Fascia; Hamstring injury; Hamstring proximal attachment; Retinaculum

PMID: 25515332

Semitendinosus

Skeletal Radiol. 2015 Jul;44(7):1051-6. doi: 10.1007/s00256-015-2133-5. Epub 2015 Apr 9.

Partial semitendinosus tendon tear in a young athlete: a case report and review of the distal semitendinosus anatomy.

Sivasundaram L¹, Matcuk GR Jr, White EA, Hatch GF 3rd, Patel DB.

Author information

Abstract

Distal semitendinosus tears have been infrequently reported in the radiology literature, and a detailed description of the anatomy and imaging features of these injuries is lacking. The semitendinosus tendon is clinically relevant, as it is frequently grafted in knee ligament reconstructions and plays an important role in performing competitive activities. We present a case of a 31-year old man who developed a partial semitendinosus tear during competitive training.

This case highlights the common clinical and imaging findings found with distal semitendinosus tears, and explores the various modalities available to treat this injury. We also review the clinically pertinent anatomy of the distal semitendinosus tendon and discuss the pitfalls that musculoskeletal radiologists may encounter, to avoid misdiagnosing these rare injuries.

PMID: 25855409

MOTOR CONTROL

Prone hip extension

Manual Therapy

June 2015 Volume 20, Issue 3, Pages 440–444

EMG activity and force during prone hip extension in individuals with lumbar segmental instability*

Hee-Seok Jung Sun-Young Kang Joo-Hee Park Heon-Seock Cynn Hye-Seon Jeon

DOI: <http://dx.doi.org/10.1016/j.math.2014.11.002>

Abstract

The goal of the current study was to investigate potential differences in back and hip extensor muscle activity and hip extension force during prone hip extension (PHE) in individuals with lumbar segmental instability (LSI) and asymptomatic subjects. Thirty-six subjects with LSI and 26 asymptomatic volunteers participated in this study. Muscle activity of the erector spinae, gluteus maximus, and biceps femoris was recorded using electromyography (EMG), and hip extension force was measured by a digital force gauge.

Muscle activity was significantly greater in subjects with LSI than in asymptomatic subjects during PHE ($p < 0.05$). Hip extension force was significantly lower in the subjects with LSI than in asymptomatic subjects during PHE ($p < 0.05$). These findings suggest that during PHE, subjects with LSI have differences in back and hip extensor muscle activity and hip extension force compared to asymptomatic individuals.

Impact of SI belt on hamstring function

Man Ther. 2015 Jun;20(3):412-9. doi: 10.1016/j.math.2014.10.011. Epub 2014 Oct 25.

Effects of external pelvic compression on electromyographic activity of the hamstring muscles during unipedal stance in sportsmen with and without hamstring injuries.

Arumugam A¹, Milosavljevic S², Woodley S³, Sole G⁴.

Author information

Abstract

There is some evidence that hamstring function can be influenced by interventions focusing on the pelvis via an anatomic and neurophysiologic link between these two segments. Previous research demonstrated increased electromyographic activity from injured hamstrings during transition from bipedal to unipedal stance (BUS). The aim of this study was to investigate the effects of a pelvic compression belt (PCB) on electromyographic activity of selected muscles during BUS in sportsmen with and without hamstring injury. Electromyographic amplitudes (normalised to maximum voluntary isometric contraction [MVIC]) of the hamstrings, gluteus maximus, gluteus medius and lumbar multifidus were obtained during BUS from 20 hamstring-injured participants (both sides) and 30 healthy participants (one side, randomly selected). There was an increase in biceps femoris (by 1.23 ± 2.87 %MVIC; $p = 0.027$) and gluteus maximus (by 0.63 ± 1.13 %MVIC; $p = 0.023$) electromyographic activity for the hamstring-injured side but no significant differences other than a decrease in multifidus activity (by 1.36 ± 2.92 %MVIC; $p = 0.023$) were evident for healthy participants while wearing the PCB. However, the effect sizes for these findings were small. Wearing the PCB did not significantly change electromyographic activity of other muscles in either participant group ($p > 0.050$). Moreover, the magnitude of change induced by the PCB was not significantly different between groups ($p > 0.050$) for the investigated muscles.

Thus, application of a PCB to decrease electromyographic activity of injured hamstrings during BUS is likely to have little effect. Similar research is warranted in participants with acute hamstring injury.

