

ABSTRACTS

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LUMBAR SPINE
LBP

Sleep and LBP

Clin J Pain. 2014 Sep;30(9):755-65. doi: 10.1097/AJP.0000000000000055.

The bidirectional relationship between pain intensity and sleep disturbance/quality in patients with low back pain.

Alsaadi SM1, McAuley JH, Hush JM, Lo S, Bartlett DJ, Grunstein RR, Maher CG.

Abstract

OBJECTIVES:

This study investigated the bidirectional relationship between the intensity of low back pain (LBP) and sleep disturbance. Further, the study aimed to determine whether any relationship is dependent on pain duration, symptoms of depression and anxiety, and the method of sleep assessment (subjective vs. objective).

MATERIALS AND METHODS:

Eighty patients with LBP completed a sleep diary. A subgroup of 50 patients additionally wore an electronic device (Armband) to measure sleep for 7 consecutive days. Pain intensity was assessed twice daily using a sleep diary. Depression and anxiety symptoms were assessed at baseline using the Depression Anxiety Stress Scale questionnaire. Generalized estimating equations (GEE) with an exchangeable correlation structure were used to examine the relationship between day-time pain intensity and sleep.

RESULTS:

The GEE analysis showed that a night of poor sleep quality, difficulty falling sleep (assessed by the sleep diary), waking after sleep onset, and low sleep efficiency (assessed by the sleep diary and Armband) were followed by a day with higher pain intensity. Further, a day with higher pain intensity was associated with a decrease in the subsequent night's sleep quality, an increase in sleep latency (assessed by the sleep diary), waking after sleep onset (assessed by both measures), and low sleep efficiency (assessed by the Armband).

DISCUSSION:

The findings demonstrate that there is a bidirectional relationship between sleep and pain intensity in patients with LBP. The relationship is independent of pain duration and baseline symptoms of depression and anxiety and somewhat dependent on the method of sleep measurement (sleep diary or Armband). Future research is needed to determine whether targeting sleep improvement in patients with LBP contributes to pain reduction.

PMID: 24451630

LBP experience and positions

J Neuroeng Rehabil. 2014 Jul 31;11(1):115.

Altered regional homogeneity in experimentally induced low back pain: a resting-state fMRI study.

Zhang SS, Wu W, Liu ZP, Huang GZ, Guo SG, Yang JM.

Abstract

BACKGROUND:

Functional imaging studies have indicated that patients with low back pain can have significant reductions in cerebral cortex grey matter. However, the mechanisms governing the nociceptive pathways in the human brain are unclear. The aim of this study was to use functional magnetic resonance imaging (fMRI) and regional homogeneity (ReHo) to investigate changes in resting-state brain activity in subjects that experienced experimentally induced low back pain.

METHODS:

Healthy subjects (n = 15) underwent fMRI (3.0 T) at baseline and during painful stimulation (intramuscular injection of 3% hypertonic saline).

RESULTS:

Compared to the scans conducted at baseline, scans conducted during experimentally induced low back pain showed increased ReHo on the right side in the medial prefrontal cortex, precuneus, insula, parahippocampal gyrus and cerebellum (posterior lobe), but decreased ReHo in the primary somatosensory cortex, anterior cingulate cortex and parahippocampal gyrus on the left side. The right inferior parietal lobule also showed a decreased ReHo ($P < 0.05$, cluster threshold ≥ 10).

CONCLUSIONS:

These findings suggest that abnormally spontaneous resting-state activity in some brain regions may be associated with pain processing. These changes in neural activity may contribute to the recognition, execution, memory and emotional processing of acute low back pain.

PMID: 25080831

Sleep deprivation and LBP

Int Arch Occup Environ Health. 2014 Aug 2.

Sleep disturbances predict long-term changes in low back pain among Finnish firefighters: 13-year follow-up study.

Lusa S1, Miranda H, Luukkonen R, Punakallio A.

Abstract

PURPOSE:

To investigate the prevalence of low back pain among Finnish firefighters and to examine whether sleep disturbances predict membership of low back pain trajectories.

METHODS:

In this prospective study, 360 actively working firefighters responded to a questionnaire in 1996, 1999 and 2009. The outcome variables were radiating and local low back pain during the preceding year. Using logistic regression modeling, the likelihood of membership of pain trajectories was predicted by sleep disturbances at baseline.

RESULTS:

During the 13-year follow-up, the prevalence of radiating low back pain increased from 16 to 29 % ($p < 0.0001$) and that of local low back pain from 28 to 40 % ($p < 0.001$). The following trajectories were identified: "pain free," "recovering," "new pain," "fluctuating" and "chronic." More than one-fifth of the participants belonged to the new pain trajectory as regards both pain types, 6 % of the participants belonged to the chronic radiating and 12 % to the chronic local low back pain trajectory. Those with sleep disturbances at baseline had a 2.4-fold risk (adjusted OR 2.4; 95 % CI 1.2-4.7) of belonging to the new pain or chronic radiating pain cluster compared to pain-free participants.

CONCLUSIONS:

This is the first prospective study to show that low back symptoms are common and persistent among firefighters and that sleep disturbances strongly predict membership of a radiating pain trajectory. Occupational health and safety personnel, as well as the firefighters themselves, should recognize sleep problems early enough in order to prevent back pain and its development into chronic pain.

PMID: 25085527

Alternative medicine and expectations

BMC Complement Altern Med. 2014 Jul 30;14(1):276.

New perspectives on patient expectations of treatment outcomes: results from qualitative interviews with patients seeking complementary and alternative medicine treatments for chronic low back pain.

Hsu C, Sherman KJ, Eaves ER, Turner JA, Cherkin DC, Crompt D, Schafer L, Ritenbaugh C.

Abstract

BACKGROUND:

Positive patient expectations are often believed to be associated with greater benefits from complementary and alternative medicine (CAM) treatments. However, clinical studies of CAM treatments for chronic pain have not consistently supported this assumption, possibly because of differences in definitions and measures of expectations. The goal of this qualitative paper is to provide new perspectives on the outcome expectations of patients prior to receiving CAM therapies for chronic low back pain.

METHODS:

We conducted semi-structured interviews with 64 individuals receiving massage, chiropractic, acupuncture or yoga for chronic low back pain. Interviews were recorded and transcribed. Transcripts were analyzed by a team of experienced qualitative researchers using an immersion/crystallization approach to coding and analysis.

RESULTS:

Overall, participants' expectations of treatment outcomes tended to cluster in four key domains: pain relief, improved function (including an increase in ability to engage in meaningful activities), improved physical fitness, and improved overall well-being (including mental well-being). Typically, patients had modest expectations for outcomes from treatment. Furthermore, outcome expectations were complex on several levels. First, the concept of expectations overlapped with several related concepts; in particular, hopes. Participants sometimes used expectations and hopes interchangeably and at other times made clear distinctions between these two terms depending on context. A related finding was that participants were cautious about stating that they expected positive outcomes. Finally, participants articulated strong interrelationships among the four key domains and often discussed how changes in one domain might affect other domains.

CONCLUSIONS:

Overall, these findings contribute to a growing body of literature exploring the role of expectations in patient outcomes. This paper provides important guidance that may help refine the way treatment expectations are studied in the future. In particular, participants' statements indicate that standardized measures of patient expectations should include items that capture hesitancy to articulate overly optimistic outcomes as well as interrelationships among different outcomes.

PMID: 25077732

Muscle size

Man Ther. 2014 Jul 17. pii: S1356-689X(14)00135-0. doi: 10.1016/j.math.2014.07.007

Age and side-related morphometric MRI evaluation of trunk muscles in people without back pain.

Valentin S1, Licka T2, Elliott J3.

Abstract

Purpose: This study evaluated lumbar spine muscle volume and Muscle Fatty Infiltrate (MFI) across two age groups of healthy adults.

Methods: Twenty-four participants (young group - YG: age 18-25, n = 12; mature group - MG: age 45-60, n = 12) without low back pain underwent T1-weighted axial MRI. Muscle volume and MFI were obtained from the left and right lumbar erector spinae (ES), multifidus (M), rectus abdominis (RA) and psoas (PS) muscles. For MFI, mean pixel intensity (MPI) of muscles was reported as a percentage of subcutaneous fat MPI.

Findings: Within-group comparison of left and right side muscle volume was not significantly different in the YG. In the MG, right RA and ES were significantly smaller than left (RA p = 0.049; ES p = 0.03). In both groups, left PS, M and ES MFI was significantly smaller compared to the right side and left RA MFI was significantly greater compared to right side (all p ≤ 0.001). For M volume, 81.7-84.6% of variance was explained by age, height and Body Mass Index (BMI). For ES volume, 81.6-82.8% of variance was explained by height and BMI. Age explained 18.1%-36.0% of variance in M and ES right MFI.

Conclusions: Age and BMI are relevant factors for extensor muscle volume, but not for flexor muscle volume. Also, age significantly influences MFI for right-sided extensors only. The age effect is apparently independent of full subjective back functionality. For future spinal muscle research, the side-and muscle-specific effect of age on muscle morphology should be considered.

KEYWORDS: Fatty infiltration; Lumbar spine; MRI; Muscle volume
PMID: 25085813

The person and LBP

Spine J. 2014 Aug 1;14(8):1769-1780. doi: 10.1016/j.spinee.2014.02.029. Epub 2014 Apr 29.

A systematic review of low back pain and sciatica patients' expectations and experiences of health care.

Hopayian K1, Notley C2.

Abstract

BACKGROUND CONTEXT:

Previous systematic reviews of patients' experience of health services have used mixed qualitative and quantitative studies. This review focused on qualitative studies, which are more suitable for capturing experience, using modern methods of synthesis of qualitative studies.