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KEYWORDS:

Electromyography; Hamstring injury; Pelvic compression belt; Unipedal stance

PMID: 25466292

Proprioception training part 1

Man Ther. 2015 Jun;20(3):368-77. doi: 10.1016/j.math.2015.01.008. Epub 2015 Jan 29.

Proprioception in musculoskeletal rehabilitation. Part 1: Basic science and principles of assessment and clinical interventions.

Röijezon U¹, Clark NC², Treleaven J³.

Author information

Abstract

INTRODUCTION:

Impaired proprioception has been reported as a feature in a number of musculoskeletal disorders of various body parts, from the cervical spine to the ankle. Proprioception deficits can occur as a result of traumatic damage, e.g., to ligaments and muscles, but can also occur in association with painful disorders of a gradual-onset nature. Muscle fatigue can also adversely affect proprioception and this has implications for both symptomatic and asymptomatic individuals. Due to the importance of proprioception for sensorimotor control, specific methods for assessment and training of proprioception have been developed for both the spine and the extremities.

PURPOSE:

The aim of this first part of a two part series on proprioception in musculoskeletal rehabilitation is to present a theory based overview of the role of proprioception in sensorimotor control, assessment, causes and findings of altered proprioception in musculoskeletal disorders and general principles of interventions targeting proprioception.

IMPLICATIONS:

An understanding of the basic science of proprioception, consequences of disturbances and theories behind assessment and interventions is vital for the clinical management of musculoskeletal disorders. Part one of this series supplies a theoretical base for part two which is more practically and clinically orientated, covering specific examples of methods for clinical assessment and interventions to improve proprioception in the spine and the extremities.

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KEYWORDS:

Assessment; Musculoskeletal disorder; Proprioception; Rehabilitation

PMID: 25703454

Proprioceptive training part 2

Manual Therapy

June 2015 Volume 20, Issue 3, Pages 378–387

Proprioception in musculoskeletal rehabilitation. Part 2: Clinical assessment and intervention

Nicholas C. Clark , Ulrik Røijezon Julia Treleaven

DOI: <http://dx.doi.org/10.1016/j.math.2015.01.009>**Abstract****Introduction**

Proprioception can be impaired in gradual-onset musculoskeletal pain disorders and following trauma. Understanding of the role of proprioception in sensorimotor dysfunction and methods for assessment and interventions is of vital importance in musculoskeletal rehabilitation. In Part 1 of this two-part Masterclass we presented a theory-based overview of the role of proprioception in sensorimotor control, causes and findings of altered proprioception in musculoskeletal conditions, and general principles of assessment and interventions.

Purpose

The aim of this second part is to present specific methods for clinical assessment and interventions to improve proprioception in the spine and extremities.

Implications

Clinical assessment of proprioception can be performed using goniometers, inclinometers, laser-pointers, and pressure sensors. Manual therapy, taping, and bracing can immediately enhance proprioception and should be used to prepare for exercise interventions. Various types of exercise (active joint repositioning, force sense, co-ordination, muscle performance, balance/unstable surface, plyometric, and vibration training) should be employed for long-term enhancement of proprioception.

POSTURE**Postural correction and hip pain**

Man Ther. 2015 Jun;20(3):508-12. doi: 10.1016/j.math.2015.01.014. Epub 2015 Feb 4.

Postural correction reduces hip pain in adult with acetabular dysplasia: A case report.

Lewis CL¹, Khuu A², Marinko LN².

Author information

Abstract

Developmental dysplasia of the hip is often diagnosed in infancy, but less severe cases of acetabular dysplasia are being detected in young active adults. The purpose of this case report is to present a non-surgical intervention for a 31-year-old female with mild acetabular dysplasia and an anterior acetabular labral tear. The patient presented with right anterior hip and groin pain, and she stood with the trunk swayed posterior to the pelvis (swayback posture). The hip pain was reproduced with the anterior impingement test. During gait, the patient maintained the swayback posture and reported 6/10 hip pain. Following correction of the patient's posture, the patient's pain rating was reduced to a 2/10 while walking. The patient was instructed to maintain the improved posture. At the 1 year follow-up, she demonstrated significantly improved posture in standing and walking. She had returned to recreational running and was generally pain-free. The patient demonstrated improvement on self-reported questionnaires for pain, function, and activity. These findings suggest that alteration of posture can have an immediate and lasting effect on hip pain in persons with structural abnormality and labral pathology.

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KEYWORDS:

Dysplasia; Gait; Labral tear; Movement system; Posture

PMID: 25731688

Sagittal alignment

Spine (Phila Pa 1976). 2015 Feb 19.

Recruitment of Compensatory Mechanisms in Sagittal Spinal Malalignment is Age and Regional Deformity Dependent: A full standing axis analysis of key radiographic parameters.

Diebo BG¹, Ferrero E, Lafage R, Challier V, Liabaud B, Liu S, Vital JM, Errico TJ, Schwab FJ, Lafage V.

Author information

Abstract

: Study Design. Retrospective review, full body radiographic analysis of adult patients with sagittal spinal malalignment.

Objective. Investigate the compensatory mechanisms involved in the sagittal plane of the body following progressive spinal sagittal malalignment, and study the impact of age on compensatory mechanisms recruitment.

Summary of Background Data. Sagittal spinal malalignment (SSM) patients recruit compensatory mechanisms to maintain erect posture and horizontal gaze. Mechanisms such as pelvic retroversion, knee flexion and pelvic shift have been proposed, but how they contribute and how age affects their recruitment is poorly understood.

Methods. Retrospective review of adult SSM patients who underwent full standing axis stereoradiography EOS[®]. Radiographic measurements were performed with Surgimap[®]. Patients were categorized based on the mismatch between pelvic incidence and lumbar lordosis (PI-LL). Compensatory mechanisms were normalized to each patient's PI-LL and compared by mismatch groups. In addition, patients were subcategorized into two age groups (≥ 65 yrs and < 65 yrs) and compared within the same groups of mismatch.

Results. 161 patients with a mean age of 62.93 ± 12.8 yrs. Mean SVA 62.3 ± 61.5 mm, PT $29.2 \pm 8.4^\circ$, and PI-LL $21.0 \pm 14.9^\circ$. Mismatch groups were: Group 1: PI-LL $0-10^\circ$, Group 2: $10-20^\circ$, Group 3: $20-30^\circ$, and Group 4: $> 30^\circ$. There were significant differences between all groups in regards to thoracic kyphosis (TK), pelvic tilt (PT), knee flexion angle (KA), and pelvic shift (P.Sh) by ANOVA ($p < 0.001$). As PI-LL increased, TK and PT contribution to the compensation cascade decreased and KA and P.Sh contribution increased. Patients with PI-LL of $> 30^\circ$ who were older had significantly less PT and more TK than patients with similar PI-LL who were younger.

Conclusions. Spino-pelvic mismatch is an important driver in SSM. Pelvic retroversion and flattening of thoracic kyphosis (reduction) become exhausted with increasing mismatch, at which point there appears to be a steady transfer of compensation towards significant participation of the lower limbs. Further analysis suggests differential recruitment of these compensatory mechanisms based upon age.

PMID: 25705962

SCOLIOSIS**Measuring**

Eur Spine J. 2015 Apr 28.

Reliability and validity of inexpensive and easily administered anthropometric clinical evaluation methods of postural asymmetry measurement in adolescent idiopathic scoliosis: a systematic review.

Prowse A¹, Pope R, Gerdhem P, Abbott A.

Author information

Abstract

PURPOSE:

As accurate and reproducible measurements of spinal curvature are crucial in the examination of patients with adolescent idiopathic scoliosis (AIS), this systematic review aims to report on the reliability and validity of a range of inexpensive and easily administered anthropometric methods of postural asymmetry measurement in an AIS population, to inform practice in a clinical setting.

METHODS:

A systematic search of health research databases located studies assessing reliability and validity of inexpensive and easily administered anthropometric measures.

RESULTS:

Fourteen studies satisfied eligibility criteria. The methodological quality of included studies ranged from low to high. Validity studies were of moderate to high quality. In total, nine clinically applicable, inexpensive and easily administered anthropometric methods were identified, for assessing AIS curvature. All methods demonstrated high to very high inter-observer and intra-observer reliability. Reported criterion validity of the scoliometer and 2D photographs, when compared to Cobb angle assessed from radiographs, ranged from low to very high. iPhone measurements correlated well with scoliometer measurements. 2D photography results had a moderate to high correlation with 3D topography results.

CONCLUSIONS:

Overall, strong levels of evidence exist for iPhone and scoliometer measurements, with a high to very high reliability and moderate to very high validity. Moderate levels of evidence exist for scoliometer with mathematical formula and clinical examination with moderate and low validity, respectively. Limited evidence exists for aesthetic tools TRACE and AI and 2D photography. These results indicate there are accurate and reproducible anthropometric measures that are inexpensive and applicable in therapy settings to assess postural asymmetry; however, these only exist for measurement in the transverse plane, despite 3D characteristics of AIS. Further research is required into an inexpensive and easily administered method that can assess postural asymmetry in all anatomical planes.