PURPOSE:

To describe the experience of health care of low back pain and sciatica patients and the sources of satisfaction or dissatisfaction with special reference to patients who do not receive a diagnosis.

STUDY DESIGN:

A systematic review of qualitative studies.

SAMPLE:

Primary qualitative studies identified from Medline, Embase, CINAHL, and Psycinfo databases.

OUTCOME MEASURES:

Conceptual themes of patients' experiences.

METHOD:

Data collection and analysis were through thematic content analysis. Two reviewers independently screened titles and collected and analyzed data. The authors were in receipt of a Primary Care Research Bursary from National Health Service Suffolk and Norfolk Research Departments, a not-for-profit organization.

RESULTS:

Twenty-eight articles met the inclusion criteria. Most studies were of high quality. Nine themes emerged: the process and content of care, relationships and interpersonal skills, personalized care, information, the outcome of care, the importance of a diagnosis, delegitimation, recognizing the expert, and service matters. How care was given mattered greatly to patients, with importance given to receiving a perceived full assessment, consideration for the individual's context, good relationships, empathy, and the sharing of information. These aspects of care facilitated the acceptance by some of the limitations of health care and were spread across disciplines. Not having a diagnosis made coping more difficult for some but for others led to delegitimation, a feeling of not being believed. Service matters such as cost and waiting time received little mention.

CONCLUSIONS:

Although much research into the development of chronic low back pain (LBP) has focused on the patient, this review suggests that research into aspects of care also warrant research. The benefits of generic principles of care, such as personalization and communication, are important to patients with LBP and sciatica; so, practitioners may help their patients by paying as much attention to them as to specific interventions. When neither cure nor a diagnostic label is forthcoming, generic skills remain important for patient satisfaction.

Tactile sensitivity and LBP

Man Ther. 2014 Jul 15. pii: S1356-689X(14)00132-5. doi: 10.1016/j.math.2014.06.010

Are tactile acuity and clinical symptoms related to differences in perceived body image in patients with chronic nonspecific lower back pain?

Nishigami T1, Mibu A2, Osumi M3, Son K2, Yamamoto S2, Kajiwara S2, Tanaka K2, Matsuya A4, Tanabe A2.

Abstract

Purpose: Clinically, perceived image of the lower back and the two-point discrimination (TPD) test are used as markers for evaluating alterations of cortical reorganization. The purpose of the present study was to examine whether TPD and selected clinical findings are different in subgroups of individuals with chronic nonspecific lower back pain (CNLBP) based on body image drawings.

Methods: Forty-two patients with CNLBP and seventeen healthy individuals were recruited. Perceived body image, TPD and clinical profiles was measured.

Findings: Of the patients with CNLBP, 42.8% had a normal perceived body image, 28.5% an expanded image, and 28.5% a shrunken image. The TPD distance threshold was significantly larger for the expanded subgroup (13.3 ± 6.8 mm) compared with the control (5.5 ± 3.8 mm; Difference, 7.8; 95%CI, 1.83 to 13.66; $p < 0.05$) and normal subgroups (4.5 ± 5.5 mm; Difference, 8.8; 95%CI, 2.90 to 14.59; $p < 0.05$). No significant differences in pain intensity, duration of pain, Roland Morris Disability Questionnaire (RDQ), and Pain Catastrophizing Scale (PCS) scores were found between three body image subgroups.

Conclusions: Our results suggest that TPD is increased in patients who report an expanded perceived image of the lower back compared with healthy individuals and patients who report a normal image. The effectiveness of new rehabilitation techniques may be evaluated by assessing perceived image of the lower back and TPD values for patients with CNLBP before and after treatment.

KEYWORDS: Body image; Cortical reorganization; Low back pain; Tactile acuity

PMID: 25081221

Disc

Impact of different types of herniations

Spine J. 2014 Aug 1;14(8):1526-31. doi: 10.1016/j.spinee.2013.09.020. Epub 2013 Oct 11.

Similar outcome despite slight clinical differences between lumbar radiculopathy induced by lateral versus medial disc herniations in patients without previous foraminal stenosis: a prospective cohort study with 1-year follow-up.

Mérot OA1, Maugars YM1, Berthelot JM2.

Abstract

BACKGROUND CONTEXT: It has been claimed that lumbar radiculopathy induced by foraminal disc herniations had poorer outcome and different clinical features, including: 1-more progressive onset, but shorter duration between the first sign and request of medical care; 2-more severe radiculopathy; 3-less frequent/severe back pain; 4-less limitation of straight leg raising (SLR); 5-more frequent neurologic deficiencies; 6-poorer outcome.

PURPOSE: To check whether this still holds true when including only patients without other reasons for foraminal stenosis, that is, whether patients with medial disc herniations had different features and outcome than those with more lateral disc herniations.

STUDY DESIGN: All patients hospitalized to treat a lumbar radiculopathy within a 6-month period in two French rheumatology units in 2012 were included in this prospective study each time computed tomography scan or magnetic resonance imaging had already been performed and showed clear disc bulging/herniation but no features of medial or lateral spinal stenosis.

PATIENT SAMPLE: Fifty-nine patients (31 males, 49 with sciatica only) were included: 31 (53%) had medial disc herniations and 28 (47%) had more lateral herniations (posterolateral in 3, foraminal in 20, and far lateral in 5).

OUTCOME MEASURES: Outcome was assessed by a phone call 1 year after the baseline assessment using a standardized questionnaire. Patients were asked whether they experienced a relapse of their radiculopathy after discharge from the hospital; whether they had been operated or not; whether they felt it had improved or not; whether they felt cured or not; to assess their level of pain radiating in the leg when standing on a 0 to 10 verbal scale; and how long they could walk.

METHODS: Features of patients with medial disc herniations were compared with patients with more lateral herniations.

RESULTS: No significant differences according to the location of herniations were noticed for the speed of radiculopathy onset, time elapsed since onset, back pain (both lying or standing), and leg pain (both lying or standing), but slight significant differences (t test <0.05) were observed for other items: the 28 patients with lateral herniations were 8 years older (53.4 ± 15.8 vs. 45.2 ± 12.6), their herniations involved discs from upper levels of the lumbar spine (above L4-L5: 7/28 vs. 3/31), motor weakness was more frequent (25% vs. 3%), SLR was less restricted ($65.0^\circ \pm 24.5^\circ$ vs. $51.1^\circ \pm 25.7^\circ$), DN4 score of neuropathic pain was higher (4.4 ± 2.1 vs. 3.2 ± 1.8), anxiety level was higher (10.3 ± 4.1 vs. 7.9 ± 3.2), length of hospital stay was longer (5.7 ± 2.4 days vs. 4.5 ± 1.4 days), and physician's prognosis of a good outcome was poorer (6.6 ± 2.2 vs. 8.0 ± 1.6). However, at the end of follow-up (12.2 ± 3.3 months), outcome was similar: 37% (vs. 41% for medial herniations) had transiently relapsed, 66% felt finally improved (vs. 63%), and walking capacity was nearly identical despite the fact that only 18% had to be operated (vs. 32% of those with medial herniations).

CONCLUSIONS: Despite differences in clinical presentation, the outcome of radiculopathy induced by the more lateral lumbar disc herniations was not worse than the outcome of patients with only medial disc herniations. Previous claims of poorer outcome in foraminal herniations might be explained by the inclusion of patients with associated foraminal stenosis.

KEYWORDS: Disc; Foraminal; Herniation; Lateral; Medial; Outcome; Prognosis; Radiculopathy;

Viability, growth kinetics and stem cell markers of single and clustered cells in human intervertebral discs: implications for regenerative therapies.

Turner S1, Balain B, Caterson B, Morgan C, Roberts S.

Abstract

PURPOSE:

There is much interest in the development of a cellular therapy for the repair or regeneration of degenerate intervertebral discs (IVDs) utilising autologous cells, with some trials already underway. Clusters of cells are commonly found in degenerate IVDs and are formed via cell proliferation, possibly as a repair response. We investigated whether these clusters may be more suitable as a source of cells for biological repair than the single cells in the IVD.

METHODS:

Discs were obtained at surgery from 95 patients and used to assess the cell viability, growth kinetics and stem or progenitor cell markers in both the single and clustered cell populations.

RESULTS:

Sixty-nine percent (± 15) of cells in disc tissue were viable. The clustered cell population consistently proliferated more slowly in monolayer than single cells, although this difference was only significant at P0-1 and P3-4. Both populations exhibited progenitor or notochordal cell markers [chondroitin sulphate epitopes (3B3(-), 7D4, 4C3 and 6C3), Notch-1, cytokeratin 8 and 19] via immunohistochemical examination; stem cell markers assessed with flow cytometry (CD73, 90 and 105 positivity) were similar to those seen on bone marrow-derived mesenchymal stem cells.

CONCLUSIONS:

These results confirm those of previous studies indicating that progenitor or stem cells reside in adult human intervertebral discs. However, although the cell clusters have arisen via proliferation, there appear to be no greater incidence of these progenitor cells within clusters compared to single cells. Rather, since they proliferate more slowly in vitro than the single cell population, it may be beneficial to avoid the use of clustered cells when sourcing autologous cells for regenerative therapies.

PMID: 25095758

INJECTIONS

Glucocorticoids

N Engl J Med. 2014 Jul 3;371(1):11-21. doi: 10.1056/NEJMoa1313265.

A randomized trial of epidural glucocorticoid injections for spinal stenosis.

Friedly JL, Comstock BA, Turner JA, Heagerty PJ, Deyo RA, Sullivan SD, Bauer Z, Bresnahan BW, Avins AL, Nedeljkovic SS, Nerenz DR, Standaert C, Kessler L, Akuthota V, Annaswamy T, Chen A, Diehn F, Firtch W, Gerges FJ, Gilligan C, Goldberg H, Kennedy DJ, Mandel S, Tyburski M, Sanders W, Sibell D, Smuck M, Wasan A, Won L, Jarvik JG.