PMID: 25917824

ATHLETICS

Youth and sport specific qualities

PLoS One. 2015 May 15;10(5):e0126282. doi: 10.1371/journal.pone.0126282. eCollection 2015.

Anthropometric characteristics, physical fitness and motor coordination of 9 to 11 year old children participating in a wide range of sports.

Opstoel K¹, Pion J², Elferink-Gemser M¹, Hartman E³, Willemse B¹, Philippaerts R², Visscher C³, Lenoir M².

Author information

Abstract

OBJECTIVES:

The aim of this study was to investigate to what extent 9 to 11 year old children participating in a specific sport already exhibit a specific anthropometric, physical fitness and motor coordination profile, in line with the requirements of that particular sport. In addition, the profiles in children with a different training volume were compared and possible differences in training hours per week between children from a low, moderate, and high level of physical fitness and motor coordination were investigated.

METHODS AND RESULTS:

Data of 620 children, 347 boys and 273 girls, who participated in the Flemish Sports Compass were used. Only the primary sport of each child was considered and six groups of sports (Ball sports, Dance, Gymnastics, Martial arts, Racquet sports and Swimming) were formed based on common characteristics. Measurements consisted of 17 tests. Independent T-tests and Mann-Whitney U-tests revealed few differences between the groups of sports and the discriminant analyses with the moderate and low active group did not show any significant results ($p > .05$). However, when discriminating among the high active children, a 85.2 % correct classification between six groups of sports was found (Wilks' $\Lambda = .137$ and $p < .001$). Finally, children performing under average on the tests spent significantly fewer hours in sport per week (2.50 ± 1.84 hours) compared to the children performing best (3.25 ± 2.60 hours) ($p = .016$) and the children performing above average (2.90 ± 1.96 hours) ($p = .029$) on physical fitness and motor coordination.

DISCUSSION:

The study showed that in general, children at a young age do not exhibit sport-specific characteristics, except in children with a high training volume. It is possible that on the one hand, children have not spent enough time yet in their sport to develop sport-specific qualities. On the other hand, it could be possible that they do not take individual qualities into account when choosing a sport.

PMID: 25978313

Lower extremity injuries and sports

Clin J Sport Med. 2015 May;25(3):221-9. doi: 10.1097/JSM.0000000000000124.

Bridging the gap between content and context: establishing expert consensus on the content of an exercise training program to prevent lower-limb injuries.

Donaldson A¹, Cook J, Gabbe B, Lloyd DG, Young W, Finch CF.

OBJECTIVE:

To achieve expert consensus on the content of an exercise training program (known as FootyFirst) to prevent lower-limb injuries.

DESIGN: Three-round online Delphi consultation process.

SETTING: Community Australian Football (AF).

PARTICIPANTS: Members of the Australian Football Leagues' Medical Officers (n = 94), physiotherapists (n = 50), and Sports Science (n = 19) Associations were invited to participate through e-mail. Five people with more general expertise in sports-related lower-limb injury prevention were also invited to participate.

MAIN OUTCOME MEASURES:

The primary outcome measure was the level of agreement on the appropriateness of the proposed exercises and progressions for inclusion in FootyFirst. Consensus was reached when $\geq 75\%$ of experts who responded to each item agreed and strongly agreed, or disagreed and strongly disagreed, that an exercise or its progressions were appropriate to include in FootyFirst.

RESULTS:

Fifty-five experts participated in at least 1 Delphi round. In round 1, consensus was achieved that the proposed warm-up (run through and dynamic stretches) and the exercises and progressions for hamstring strength and for balance, landing, and changing direction were appropriate to include in FootyFirst. There was also consensus in round 1 that progressions for hip/core strength should be included in FootyFirst. Consensus was reached in round 2 that the revised groin strength and hip strength exercises should be included in FootyFirst. Consensus was reached for the progression of the groin strength exercises in round 3.

CONCLUSIONS:

The formal consensus development process has resulted in an evidence-informed, researcher-developed, exercise-based sports injury prevention program that is expert endorsed and specific to the context of AF.

CLINICAL RELEVANCE:

Lower-limb injuries are common in running, kicking, and contact sports like AF. These injuries are often costly to treat, and many have high rates of recurrence, making them challenging to treat clinically. Reducing these injuries is a high priority for players, teams, and medical staff. Exercise programs provide a method for primary prevention of lower-limb injuries, but they have to be evidence based, have currency with sports practitioners/clinicians, and utility for the context in which they are to be used. However, the comprehensive methods and clinical engagement processes used to develop injury prevention exercise programs have not previously been described in detail. This study describes the results of engaging clinicians and sport scientists in the development of a lower-limb sports injury prevention program for community AF, enabling the development of a program that is both evidence informed and considerate of expert clinical opinion. PMID: 25010154

GAIT**Kyphosis and gait**

Osteoporosis International May 2015 Date: 21 May 2015

The relationship of thoracic kyphosis to gait performance and quality of life in women with osteoporosis

- F. Sangtarash, F. D. Manshadi, A. Sadeghi

Abstract**Summary**

Thoracic kyphosis angle (TKA) increases with osteoporosis. This study aimed to investigate the relationship between magnitude of TKA and quality of life and gait performance in 34 osteoporotic women. Our results suggest that increasing TKA is significantly associated with decreasing quality of life ($r = -0.48, p < 0.005$) and gait performance ($r = -0.74, p < 0.0005$).

Introduction

Osteoporosis and its related effects are threatening health and quality of life especially in postmenopausal women. Increased thoracic kyphosis angle (TKA), as one of the most common adverse musculoskeletal changes, could be regarded as a quantitative index for osteoporotic patients' assessment. Dual digital inclinometer (DDI) is one of the latest tools for non-invasive TKA measurement. The main purpose of this study was to determine whether a relationship existed between the magnitude of TKA, gait performance, and quality of life in a group of osteoporotic women.

Methods

Thirty-four osteoporotic women, aged 50–68, participated in this descriptive analytic study. The magnitude of TKA measured by using DDI and expressed as the kyphosis index (KI). Quality of life and gait performance were assessed using short form 36 (SF36) questionnaire and functional gait assessment test, respectively. Back extension range of motion (ROM) and back extensor strength were also assessed. Pearson's correlation test was used to analyze the data, with the significance level of $p < 0.05$.

Results

The findings revealed a statistically significant negative correlation between KI and quality of life ($r = -0.48, p < 0.005$) and KI and gait performance ($r = -0.74, p < 0.0005$). There was also a significantly negative relation between KI and back extension ROM and back extensor strength ($p < 0.05$).

Conclusion

The results of this study demonstrated that increased thoracic kyphosis negatively affects gait performance and quality of life. This finding could be regarded as an important implication for therapist to pay more attention to the magnitude of thoracic kyphosis angle and its changes, when selecting appropriate therapeutic methods to improve gait performance and quality of life in osteoporosis women.

Gait cadence

Gait Posture. 2015 Apr 28. pii: S0966-6362(15)00453-1. doi: 10.1016/j.gaitpost.2015.04.012.

Quantifying the cadence of free-living walking using event-based analysis.

Granat M¹, Clarke C², Holdsworth R³, Stansfield B⁴, Dall P⁵.

Author information

Abstract

PURPOSE:

Free-living walking occurs over a wide range of durations and intensities (cadence). Therefore, its characterisation requires a full description of the distribution of duration and cadence of these walking events. The aim was to use event-based analysis to characterise this in a population with intermittent claudication (IC) and a healthy matched control group.

METHODS:

Seven-day walking activity was recorded using the activPAL activity monitor in a group of people with IC (n=30) and an age-matched control group (n=30). The cadence, number of steps and duration of individual walking events were calculated and outcomes were derived, and compared (p<0.05), based on thresholds applied.

RESULTS:

Both groups had similar number of walking events per day (392±117 vs 415±160). The control group accumulated a greater proportion of their walking at higher cadences and 32% of their steps were taken at a cadence above 100steps/min, for the IC group this was 20%. Longer walking events had higher cadences and the IC group had fewer of these. As walking events became longer the cadence increased but the inter-event cadence variability decreased. More purposeful walking might occur at a higher cadence, and be performed at a preferred cadence. Individuals with IC had a smaller volume of walking, but these differences occurred almost entirely above a cadence of 90steps/min.

CONCLUSIONS:

This is the first study which has quantified the cadence of continuous periods of free-living walking. The characteristics (duration, number of steps and cadence) of all the individual walking events were used to derive novel outcomes, providing new insights into free-living walking behaviour.