Abstract

BACKGROUND:

Epidural glucocorticoid injections are widely used to treat symptoms of lumbar spinal stenosis, a common cause of pain and disability in older adults. However, rigorous data are lacking regarding the effectiveness and safety of these injections.

METHODS:

In a double-blind, multisite trial, we randomly assigned 400 patients who had lumbar central spinal stenosis and moderate-to-severe leg pain and disability to receive epidural injections of glucocorticoids plus lidocaine or lidocaine alone. The patients received one or two injections before the primary outcome evaluation, performed 6 weeks after randomization and the first injection. The primary outcomes were the score on the Roland-Morris Disability Questionnaire (RMDQ, in which scores range from 0 to 24, with higher scores indicating greater physical disability) and the rating of the intensity of leg pain (on a scale from 0 to 10, with 0 indicating no pain and 10 indicating "pain as bad as you can imagine").

RESULTS:

At 6 weeks, there were no significant between-group differences in the RMDQ score (adjusted difference in the average treatment effect between the glucocorticoid-lidocaine group and the lidocaine-alone group, -1.0 points; 95% confidence interval [CI], -2.1 to 0.1; P=0.07) or the intensity of leg pain (adjusted difference in the average treatment effect, -0.2 points; 95% CI, -0.8 to 0.4; P=0.48). A prespecified secondary subgroup analysis with stratification according to type of injection (interlaminar vs. transforaminal) likewise showed no significant differences at 6 weeks.

CONCLUSIONS:

In the treatment of lumbar spinal stenosis, epidural injection of glucocorticoids plus lidocaine offered minimal or no short-term benefit as compared with epidural injection of lidocaine alone.

Surgery

Obesity/complications

The Spine Journal

Obese Class III patients at significantly greater risk of multiple complications after lumbar surgery: an analysis of 10,387 patients in the ACS NSQIP database

Rafael A. Buerba, BA, [Michael C. Fu](#), BS, [Jordan A. Gruskay](#), BA, [William D. Long III](#), MD, [Jonathan N. Grauer](#), MD  Published Online: December 09, 2013

Abstract

Background context: Prior studies on the impact of obesity on spine surgery outcomes have focused mostly on lumbar fusions, do not examine lumbar discectomies or decompressions, and have shown mixed results regarding complications. Differences in sample sizes and body mass index (BMI) thresholds for the definition of the obese versus comparison cohorts could account for the inconsistencies in the literature.

Purpose: The purpose of the study was to analyze whether different degrees of obesity influence the complication rates in patients undergoing lumbar spine surgery.

Study design/setting: This was a retrospective cohort analysis of prospectively collected data using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database from 2005 to 2010.

Patient sample: Patients in the de-identified, risk-adjusted, and multi-institutional ACS NSQIP database undergoing lumbar anterior fusion, posterior fusion, transforaminal lumbar interbody fusion/posterior lumbar interbody fusion (TLIF/PLIF), discectomy, or decompression were included.

Outcome measures: Primary outcome measures were 30-day postsurgical complications, including pulmonary embolism and deep vein thrombosis, death, system-specific complications (wound, pulmonary, urinary, central nervous system, and cardiac), septic complications, and having one or more complications overall. Secondary outcomes were time spent in the operating room, blood transfusions, length of stay, and reoperation within 30 days.

Methods: Patients undergoing lumbar anterior fusion, posterior fusion, TLIF/PLIF, discectomy, or decompression in the ACS NSQIP, 2005 to 2010, were categorized into four BMI groups: nonobese (18.5–29.9 kg/m²), Obese I (30–34.9 kg/m²), Obese II (35–39.9 kg/m²), and Obese III (greater than or equal to 40 kg/m²). Obese I to III patients were compared with patients in the nonobese category using chi-square test and analysis of variance. Multivariate linear/logistic regression models were used to adjust for preoperative risk factors.

Results: Data were available for 10,387 patients undergoing lumbar surgery. Of these, 4.5% underwent anterior fusion, 17.9% posterior fusion, 6.3% TLIF/PLIF, 40.7% discectomy, and 30.5% decompression. Among all patients, 25.6% were in the Obese I group, 11.5% Obese II, and 6.9% Obese III. On multivariate analysis, Obese I and III had a significantly increased risk of urinary complications, and Obese II and III patients had a significantly increased risk of wound complications. Only Obese III patients, however, had a statistically increased risk of having increased time spent in the operating room, an extended length of stay, pulmonary complications, and having one or more complications (all $p < .05$).

Conclusions: Patients with high BMI appear to have higher complication rates after lumbar surgery than patients who are nonobese. However, the complication rates seem to increase substantially for Obese III patients. These patients have longer times spent in the operating room, extended hospital stays, and an increased risk for wound, urinary, and pulmonary complications and for having at least one or more complications overall. Surgeons should be aware of the increased risk of multiple complications for patients with BMI greater than or equal to 40 kg/m².

VISCERA

Abuse and GI Problems

J Trop Pediatr. 2014 Jul 23. pii: fmu035.

Association Between Functional Gastrointestinal Diseases and Exposure to Abuse in Teenagers.

Devanarayana NM1, Rajindrajith S2, Perera MS3, Nishanthanie SW3, Karunanayake A4, Benninga MA5.

Abstract

Purpose: Abdominal pain-predominant functional gastrointestinal diseases (AP-FGD) are common in children and commonly attributed to exposure to child abuse. However, this relationship has not been studied in teenagers, and the main objective of the current study was to assess it.

Method: Teenagers were recruited from four randomly selected schools in Western province of Sri Lanka. Data were collected using a validated self-administered questionnaire. AP-FGD were diagnosed using Rome III criteria. A total of 1850 teenagers aged 13-18 years were included. Three hundred and five (16.5%) had AP-FGD.

Findings: AP-FGD were significantly higher in those exposed to sexual (34.0%), emotional (25.0%) and physical (20.2%) abuse, than in those not abused (13.0%, $p < 0.001$). Those with AP-FGD exposed to abuse had a higher severity score for bowel symptoms (30.8% vs. 24.7% in not abused, $p < 0.05$).

Conclusions: This study highlights the importance of identifying exposure to abuse in management of teenagers with AP-FGD.

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KEYWORDS: abdominal pain; abuse; child; functional gastrointestinal disorder; somatization

THORACIC SPINE

Vertical compression injury

Journal of Bodywork and Movement Therapies

Lower thoracic syndrome – A differential screen for back pain following vertical compression injury: A case report

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Institute of Therapeutic Sciences, Residency in Orthopaedic Physical Therapy, Fellowship in Orthopaedic Manual Physical Therapy. Published Online: January 21, 2014

Summary

Purpose: A 36-year-old male experienced left sided back and radiating flank pain, following a fall on his buttock.

Method: A detailed medical evaluation ruled out the presence of red flags. Initial examination revealed positive findings of comparable local tenderness over the left T11, T12 and left paraspinal area, and a 2 cm shortening of the left leg. 8 treatment visits for a period of 4 weeks addressed mechanical dysfunction at the T11, T12, lumbar and pelvic region, comprising manual therapy, therapeutic exercise and pain relieving modalities.

Findings: Reduction of local tenderness, back and radiating flank pain was observed. Additionally, resolution of the persistent apparent shortening of his left leg was observed, following a high velocity thrust (HVT) manipulation of the T11, T12 segments. The vertebral motion segment of T11, T12, the thoracoabdominal nerves, the 12th rib, the quadratus lumborum and the serratus posterior inferior are speculated to be potential symptom mediators.

Conclusion: The findings in the case report suggest the lower thoracic region to be included during the evaluation process of back pain, especially when the mechanism of injury is a vertical compression.

Keywords: Vertical compression, Lower thoracic, Flank pain

CERVICAL SPINE

C spine and shoulder pain in adolescents

J Adolesc Health. 2014 Apr 16. pii: S1054-139X(14)00105-0. doi:

Adolescent Neck and Shoulder Pain-The Association With Depression, Physical Activity, Screen-Based Activities, and Use of Health Care Services.

Myrtveit SM1, Sivertsen B2, Skogen JC3, Frostholm L4, Stormark KM5, Hysing M5.

Abstract

PURPOSE:

Neck and shoulder pain is frequent in adolescents, and multiple factors seem to affect the risk of such symptoms. We aimed to investigate the prevalence of neck and shoulder pain in Norwegian adolescence and to examine whether behavioral and emotional factors were associated with the risk of neck and shoulder pain. Finally we aimed to investigate whether neck and shoulder pain was related to the use of health services.

METHOD:

Data from the population-based study ung@hordaland were used. Participants were asked how often during the last 6 months they had experienced neck and shoulder pain. The association between frequent neck and shoulder pain and physical activity, symptoms of depression, and screen-based activities was evaluated using logistic regression analyses stratified by gender. The relative risk of visiting health services when reporting neck and shoulder pain was calculated using multiple logistic regression analyses.

RESULTS:

Frequent neck and shoulder pain was reported by 20.0% (1,797 of the total 8,990) and more often by girls than boys ($p < .001$). A high score of depressive symptoms was the strongest risk factor for neck and shoulder pain in both boys and girls (odds ratio = 6.14 [95% confidence interval 4.48-8.42] and odds ratio = 3.10 [95% confidence interval 2.63-3.67], respectively). Frequent screen-based activities slightly increased the risk while physical activity was protective. Individuals reporting neck and shoulder pain more often visited their general practitioner (47.1% vs. 31.8%) and school health services (24.6% vs. 13.5%).

CONCLUSION:

Frequent neck and shoulder pain was reported in 20% of Norwegian adolescents. Symptoms of depression and screen-based activities increased the risk of neck and shoulder pain while physical activity was protective. Individuals reporting neck and shoulder pain visited health services more frequently than others.

KEYWORDS:

Adolescent health; Depression; Health services; Neck and shoulder pain; Physical activity; Risk factors; Screen-based activities

PMID: 24746679

CONCUSSIONS

PT and concussions

Br J Sports Med. 2014 May 22. pii: bjsports-2013-093267. doi: 10.1136/bjsports-2013-093267.

Cervicovestibular rehabilitation in sport-related concussion: a randomised controlled trial.

Schneider KJ1, Meeuwisse WH2, Nettel-Aguirre A3, Barlow K4, Boyd L5, Kang J6, Emery CA7.

Abstract

BACKGROUND/AIM:

Concussion is a common injury in sport. Most individuals recover in 7-10 days but some have persistent symptoms. The objective of this study was to determine if a combination of vestibular rehabilitation and cervical spine physiotherapy decreased the time until medical clearance in individuals with prolonged postconcussion symptoms.

METHODS:

This study was a randomised controlled trial. Consecutive patients with persistent symptoms of dizziness, neck pain and/or headaches following a sport-related concussion (12-30 years, 18 male and 13 female) were randomised to the control or intervention group. Both groups received weekly sessions with a physiotherapist for 8 weeks or until the time of medical clearance. Both groups received postural education, range of motion exercises and cognitive and physical rest until asymptomatic followed by a protocol of graded exertion. The intervention group also received cervical spine and vestibular rehabilitation. The primary outcome of interest was medical clearance to return to sport, which was evaluated by a study sport medicine physician who was blinded to the treatment group.

RESULTS:

In the treatment group, 73% (11/15) of the participants were medically cleared within 8 weeks of initiation of treatment, compared with 7% (1/14) in the control group. Using an intention to treat analysis, individuals in the treatment group were 3.91 (95% CI 1.34 to 11.34) times more likely to be medically cleared by 8 weeks.

CONCLUSIONS:

A combination of cervical and vestibular physiotherapy decreased time to medical clearance to return to sport in youth and young adults with persistent symptoms of dizziness, neck pain and/or headaches following a sport-related concussion.

KEYWORDS: Concussion; Physiotherapy; Sporting injuries; Sports physiotherapy

GLENOHUMERAL/SHOULDER

Steroid injections

PM R. 2014 Jul 1. pii: S1934-1482(14)00306-2. doi: 10.1016/j.pmrj.2014.06.015

Glenohumeral corticosteroid injections in adhesive capsulitis: a systematic search and review.

Song A, Higgins LD, Newman J, Jain NB.

Abstract

OBJECTIVES:

To assess the literature on outcomes of corticosteroid injections for adhesive capsulitis, and in particular, image-guided corticosteroid injections. TYPE: Systematic search and review

LITERATURE SURVEY: The databases used were PubMed (1966-present), Embase (1947-present), Web of Science (1900-present), and the Cochrane Central Register of Controlled Trials. Upon reviewing full text articles of these studies, a total of 25 studies were identified for inclusion. The final yield included 7 prospective studies, 16 randomized trials, and 2 retrospective studies.

METHODOLOGY:

This systematic review was formatted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Study criteria were limited to clinical trials, prospective studies, and retrospective studies that specifically evaluated intra-articular corticosteroid injections, both alone and in combination with other treatment modalities, for shoulder adhesive capsulitis. We included studies that were not randomized control trials because our review was not a meta-analysis. Data items extracted from each study included: study design, study population, mean patient age, duration of study, duration of symptoms, intervention, single or multiple injections, location of injections, control population, follow up duration, and outcome measurements. A percent change in outcome measures was calculated when corresponding data was available. Risk of bias in individual studies was assessed when appropriate.

SYNTHESIS:

All studies involved at least one corticosteroid injection intended for placement in the glenohumeral joint but only eight studies used image-guidance for all injections. Seven of these studies reported statistically significant improvements in ROM at 12 weeks of follow-up or earlier. Ninety-two percent of all studies documented a greater improvement in either visual analog pain scores or range of motion after corticosteroid injections in the first 1-6 weeks as compared with the control or comparison group.

CONCLUSIONS:

Corticosteroid injections offer rapid pain relief in the short-term (particularly in the first 6 weeks) for adhesive capsulitis. Long-term outcomes seem to be similar to other treatments including placebo. The added benefit of image-guided corticosteroid injections in improving shoulder outcomes needs further assessment.

ROTATOR CUFF

Impact of RCT

BMC Musculoskelet Disord. 2014 Jul 9;15:228. doi: 10.1186/1471-2474-15-228.

Living with a symptomatic rotator cuff tear 'bad days, bad nights': a qualitative study.

Minns Lowe CJ1, Moser J, Barker K.

Abstract

BACKGROUND:

Rotator cuff tears are a common cause of shoulder pain. There is an absence of information about symptomatic rotator cuffs from the patients' perspective; this limits the information clinicians can share with patients and the information that patients can access via sources such as the internet. This study describes the experiences of people with a symptomatic rotator cuff, their symptoms, the impact upon their daily lives and the coping strategies utilised by study participants.

METHODS:

An interpretive phenomenological analysis approach was used. 20 participants of the UKUFF trial (The United Kingdom Rotator Cuff Surgery Trial) agreed to participate in in-depth semi-structured interviews about their experiences about living with a symptomatic rotator cuff tear. Interviews were digitally recorded and fully transcribed. Field notes, memos and a reflexive diary were used. Data was coded in accordance with interpretive phenomenological analysis. Peer review, code-recode audits and constant comparison of data, codes and categories occurred throughout.

RESULTS:

The majority of patients described intense pain and severely disturbed sleep. Limited movement and reduced **muscle** strength were described by some participants. The predominantly adverse impact that a symptomatic rotator cuff tear had upon activities of daily living, leisure activities and occupation was described. The emotional and financial impact and impact upon caring roles were detailed. Coping strategies included attempting to carry on as normally as possible, accepting their condition, using their other arm, using analgesics, aids and adaptations.

CONCLUSIONS:

Clinicians need to appreciate and understand the intensity and shocking nature of pain that may be experienced by participants with known rotator cuff tears and understand the detrimental impact tears can have upon all areas of patient's lives. Clinicians also need to be aware of the potential emotional impact caused by cuff tears and to ensure that patients needing help for conditions such as depression are speedily identified and provided with support, explanation and appropriate treatment.

Glutamate

Am J Sports Med. 2014 May 28;42(8):1955-1962

Up-regulation of Glutamate in Painful Human Supraspinatus Tendon Tears.

Franklin SL1, Dean BJ2, Wheway K2, Watkins B2, Javaid MK2, Carr AJ2.

Abstract

BACKGROUND:

Pain related to rotator cuff tendinopathy is a common problem, but little is known regarding the origin and cause of pain from the tendon substance. No study to date has looked at the association between tissue changes and patient outcomes.

PURPOSE:

To describe the peripheral neuronal phenotype in painful rotator cuff tears and to determine correlations between tissue changes and clinical outcome measures.

STUDY DESIGN:

Controlled laboratory study.

METHODS:

Tissue samples of the supraspinatus were taken from patients undergoing surgery to repair a rotator cuff tendon tear. Patients were classified as having small/medium or large/massive tears. Control tissue was obtained from patients undergoing surgery for posttraumatic shoulder instability. Immunohistochemical techniques were performed using antibodies to known nociceptive and neuronal markers as well as general tissue structural markers.

RESULTS:

There was no correlation between tissue changes and patient-reported outcomes. A significant increase in the expression of glutamate was seen in tendon tears. There were differences in the expression of metabotropic and ionotropic glutamate receptors. Expression changes were also observed for markers of the sensory and autonomic systems; however, no differences were found in neurotrophins.

CONCLUSION:

Glutamate and the glutaminergic system play a key role in painful human tendon tears; however, the exact role is still uncertain, as glutamate is highly involved in both pain and metabolic pathways.

CLINICAL RELEVANCE:

This study has identified a number of markers that could be potential therapeutic targets.

KEYWORDS: nociception; pain; tendinopathy; tendon

PMID: 24872365

Validity of tests

Am J Sports Med. 2014 Jun 16;42(8):1911-1919.

Clinical Assessment of Physical Examination Maneuvers for Rotator Cuff Lesions.

Somerville LE1, Willits K2, Johnson AM3, Litchfield R2, LeBel ME2, Moro J4, Bryant D5.

Abstract

BACKGROUND:

Shoulder pain and disability pose a diagnostic challenge for clinicians owing to the numerous causes that exist. Unfortunately, the evidence in support of most clinical tests is weak or absent.

PURPOSE:

To determine the diagnostic validity of physical examination maneuvers for rotator cuff lesions.

STUDY DESIGN:

Cohort study (diagnosis); Level of evidence, 1.

METHODS:

Consecutive shoulder patients recruited for this study were referred to 2 tertiary orthopaedic clinics. A surgeon took a thorough history and indicated his or her certainty about each possible diagnosis. A clinician performed the physical examination for diagnoses where uncertainty remained. Arthroscopy was considered the reference standard for patients who underwent surgery, and MRI with arthrogram was considered the reference for patients who did not. The sensitivity, specificity, and likelihood ratios were calculated to investigate whether combinations of the top tests provided stronger predictions of the presence or absence of disease.

RESULTS:

There were 139 participants. None of the tests were highly sensitive for diagnosing rotator cuff tears or tendinosis. Tests for subscapularis tears were all highly specific. No optimal combination of tests improved the ability to correctly diagnose rotator cuff tears. Closer analysis revealed the internal rotation and lateral rotation lag sign did not improve the ability to diagnose subscapularis or supraspinatus tears, respectively, although the lateral rotation lag sign demonstrated a discriminatory ability for tear size.