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KEYWORDS:

Accelerometry; Intermittent claudication; Physical activity; Stepping rate

PMID: 25953505

PAIN

Side effects of medication

Pain. 2015 Jun;156(6):1092-100. doi: 10.1097/j.pain.0000000000000154.

Self-reports of medication side effects and pain-related activity interference in patients with chronic pain: a longitudinal cohort study.

Martel MO¹, Finan PH, Dolman AJ, Subramanian S, Edwards RR, Wasan AD, Jamison RN.
Author information

Abstract

The primary purpose of this study was to examine the association between self-reports of medication side effects and pain-related activity interference in patients with chronic pain.

The potential moderators of the association between reports of side effects and pain-related activity interference were also examined. A total of 111 patients with chronic musculoskeletal pain were asked to provide, once a month for a period of 6 months, self-reports of medication use and the presence of any perceived side effects (eg, nausea, dizziness, headaches) associated with their medications. At each of these time points, patients were also asked to provide self-reports of pain intensity, negative affect, and pain-related activity interference. Multilevel modeling analyses revealed that month-to-month increases in perceived medication side effects were associated with heightened pain-related activity interference ($P < 0.05$). Importantly, multilevel models revealed that perceived medication side effects were associated with heightened pain-related activity interference even after controlling for the influence of patient demographics, pain intensity, and negative affect.

This study provides preliminary evidence that reports of medication side effects are associated with heightened pain-related activity interference in patients with chronic pain beyond the influence of other pain-relevant variables. The implications of our findings for clinical practice and the management of patients with chronic pain conditions are discussed.

PMID: 25782367

Pain and disability

Pain. 2015 Jun;156(6):988-97. doi: 10.1097/j.pain.000000000000146.

How does pain lead to disability? A systematic review and meta-analysis of mediation studies in people with back and neck pain.

Lee H¹, Hübscher M, Moseley GL, Kamper SJ, Traeger AC, Mansell G, McAuley JH.

Author information

Abstract

Disability is an important outcome from a clinical and public health perspective.

However, it is unclear how disability develops in people with low back pain or neck pain. More specifically, the mechanisms by which pain leads to disability are not well understood. Mediation analysis is a way of investigating these mechanisms by examining the extent to which an intermediate variable explains the effect of an exposure on an outcome. This systematic review and meta-analysis aimed to identify and examine the extent to which putative mediators explain the effect of pain on disability in people with low back pain or neck pain. Five electronic databases were searched. We found 12 studies (N = 2961) that examined how pain leads to disability with mediation analysis. Standardized regression coefficients (β) of the indirect and total paths were pooled. We found evidence to show that self-efficacy ($\beta = 0.23$, 95% confidence interval [CI] = 0.10 to 0.34), psychological distress ($\beta = 0.10$, 95% CI = 0.01 to 0.18), and fear ($\beta = 0.08$, 95% CI = 0.01 to 0.14) mediated the relationship between pain and disability, but catastrophizing did not ($\beta = 0.07$, 95% CI = -0.06 to 0.19). The methodological quality of these studies was low, and we highlight potential areas for development.

Nonetheless, the results suggest that there are significant mediating effects of self-efficacy, psychological distress, and fear, which underpins the direct targeting of these constructs in treatment.

PMID: 25760473

Hyperbaric therapy

Pain Pract. 2015 May 19. doi: 10.1111/papr.12312.

Hyperbaric Oxygen Therapy: A New Treatment for Chronic Pain?

Sutherland AM¹, Clarke HA¹, Katz J^{1,2}, Katznelson R^{1,3}.

Author information

Abstract

BACKGROUND AND OBJECTIVE:

Hyperbaric oxygen therapy (HBOT) is a treatment providing 100% oxygen at a pressure greater than that at sea level. HBOT is becoming increasingly recognized as a potential treatment modality for a broad range of ailments, including chronic pain. In this narrative review, we discuss the current understanding of pathophysiology of nociceptive, inflammatory and neuropathic pain, and the body of animal studies addressing mechanisms by which HBOT may ameliorate these different types of pain. Finally, we review clinical studies suggesting that HBOT may be useful in treating chronic pain syndromes, including chronic headache, fibromyalgia, complex regional pain syndrome, and trigeminal neuralgia.

DATABASE AND DATA TREATMENT:

A comprehensive search through MEDLINE, EMBASE, Scopus, and Web of Science for studies relating to HBOT and pain was performed using the following keywords: hyperbaric oxygen therapy or hyperbaric oxygen treatment (HBOT), nociceptive pain, inflammatory pain, neuropathic pain, HBOT AND pain, HBOT AND headache, HBOT AND fibromyalgia, HBOT AND complex regional pain syndrome, and HBOT AND trigeminal neuralgia.