CONCLUSION:

No test in isolation is sufficient to diagnose a patient with rotator cuff damage. A combination of tests improves the ability to diagnose damage to the rotator cuff. It is recommended that the internal rotation and lateral rotation lag signs be removed from the gamut of physical examination tests for supraspinatus and subscapularis tears.

KEYWORDS: diagnosis; physical examination; rotator cuff; shoulder
PMID: 24936584

HIP **Replacements**

Return of normal function

Int Orthop. 2014 Aug;38(8):1577-83. doi: 10.1007/s00264-014-2401-3. Epub 2014 Jun 26.

Does total hip arthroplasty restore native hip anatomy? Three-dimensional reconstruction analysis.

Tsai TY1, Dimitriou D, Li G, Kwon YM.

Abstract

PURPOSE:

Component orientations and positions in total hip arthroplasty (THA) are important parameters in restoring hip function. However, measurements using plain radiographs and 2D computed tomography (CT) slices are affected by patient position during imaging. This study used 3D CT to determine whether contemporary THA restores native hip geometry.

METHODS:

Fourteen patients with unilateral THA underwent CT scan for 3D hip reconstruction. Hip models of the nonoperated side were mirrored with the implanted side to quantify the differences in hip geometry between sides.

RESULTS:

The study demonstrated that combined hip anteversion (sum of acetabular and femoral anteversion) and vertical hip offset significantly increased by $25.3^\circ \pm 29.3^\circ$ (range, -25.7° to 55.9° , $p = 0.003$) and 4.1 ± 4.7 mm (range, -7.1 to 9.8 mm, $p = 0.009$) in THAs.

CONCLUSIONS:

These data suggest that hip anatomy is not fully restored following THA compared with the contralateral native hip.

KNEE

Impact of forefoot varus on knee mechanics

Man Ther. 2014 Jul 12. pii: S1356-689X(14)00127-1. doi: 10.1016/j.math.2014.07.001.

The effects of forefoot varus on hip and knee kinematics during single-leg squat.

Scattone Silva R1, Maciel CD2, Serrão FV3.

Abstract

Purpose: Foot misalignments, such as forefoot varus (FV), have been associated with musculoskeletal injuries in the proximal joints of the lower limb. Previous theories suggested that this association occurs because FV influences knee and hip kinematics during closed kinetic chain activities. However, research on the effects of FV in the kinematics of the lower limb is very scarce. Therefore, the purpose of this study was to compare the knee and hip kinematics between subjects with and without FV during a functional weight-bearing activity.

Method: Forty-six healthy adolescents were divided into two groups: group of subjects with FV (VG, n = 23) and group of subjects with aligned forefoot (CG, n = 23). A kinematic evaluation was conducted while the subjects performed a single-leg squat task. The variables of interest were hip internal rotation and adduction and knee abduction excursions at 15°, 30°, 45° and 60° of knee flexion. Between-group comparisons were performed with multivariate analysis of variance.

Findings: Results showed that the VG presented greater hip internal rotation when compared with the CG across all evaluated knee flexion angles ($P = 0.02-0.0001$). No differences between groups were observed in hip adduction or knee abduction ($P > 0.05$).

Conclusion: These results indicate that FV influences the transverse plane hip movement patterns during a functional weight-bearing activity. Considering that excessive hip internal rotation has been associated with knee injuries, these findings might contribute for a better understanding of the link between FV and injuries of the proximal joints of the lower limb.

KEYWORDS: Biomechanics; Patellofemoral pain; Subtalar hyperpronation
PMID: 25081219

Knee/ACL

Strength deficits and ACL

Arch Orthop Trauma Surg. 2014 Aug 5.

Return to play following ACL reconstruction: a systematic review about strength deficits.

Petersen W1, Taheri P, Forkel P, Zantop T.

Abstract

PURPOSE:

There is a lack of consensus regarding appropriate criteria attesting patients' unrestricted sports activities after ACL reconstruction. Purpose of this study was to perform a systematic review about strength deficits to find out if a strength test might be a return to play criterion.

DATA SOURCE:

Pubmed central, Google Scholar.

STUDY ELIGIBILITY CRITERIA:

English language articles.

INTERVENTIONS:

Strength tests after ACL reconstruction with autologous tendon grafts.

METHODS:

A systematic search for articles about muscle strength after ACL reconstruction was performed.

RESULTS:

Forty-five articles could be identified. All articles identified reported strength deficits after ACL reconstruction in comparison to control subjects. Some of these deficits persisted up to 5 years after surgery. Knee flexor strength is more impaired after ACL reconstruction with hamstring grafts and quadriceps strength after BPTB ACL reconstruction.

CONCLUSION:

Strength deficits of hip, knee and ankle muscles are reported after ACL reconstruction. Muscular strength test may be an important tool to determine if an athlete can return to competitive sports after ACL reconstruction.

PMID: 25091127

ACL and soccer

Am J Sports Med. 2014 Apr 30;42(8):1985-1992.

Effect of Anticipation on Lower Extremity Biomechanics During Side- and Cross-Cutting Maneuvers in Young Soccer Players.

Kim JH1, Lee KK1, Kong SJ2, An KO3, Jeong JH4, Lee YS5.

Abstract

BACKGROUND: Less mature athletes exhibit biomechanical parameters during cutting maneuvers that may place these athletes at greater risk for injury than their more mature counterparts, especially if the maneuvers are unanticipated. However, most studies on risk factors for anterior cruciate ligament (ACL) injury have focused on neuromuscular and knee kinematic differences between the sexes, not on the biomechanical parameters between specific sporting maneuvers.

HYPOTHESES: (1) Anticipation will have a greater effect than the type of cutting maneuver (side- vs cross-cutting) in terms of the biomechanical risk factors for ACL injuries, and (2) the biomechanical risk factors will be different between the 2 types of maneuvers.

STUDY DESIGN: Controlled laboratory study.

METHODS: Thirty-seven young, male middle school soccer players participated in this study. Three-dimensional motion analysis featuring ground-reaction force and electromyography of the right leg was used. Kinematics, kinetics, and electromyography data for each athlete were analyzed during anticipated and unanticipated side- and cross-cutting maneuvers. The differences between anticipated and unanticipated states as well as between side- and cross-cutting maneuvers were calculated and compared.

RESULTS: After unanticipated side-cutting, the time to peak ground-reaction force was longer and peak values were smaller compared with anticipated side-cutting. Flexion, valgus, and internal rotations in the knee joint were larger, and greater flexion and valgus moments were observed. The vastus lateralis and vastus medialis showed lower activity, and the lateral gastrocnemius showed higher activity after unanticipated side-cutting maneuvers. With unanticipated cross-cutting, the time to peak ground-reaction force was longer and peak values were smaller compared with anticipated cross-cutting, and the lateral gastrocnemius showed higher activity. Differences in the peak values of the mediolateral and vertical forces were smaller in the cross-cutting maneuver than in side-cutting. Changes in flexion and adduction of the hip joint, flexion of the knee joint, and inversion of the ankle joint were larger during side-cutting.

CONCLUSION: Although there were some interactions between direction and anticipation, anticipating a cutting maneuver generally had a greater effect than the type of maneuver when there was no significant interaction.

CLINICAL RELEVANCE: Increases in the valgus angle and moment of the knee joint and higher lateral gastrocnemius activity during the late period showed an association with ACL injury risk factors during side-cutting, and higher lateral gastrocnemius activity during the early period showed an association with injury risk factors during cross-cutting.

KEYWORDS: biomechanics; cross-cutting; lower extremity; side-cutting; soccer

PMID: 24787044

Meniscus

Meniscal roots

Am J Sports Med. 2014 May 5;42(8):1881-1887.

Structural Properties of the Meniscal Roots.

Ellman MB1, LaPrade CM2, Smith SD2, Rasmussen MT2, Engebretsen L3, Wijdicks CA2, LaPrade RF4.

Abstract

BACKGROUND: Current surgical techniques for meniscal root repair reattach the most prominent, dense portion of the meniscal root and fail to incorporate recently identified peripheral, supplemental attachment fibers. The contribution of supplemental fibers to the biomechanical properties of native meniscal roots is unknown.

HYPOTHESIS/PURPOSE: The purpose was to quantify the ultimate failure strengths, stiffness, and attachment areas of the native posterior medial (PM), posterior lateral (PL), anterior medial (AM), and anterior lateral (AL) meniscal roots compared with the most prominent, dense meniscal root attachment after sectioning of supplemental fibers. It was hypothesized that the ultimate failure strength, stiffness, and attachment area of each native root would be significantly higher than those of the respective sectioned root.

STUDY DESIGN: Controlled laboratory study.

METHODS: Twelve matched pairs of male human cadaveric knees were used. The 4 native meniscal roots were left intact in the native group, whereas the roots in the contralateral knee (sectioned group) were dissected free of all supplemental fibers. A coordinate measuring device quantified the amount of tissue resected in the sectioned group compared with the native group. A dynamic tensile testing machine pulled each root in line with its circumferential fibers. All root attachments were preconditioned from 10 to 50 N at a rate of 0.1 Hz for 10 cycles and subsequently pulled to failure at a rate of 0.5 mm/s.

RESULTS: Supplemental fibers composed a significant percentage of the native PM, PL, and AM meniscal root attachment areas. Mean ultimate failure strengths (in newtons) of the native PM, PL, and AM roots were significantly higher than those of the sectioned state, while the ultimate failure strength of the native AL root was indistinguishable from that of the sectioned state.

CONCLUSION: Three of the 4 meniscal root attachments (PM, PL, AM) contained supplemental fibers that accounted for a significant percentage of the native root attachment areas, and these fibers significantly contributed to the failure strengths of the native roots.

CLINICAL RELEVANCE: These supplemental fibers are not routinely reattached during root repair surgery, suggesting that current techniques fail to reattach the biomechanically relevant attachments of native meniscal roots.

KEYWORDS: lateral meniscus; meniscal repair; meniscus root; posterior meniscus root, medial meniscus; root repair

PMID: 24799425

NFL and meniscus

Am J Sports Med. 2014 Jun 9;42(8):1865-1872.

Return to Play After Partial Lateral Meniscectomy in National Football League Athletes.

Aune KT1, Andrews JR2, Dugas JR2, Cain EL Jr2.

Abstract

BACKGROUND: Lateral meniscal injury is a common and possibly career-threatening injury among players in the National Football League (NFL). The rate of return to play (RTP) and factors that affect RTP after lateral meniscal injury in NFL players are currently not defined.

PURPOSE: The aims of this study were to determine the rate of RTP to regular-season NFL game play of NFL players after arthroscopic partial lateral meniscectomy and to identify factors that can predict the ability to return to play.

STUDY DESIGN: Case series; Level of evidence, 4.

METHODS: Seventy-two patients undergoing 77 arthroscopic lateral partial meniscectomies were followed to determine the rate of RTP (defined as successful RTP in at least 1 regular-season NFL game after meniscectomy) and factors predicting players' ability to return to play. Perioperative variables were recorded using retrospective chart review. Players' heights and weights, dates of return, draft rounds, and counts of games, starts, and seasons both before and after meniscectomy were all collected from statistical databases maintained by the NFL. Chi-square and Student t tests were performed to assess differences among covariates with respect to an athlete's ability to return to play, and odds ratios were calculated as appropriate. All percentages were calculated as percent of total procedures performed (n = 77).

RESULTS: Of the 77 partial lateral meniscectomies performed, 61% (n = 47) resulted in the athlete returning to play at his previous level of competition with an average length of time to RTP of 8.5 months; 19 (40%) of those who returned were still active in the NFL at the time of follow-up. Age at time of surgery, games and seasons played before surgery, and individual position were not significantly different between those who did and did not return to play. Undergoing a concomitant procedure did not affect an athlete's ability to return to play, nor did concurrent arthroscopic anterior cruciate ligament reconstruction affect a player's likelihood to return to play. Players drafted in the first 4 rounds of the NFL draft were 3.7 times more likely to return to play than players drafted after the fourth round, and players who started more than 46.2% of their games played (the mean value for this population) were 2.8 times more likely to return to play. Speed-position players (running backs, receivers, linebackers, and defensive backs) were 4.0 times less likely to return to play than non-speed position players (linemen and tight ends).

CONCLUSION: The majority of NFL players undergoing arthroscopic lateral meniscectomy are able to return to play. Players selected earlier in the NFL draft and who are listed as starters in more of their games are more likely to return to play, as are linemen and tight ends. It is significantly more difficult for running backs, receivers, linebackers, and defensive backs to return to play.

KEYWORDS: NFL; football; knee; meniscus; return to play

PMID: 24914032

Damage of cartilage in ACL

Am J Sports Med. 2014 Jun 6;42(8):1841-1846.

Prevalence and Incidence of Cartilage Injuries and Meniscus Tears in Patients Who Underwent Both Primary and Revision Anterior Cruciate Ligament Reconstructions.

Wyatt RW¹, Inacio MC², Liddle KD³, Maletis GB⁴.

Abstract

BACKGROUND:

Previous studies have found differences in meniscus and cartilage injury rates between groups of patients after primary and revision anterior cruciate ligament reconstructions (ACLRs). This study examined a cohort of individual patients who underwent primary and subsequent revision ACLR to determine the incidence of cartilage and meniscus disease.

PURPOSE:

To describe the prevalence and incidence of meniscus and articular cartilage injuries in patients who underwent primary and then subsequent revision ACLR as well as indicate differences in the management of these injuries.

STUDY DESIGN:

Case series; Level of evidence, 4.

METHODS:

Patients who underwent primary and then revision ACLR from February 2005 to September 2011 were identified using a community-based registry. Patient and procedure characteristics were obtained, and descriptive statistics were used to evaluate the study sample.

RESULTS:

There were 261 patients who underwent primary and then subsequent revision ACLR during the study period. The median age was 18 years at primary ACLR and 20 years at revision ACLR. Revision ACLR was performed for instability in 256 patients (98%) and for infection in 5 patients (2%). The prevalence of cartilage injuries increased from 14.9% at primary ACLR to 31.8% at revision ACLR. The prevalence of meniscus tears decreased from 54.8% at primary ACLR to 43.7% at revision ACLR. The prevalence of lateral meniscus tears was 32.2% at primary ACLR but only 18.4% at revision ACLR, while the prevalence of medial meniscus tears was the same at primary and revision ACLRs (32.6%). Patients who underwent meniscus tear treatment at primary ACLR had a 70.8% prevalence of meniscus tears at revision ACLR.

CONCLUSION:

In this community-based sample followed from primary ACLR to revision ACLR, the prevalence of articular cartilage injuries increased, while the prevalence of meniscus injuries decreased. The higher prevalence of articular cartilage injuries at revision ACLR may represent new injuries. The lower prevalence of meniscus tears at revision ACLR may be caused by susceptible menisci being injured and treated at primary surgery or by changes in knee kinematics or injury exposure patterns.

KEYWORDS: articular cartilage injury; knee anterior cruciate ligament; meniscus tear
PMID: 24907289

Patella

Obesity and pathology

Research article

Association between obesity and magnetic resonance imaging defined patellar tendinopathy in community-based adults: a cross-sectional study

Jessica Fairley, Jason Toppi, Flavia M Cicuttini, Anita E Wluka, Graham G Giles, Jill Cook, Richard O'Sullivan and Yuanyuan Wang

BMC Musculoskeletal Disorders 2014, **15**:266 doi:10.1186/1471-2474-15-266

Published: 7 August 2014

Abstract (provisional)

Background

Patellar tendinopathy is a common cause of activity-related anterior knee pain. Evidence is conflicting as to whether obesity is a risk factor for this condition. The aim of this study was to determine the relationship between obesity and prevalence of magnetic resonance imaging (MRI) defined patellar tendinopathy in community-based adults.

Methods

297 participants aged 50-79 years with no history of knee pain or injury were recruited from an existing community-based cohort. Measures of obesity included measured weight and body mass index (BMI), self-reported weight at age of 18-21 years and heaviest lifetime weight. Fat-free mass and fat mass were measured using bioelectrical impedance. Participants underwent MRI of the dominant knee. Patellar tendinopathy was defined on both T1- and T2-weighted images.

Results

The prevalence of MRI defined patellar tendinopathy was 28.3%. Current weight (OR per kg = 1.04, 95% CI 1.01-1.06, P = 0.002), BMI (OR per kg/m² = 1.10, 95% CI 1.04-1.17, P = 0.002), heaviest lifetime weight (OR per kg = 1.03, 95% CI 1.01-1.05, P = 0.007) and weight at age of 18-21 years (OR per kg = 1.03, 95% CI 1.00-1.07, P = 0.05) were all positively associated with the prevalence of patellar tendinopathy. Neither fat mass nor fat-free mass was associated with patellar tendinopathy.

Conclusion

MRI defined patellar tendinopathy is common in community-based adults and is associated with current and past history of obesity assessed by BMI or body weight, but not fat mass. The findings suggest a mechanical pathogenesis of patellar tendinopathy and patellar tendinopathy may be one mechanism for obesity related anterior knee pain.

Exercise

Phys Ther. 2014 Jul 31.

Effectiveness of Exercise Therapy in Treatment of Patients With Patellofemoral Pain Syndrome: A Systematic Review and Meta-Analysis.

Clijisen R1, Fuchs J2, Taeymans J3.

Abstract

BACKGROUND AND PURPOSE:

This systematic review and meta-analysis was accomplished to determine whether exercise therapy is an effective intervention to reduce pain and patient-reported measures of activity limitations and participation restrictions (PRMALP) in patients with patellofemoral pain.

METHODS:

Randomized controlled trials in English and German language, published in Medline, PEDro and Cochrane databases were searched. Eligibility was assessed in two stages. The methodological quality of the studies was rated using the PEDro scale. Data were pooled using random-effects meta-analysis allowing for variability among studies. For clinical use, overall estimates were re-expressed in the original VAS scores. Significance was set at 5%.

RESULTS:

Fifteen studies with a total of 748 participants were included and pooled for a meta-analysis. Six studies compared the effect of exercise therapy with a control group neither receiving exercise therapy nor another intervention. Four studies compared the effect of exercise therapy versus additive therapy while five papers compared different exercise interventions. In both comparisons exercise therapy resulted in strong pain reduction and improvement of PRMALP effects. Significant short-term effects (≤ 12 weeks) of exercise therapy were found for pain and PRMALP while long-term effects (≥ 26 weeks) were observed for PRMALP only.

CONCLUSION:

This meta-analysis presents evidence that exercise therapy has a strong pain reducing effect and decreases PRMALP in patients with patellofemoral pain. However, the question, which exercise modality yields the strongest reducing effect on pain and PRMALP, remains unrevealed. The 15 studies included in this analysis were of variable quality. Large, high quality RCTs are needed to further the evaluation of the possible effects of different exercise therapy modalities on patellofemoral pain.

PMID: 25082920

Knee/total

Impact on foot function

J. Arthroplasty

Alteration Of Hindfoot Alignment After Total Knee Arthroplasty Using A Novel Hindfoot Alignment View

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Department of Orthopaedics, Graduate School of Medical Science, Kyoto Prefectural University of Medicine
Published Online: July 25, 2014

Abstract

Purpose: This study examined the coronal alignment of the hindfoot in varus osteoarthritis of the knee before and after total knee arthroplasty (TKA) in 100 legs using a novel imaging method.