RESULTS:

Twenty-five studies examining the role of HBOT in animal models of pain and human clinical trials were found and reviewed for this narrative review.

CONCLUSIONS:

HBOT has been shown to reduce pain using animal models. Early clinical research indicates HBOT may also be useful in modulating human pain; however, further studies are required to determine whether HBOT is a safe and efficacious treatment modality for chronic pain conditions.

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KEYWORDS: *analgesia; animal models; cluster headache; complex regional pain syndromes; fibromyalgia; hyperbaric oxygen therapy; inflammation; neuropathic pain; nociception; review; trigeminal neuralgia*

PMID: 25988526

Depression and pain

BMC Psychiatry. 2015 May 7;15:104. doi: 10.1186/s12888-015-0488-8.

The incremental burden of pain in patients with depression: results of a Japanese survey.

Vietri J¹, Otsubo T², Montgomery W³, Tsuji T⁴, Harada E⁵.

Author information

Abstract

BACKGROUND:

Major depressive disorder (MDD) is a chronic mental illness which affects an estimated 3% of the Japanese population. Many patients with MDD report painful physical symptoms, and research outside of Japan suggests such patients may represent a subtype of depression which is more severe and difficult to treat. There is no evidence available about the characteristics or incremental burden of these patients in Japan. The objective of this study was to quantify the incremental burden of physical pain among individuals in Japan diagnosed with depression.

METHODS:

Data for individuals age 18 and older who reported a physician diagnosis of depression were obtained from the Japan National Health and Wellness Survey (NHWS). Respondents who also reported physical pain were matched to respondents who did not report pain using propensity scores and compared using bivariate statistics. Measures included Patient Health Questionnaire (PHQ-9) for depression severity, Medical Outcomes Study 12-Item Short Form Survey Instrument (SF-12v2) for health-related quality of life, the Work Productivity and Activity Impairment (WPAI) for work and activity impairment, and 6-month report of health care use.

RESULTS:

Individuals with depression who reported physical pain had higher PHQ-9 depression scores (14.3 vs. 11.1, $p<0.001$), lower health-related quality of life (Mental Component Summary score [MCS] 29.1 vs. 32.0, $p<0.01$; Physical Component Summary score [PCS] 43.0 vs. 47.2, $p<0.001$; health utility [SF-6D] 0.567 vs. 0.613, $p<0.001$), more presenteeism (46.3% vs. 36.8%, $p<0.01$), more overall work impairment (51.4% vs. 42.3%, $p<0.01$), more activity impairment (55.4% vs. 43.9%, $p<0.001$), and reported using more health care provider visits in the prior 6 months (17.7 vs. 12.8, $p<0.01$) as well as hospitalizations (1.7 vs. 0.8, $p<0.05$) relative to propensity-score matched controls without pain. Absenteeism (13.1% vs. 11.4%, $p=0.51$) and emergency room visits (0.31 vs. 0.35, $p=0.76$) were not significantly different between the two matched groups.

CONCLUSIONS:

Individuals whose depression is accompanied by physical pain have a higher burden of illness than those whose depression does not include physical pain. Clinicians should take the presence of pain into account and consider treating both the physical and emotional symptoms of these patients.

PMID: 25947635

FIBROMYALGIA**Impact****The comparative burden of chronic widespread pain and fibromyalgia in the united states**

Pain Practice, 05/19/2015 Schaefer C, et al.

Abstract

Background/Purpose

Little information exists on the comparative patient and economic burden of chronic widespread pain (CWP) and fibromyalgia (FM) in the United States.

Methods

This multistage, observational study included an online screening survey of a large geographically diverse US sample to assess CWP status, a physician/site visit to determine FM diagnosis, and an online subject questionnaire to capture clinical characteristics, pain, health status, functioning, sleep, healthcare resource use (HRU), productivity, and costs. Based on the screener and physician evaluation, mutually exclusive groups of subjects without CWP (CWP-), with CWP but without FM (CWP+), and with confirmed FM were identified.

Results

Disease burden was examined in 472 subjects (125 CWP-, 176 CWP+, 171 FM). Age, race, and ethnicity were similar across groups. Mean body mass index and number of comorbidities increased from CWP- to CWP+ to FM ($P = 0.0044$, $P < 0.0001$, respectively). From CWP- to CWP+ to FM, there were reductions in health status (EQ-5D, SF-12) and sleep outcomes (MOS-SS, SSQ) (all $P < 0.05$). Pain severity, interference with function (BPI-SF), and overall work impairment (WPAI:SHP) increased from CWP- to CWP+ to FM (all $P < 0.0001$). Higher proportions of CWP+ (52.8%) and FM subjects (62.6%) were taking pain-related prescription medications relative to CWP- subjects (32.8%; $P < 0.0001$). Significant differences in total direct and indirect costs across the three groups (both $P < 0.0001$) were observed, with highest costs among FM subjects.

Conclusion

Fibromyalgia subjects were characterized by the greatest disease burden with more comorbidities and pain-related medications, poorer health status, function, sleep, lower productivity, and higher costs.

NUTRITION/VITAMINS

Glucosamine

Impact of disease treatments on the progression of knee osteoarthritis structural changes related to meniscal extrusion: Data from the oai progression cohort

Seminars in Arthritis and Rheumatism, 05/19/2015 Roubille C, et al.

Abstract**Objective**

In the perspective of personalized management of osteoarthritis (OA), one clinically relevant concern is the impact of meniscal extrusion (Ext) on response to treatment. This study aimed at determining the effects of conventional OA pharmacological treatments and those of the combination of glucosamine and chondroitin sulfate (Glu/CS) on knee structural changes in the presence or absence of Ext, using data from the progression cohort of the Osteoarthritis Initiative.

Methods

In this longitudinal study, knee OA participants were stratified based on whether (+) or not (-) they received analgesics/NSAIDs (+ and -analgesics/NSAIDs) and/or Glu/CS (+ and -Glu/CS) for 24 consecutive months and on the presence (Ext+) or absence (Ext-) of medial meniscal extrusion at baseline. The main outcomes were knee structural changes including the loss of joint space width (JSW) and cartilage volume loss measured by quantitative MRI.

Results

In both - and +analgesics/NSAIDs groups (n=300 each), the Ext+ participants had more advanced disease at baseline (T0), and more JSW loss and cartilage volume loss in the medial compartment ($p \leq 0.003$, univariate; $p \leq 0.049$, multivariate analyses) at both 12 (T12) and 24 (T24) months compared to Ext- participants. In the -analgesics/NSAIDs group, Ext+ participants taking Glu/CS had significantly less cartilage volume loss in the medial plateau at T24 ($p \leq 0.010$, univariate and multivariate analyses). In the +analgesics/NSAIDs group at T24, Ext- participants taking Glu/CS had less cartilage volume loss in the global ($p \leq 0.002$, univariate and multivariate analyses) and medial and lateral plateaus ($p = 0.034$, $p = 0.013$, respectively, multivariate analysis). No significant difference in JSW loss was found between groups.

Conclusion

This study is the first to demonstrate, using qMRI, that meniscal extrusion can modify the response to Glu/CS treatment in knee OA patients, depending on the severity of the disease.

NEUROLOGICAL CONDITIONS

MS

Generalised cognitive motor interference in multiple sclerosis

Gait and Posture, 05/01/2015 Learmonth YC, et al.

Abstract

Researchers have examined cognitive motor interference (CMI) for lower extremity function in MS, but have not examined this in the upper extremity.

This study examined CMI for both lower and upper extremity motor tasks in persons with MS and without MS. Eighty-two persons walked on a GAITRite electronic walkway (velocity) and performed the nine-hole peg test (NHPT, seconds) without (single task) and with a cognitive challenge (dual task). The data were analysed with mixed-factor ANOVA and Pearson correlations. When comparing MS and controls, there were statistical significant and exceptionally large Task main effects on gait velocity ($\eta_p^2 = .41$; $F_{1,60} = 55.78$; $p < .005$) and NHPT performance ($\eta_p^2 = .62$; $F_{1,60} = 127.8$; $p < .005$). When considering disability status among those with MS, there were statistically significant and large Task main effects on velocity ($\eta_p^2 = .38$; $F_{1,60} = 37.3$; $p < .005$) and NHPT test ($\eta_p^2 = .62$; $F_{1,60} = 95.7$; $p < .005$).

The dual task cost of walking and performing the NHPT were significantly correlated in the entire sample, those with MS and controls, and in those with MS who had mild, moderate, and severe disability (all $|r| > .450$). CMI occurs in both the lower and upper extremities, and is comparable between persons with and without MS and across MS disability level.