Method: We categorized the preoperative hindfoot alignment into varus (30 legs) and valgus (70 legs) groups; imaging of the hindfoot was conducted preoperatively and postoperatively, and the varus-valgus angle (VVA) was measured as the hindfoot alignment.

Findings: The femorotibial angle improved significantly after TKA. We found that the VVA improved significantly after TKA in the hindfoot valgus group ($p < 0.001$), but not in the varus group ($p = 0.554$), and we speculate that the hindfoot alignment in the valgus group improved as a result of a residual compensatory capacity in the hindfoot.

Kinesio taping

The effectiveness of kinesio taping after total knee replacement in early postoperative rehabilitation period. a randomized controlled trial

European Journal of Physical and Rehabilitation Medicine, 08/04/2014 Clinical Article

Donec V, et al.

BACKGROUND: The number of total knee replacements performed each year is increasing. Among the main impediments to functional recovery after these surgeries include postoperative edema, pain, lower limb muscle strength deficits, all of which point to a need to identify safe, effective postoperative rehabilitation modalities. **AIM:** The aim of this paper was to evaluate the effectiveness of Kinesio Taping® (KT) method in reducing postoperative pain, edema, and improved knee range of motion recovery after total knee replacement (TKR) operation in early postoperative rehabilitation period.

DESIGN: Randomized clinical trial. **SETTING:** Inpatient rehabilitation facility.

POPULATION: Ninety-four patients, who underwent primary TKR surgery.

METHODS: Using simple randomization, participants were divided into KT group and control group. Both groups received same rehabilitation program and procedures after surgery, except KT group also received KT applications throughout all rehabilitation period. Postoperative pain, edema, restoration of the operated knee flexion and extension were evaluated. The chosen level of significance was $P < 0.05$; in evaluation power of the test $\beta \leq 0.2$. Groups were homogenous to sex, age, BMI, comorbidities, preoperative knee flexion/extension impairment, preoperative pain intensity, anaesthesia, prosthesis implanted ($P > 0.05$).

RESULTS: In both groups postoperative pain decreased significantly during rehabilitation period, however less pain was found in KT group from the second postoperative week till the end of inpatient rehabilitation (28th postoperative day) ($P < 0.05$; $\beta \leq 0.2$). Postoperative edema was less intense and subsided more quickly in KT group as well ($P < 0.05$; $\beta \leq 0.2$). No difference was found in improvement of knee flexion ($P > 0.05$). Operated knee extension was found better in KT group than in control at the end of in-patient rehabilitation ($P < 0.05$; $\beta \leq 0.2$). KT was well tolerated by patients.

CONCLUSION: KT technique appeared to be beneficial for reducing postoperative pain, edema, improving knee extension in early postoperative rehabilitation period.

CLINICAL REHABILITATION IMPACT: This finding implies for health care professionals working in the field of physical medicine and rehabilitation that Kinesio Taping® method is safe and can be used as additional rehabilitation means for patients after TKR.

FOOT AND ANKLE

Spain and change in gait

PM R. 2014 Jul 1. pii: S1934-1482(14)00305-0. doi: 10.1016/j.pmrj.2014.06.014

Gait and Physical Impairments in Patients With Acute Ankle Sprains Who Did Not Receive Physical Therapy.

Punt IM, Ziltener JL, Laidet M, Armand S, Allet L⁴

Abstract

OBJECTIVE:

To assess ankle function 4 weeks after conservative management and to examine the correlation of function with gait.

DESIGN:

A prospective comparison study.

PATIENTS:

Thirty patients with grade I or II acute ankle sprains were followed up after 4 weeks of conservative management not involving physical therapy.

METHODS:

Participants underwent a clinical assessment and had to walk at a normal self-selected walking speed. Their results were compared with the data of 15 healthy subjects.

MAIN OUTCOME MEASURES:

Participants' joint swelling, muscle strength, passive mobility, and pain were assessed. In addition, patients' temporal-spatial, kinematic, and kinetic gait data were measured while walking.

RESULTS:

Muscle strength and passive mobility were significantly reduced on the injured side compared with the noninjured side ($P < .001$). During gait analysis, patients with ankle sprains showed slower walking speed, shorter step length, shorter single support time, reduced and delayed maximum plantar flexion, decreased maximum power, and decreased maximum moment ($P < .050$) compared with healthy persons. Decreased walking speed was mainly correlated with pain ($R = -0.566$, $P = .001$) and deficits in muscle strength of dorsiflexors ($R = 0.506$, $P = .004$).

CONCLUSION:

Four weeks after an ankle sprain, patients who did not receive physical therapy showed physical impairments of the ankle that were correlated with gait parameters. These findings might help fine-tune rehabilitation protocols.

Leg length determination

2014 Aug;41(8):1689-94. doi: 10.3899/jrheum.131089. Epub 2014 Jul 15.

Comparison of lifts versus tape measure in determining leg length discrepancy.

Badii M, Wade AN, Collins DR, Nicolaou S, Kobza BJ, Kopec JA.

Abstract

OBJECTIVE:

To evaluate the validity (accuracy) and reliability of 2 commonly used clinical methods, 1 indirect (lifts) and 1 direct (tape measure), for assessment of leg length discrepancy (LLD) in comparison to radiograph.

METHODS:

Twenty subjects suspected of having LLD participated in this study. Two clinical methods, 1 direct using a tape measure and 1 indirect using lifts, were standardized and carried out by 4 examiners. Difference in height of the femoral heads on standing pelvic radiograph was measured and served as the gold standard.

RESULTS:

The intraclass correlation coefficient assessing interobserver reliability was 0.737 for lifts and 0.477 for tape measure. The remainder of the analysis is based on the average of the measurements by the 4 examiners. Pearson correlation coefficients were 0.93 for the lifts and 0.75 for the tape measure method. Paired sample t tests showed difference in means of 2 mm ($p = 0.051$) for lifts and -5 mm ($p = 0.007$) for tape measure compared with radiograph. Sensitivity and specificity were 55% and 89% for lifts and 45% and 56% for tape measure, respectively, using > 5 mm as the definition for LLD. The wrong leg was identified as being shorter in 1 out of 20 subjects using lifts versus 7 out of 20 using tape measure.

CONCLUSION:

The indirect standing method of LLD measurement using lifts had superior validity, interobserver reliability, and specificity in comparison with radiograph over the direct supine method using tape measure. Both clinical methods underestimated LLD compared with radiograph.

Total knee and rear foot

J. Arthroplasty

Alteration Of Hindfoot Alignment After Total Knee Arthroplasty Using A Novel Hindfoot Alignment View

Yusuke Hara, MD, Kazuya Ikoma, MD, PhD, Yuji Arai, MD, PhD, Suzuyo Ohashi, MD, PhD, Masahiro Maki, MD, PhD, Toshikazu Kubo, MD, PhD
Department of Orthopaedics, Graduate School of Medical Science, Kyoto Prefectural University of Medicine Published Online: July 25, 2014

Abstract

Purpose: This study examined the coronal alignment of the hindfoot in varus osteoarthritis of the knee before and after total knee arthroplasty (TKA) in 100 legs using a novel imaging method.

Method: We categorized the preoperative hindfoot alignment into varus (30 legs) and valgus (70 legs) groups; imaging of the hindfoot was conducted preoperatively and postoperatively, and the varus-valgus angle (VVA) was measured as the hindfoot alignment.

Findings: The femorotibial angle improved significantly after TKA. We found that the VVA improved significantly after TKA in the hindfoot valgus group ($p < 0.001$), but not in the varus group ($p = 0.554$)

Conclusion: We speculate that the hindfoot alignment in the valgus group improved as a result of a residual compensatory capacity in the hindfoot.

MWM ankle

J Manipulative Physiol Ther. 2014 Jun;37(5):320-5. doi: 10.1016/j.jmpt.2014.01.007.

Changes in kinetic, kinematic, and temporal parameters of walking in people with limited ankle dorsiflexion: pre-post application of modified mobilization with movement using talus glide taping.

Yoon JY1, Hwang YI2, An DH3, Oh JS4.

Abstract

OBJECTIVE:

The purpose of this study was to investigate the changes in passive ankle dorsiflexion range of motion (ROM), maximum plantar force, force-time integral, and time to heel off during walking between pre- and postapplication of modified mobilization with movement (MWM) using talus glide taping in people with limited ankle dorsiflexion.

METHODS:

Eighteen feet with limited ankle dorsiflexion in 13 people were examined. Participants performed 3 different walking tasks in the following order: walking before and immediately after applying the modified MWM using talus glide taping and walking after 5-minute walking with the modified MWM using talus glide taping. A floor-mat pressure measurement system (HR-mat) was used to measure maximum plantar force, force-time integral, and time to heel off; and passive ankle dorsiflexion ROM was measured using a standard goniometer. The significance of differences was assessed using repeated one-way analysis of variance.

RESULTS:

Passive ankle dorsiflexion ROM and time to heel off were significantly increased after 5-minute walking with the modified MWM using talus glide taping compared with walking before and immediately after applying the tape. Significantly increased maximum plantar force and force-time integral on the hindfoot and significantly decreased force-time integral on the forefoot during walking after 5-minute walking were observed with the modified MWM using talus glide taping compared with before applying the tape. No significant difference between before and immediately after applying the tape was observed in any variable.

CONCLUSIONS:

Our results suggest that walking an additional 5-minute with the modified MWM using talus glide taping increased passive ankle dorsiflexion ROM and time to heel off and improved dynamic plantar loading during walking.

KEYWORDS: Ankle Joint; Athletic Tape; Joint Range of Motion
PMID: 24928640

MANUAL THERAPY

Upper T manipulation vs. mobilization

J Manipulative Physiol Ther. 2014 Jun;37(5):312-9. doi: 10.1016/j.jmpt.2014.03.003. Epub 2014 May 28.

Immediate changes in neck pain intensity and widespread pressure pain sensitivity in patients with bilateral chronic mechanical neck pain: a randomized controlled trial of thoracic thrust manipulation vs non-thrust mobilization.

Salom-Moreno J1, Ortega-Santiago R1, Cleland JA2, Palacios-Ceña M3, Truyols-Domínguez S4, Fernández-de-las-Peñas C5.

Abstract

OBJECTIVE:

The purpose of this study was to compare the effects of thoracic thrust manipulation vs thoracic non-thrust mobilization in patients with bilateral chronic mechanical neck pain on pressure pain sensitivity and neck pain intensity.

METHODS:

Fifty-two patients (58% were female) were randomly assigned to a thoracic spine thrust manipulation group or of thoracic non-thrust mobilization group. Pressure pain thresholds (PPTs) over C5-C6 zygapophyseal joint, second metacarpal, and tibialis anterior **muscle** and neck pain intensity (11-point Numerical Pain Rate Scale) were collected at baseline and 10 minutes after the intervention by an assessor blinded to group allocation. Mixed-model analyses of variance (ANOVAs) were used to examine the effects of the treatment on each outcome. The primary analysis was the group * time interaction.

RESULTS:

No significant interactions were found with the mixed-model ANOVAs for any PPT (C5-C6: $P>.252$; second metacarpal: $P>.452$; tibialis anterior: $P>.273$): both groups exhibited similar increases in PPT (all, $P<.01$), but within-group and between-group effect sizes were small (standardized mean score difference [SMD] <0.22). The ANOVA found that patients receiving thoracic spine thrust manipulation experienced a greater decrease in neck pain (between-group mean difference: 1.4; 95% confidence interval, 0.8-2.1) than did those receiving thoracic spine non-thrust mobilization ($P<.001$). Within-group effect sizes were large for both groups (SMD >2.1), and between-group effect size was also large (SMD = 1.3) in favor of the manipulative group.

CONCLUSIONS:

The results of this randomized clinical trial suggest that thoracic thrust manipulation and non-thrust mobilization induce similar changes in widespread PPT in individuals with mechanical neck pain; however, the changes were clinically small. We also found that thoracic thrust manipulation was more effective than thoracic non-thrust mobilization for decreasing intensity of neck pain for patients with bilateral chronic mechanical neck pain.

KEYWORDS: Manual Therapy; Neck Pain; Pressure; Spine

MFR

The Foot

Volume 24, Issue 2, Pages 66–71, June 2014

Effectiveness of myofascial release in the management of plantar heel pain: A randomized controlled trial

M.S. Ajimsha, D. Binsu, S. Chithra Published Online: March 21, 2014

Abstract

Background

Previous studies have reported that stretching of the calf musculature and the plantar fascia are effective management strategies for plantar heel pain (PHP). However, it is unclear whether myofascial release (MFR) can improve the outcomes in this population.

Objective

To investigate whether myofascial release (MFR) reduces the pain and functional disability associated with plantar heel pain (PHP) in comparison with a control group receiving sham ultrasound therapy (SUST).

Design Randomized, controlled, double blinded trial.

Setting Nonprofit research foundation clinic in India.

Method

Sixty-six patients, 17 men and 49 women with a clinical diagnosis of PHP were randomly assigned into MFR or a control group and given 12 sessions of treatment per client over 4 weeks. The Foot Function Index (FFI) scale was used to assess pain severity and functional disability. The primary outcome measure was the difference in FFI scale scores between week 1 (pretest score), week 4 (posttest score), and follow-up at week 12 after randomization. Additionally, pressure pain thresholds (PPT) were assessed over the affected gastrocnemii and soleus muscles, and over the calcaneus, by an assessor blinded to the treatment allocation.

Results

The simple main effects analysis showed that the MFR group performed better than the control group in weeks 4 and 12 ($P < 0.001$). Patients in the MFR and control groups reported a 72.4% and 7.4% reduction, respectively, in their pain and functional disability in week 4 compared with that in week 1, which persisted as 60.6% in the follow-up at week 12 in the MFR group compared to the baseline. The mixed ANOVA also revealed significant group-by-time interactions for changes in PPT over the gastrocnemii and soleus muscles, and the calcaneus ($P < 0.05$).

Conclusions

This study provides evidence that MFR is more effective than a control intervention for PHP.

Adverse events and lumbar manipulations

J Manipulative Physiol Ther. 2013 Jun 17. pii: S0161-4754(13)00068-7. doi: 10.1016/j.jmpt.2013.05.009

Serious Adverse Events and Spinal Manipulative Therapy of the Low Back Region: A Systematic Review of Cases.

Hebert JJ1, Stomski NJ, French SD, Rubinstein SM.

Abstract

OBJECTIVE:

The purpose of this study was to systematically search the literature for studies reporting serious adverse events following lumbopelvic spinal manipulative therapy (SMT) and to describe the case details.

METHODS:

A systematic search was conducted in PubMed including MEDLINE, EMBASE, CINAHL, and The Cochrane Library up to January 12, 2012, by an experienced reference librarian. Study selection was performed by 2 independent reviewers using predefined criteria. We included cases involving individuals 18 years or older who experienced a serious adverse event following SMT applied to the lumbar spine or pelvis by any type of provider (eg, chiropractic, medical, physical therapy, osteopathic, layperson). A serious adverse event was defined as an untoward occurrence that results in death or is life threatening, requires hospital admission, or results in significant or permanent disability. We included studies published in English, German, Dutch, and Swedish.

RESULTS:

A total of 2046 studies were screened, and 41 studies reporting on 77 cases were included. Important case details were frequently unreported, such as descriptions of SMT technique, the pre-SMT presentation of the patient, the specific details of the adverse event, time from SMT to the adverse event, factors contributing to the adverse event, and clinical outcome. Adverse events consisted of cauda equina syndrome (29 cases, 38% of total); lumbar disk herniation (23 cases, 30%); fracture (7 cases, 9%); hematoma or hemorrhagic cyst (6 cases, 8%); or other serious adverse events (12 cases, 16%) such as neurologic or vascular compromise, soft tissue trauma, muscle abscess formation, disrupted fracture healing, and esophageal rupture.

CONCLUSIONS:

This systematic review describes case details from published articles that describe serious adverse events that have been reported to occur following SMT of the lumbopelvic region. The anecdotal nature of these cases does not allow for causal inferences between SMT and the events identified in this review. Recommendations regarding future case reporting and research aimed at furthering the understanding of the safety profile of SMT are discussed.

PMID: 23787298

Carotid dissection and manipulation

J Manipulative Physiol Ther. 2014 Jan 3. pii: S0161-4754(13)00273-X. doi: 10.1016/j.jmpt.2013.09.005.

The Association Between Cervical Spine Manipulation and Carotid Artery Dissection: A Systematic Review of the Literature.

Chung CL1, Côté P2, Stern P3, L'espérance G4.

Abstract

OBJECTIVE:

Controversy surrounds the safety of cervical spine manipulation. Ischemic stroke secondary to cervical spine manipulation is a hypothesized adverse event. In Canada, the seriousness of these events and their perceived association to cervical spine manipulation has led some members of the public to call for a ban of the procedure. The primary objective of this study was to determine the incidence of internal carotid artery (ICA) dissection after cervical spine manipulation in patients who experience neck pain and its associated disorders. The secondary objective was to determine whether cervical spine manipulation is associated with an increased risk of ICA dissection in patients with neck pain, upper back pain, or headaches.

METHODS:

We systematically searched MEDLINE, CINAHL, Alternative Health, AMED, Index to Chiropractic Literature, and EMBASE from 1970 to November 2012. Two independent reviewers used standardized criteria to screen the eligibility of articles. We considered cohort studies, case-control studies, and randomized clinical trials that addressed our objectives. We planned to critically appraise eligible articles using the Scottish Intercollegiate Guideline Network methodology.

RESULTS:

We did not find any epidemiologic studies that measured the incidence of cervical spine manipulation and ICA dissection. Similarly, we did not find any studies that determined whether cervical spine manipulation is associated with ICA dissection.

CONCLUSIONS:

The incidence of ICA dissection after cervical spine manipulation is unknown. The relative risk of ICA dissection after cervical spine manipulation compared with other health care interventions for neck pain, back pain, or headache is also unknown. Although several case reports and case series raise the hypothesis of an association, we found no epidemiologic studies that validate this hypothesis.

KEYWORDS: Carotid Artery; Chiropractic; Injuries; Manipulation; Spinal

PMID: 24387889

Preload factors

J Manipulative Physiol Ther. 2014 Jun;37(5):287-93. doi: 10.1016/j.jmpt.2014.04.002.

The role of preload forces in spinal manipulation: experimental investigation of kinematic and electromyographic responses in healthy adults.

François N1, Claude D2, Loranger M3, Pagé I4, Descarreaux M5.

Abstract

OBJECTIVES:

Previous studies have identified preload forces and an important feature of skillful execution of spinal manipulative therapy (SMT) as performed by manual therapists (eg, doctors of chiropractic and osteopathy). It has been suggested that applying a gradual force before the thrust increases the spinal unit stiffness, minimizing displacement during the thrust. Therefore, the main objective of this study was to assess the vertebral unit biomechanical and neuromuscular responses to a graded increase of preload forces.

METHODS:

Twenty-three participants underwent 4 different SMT force-time profiles delivered by a servo-controlled linear actuator motor and varying in their preload forces, respectively, set to 5, 50, 95, and 140N in 1 experimental session. Kinematic markers were placed on T6, T7, and T8 and electromyographic electrodes were applied over paraspinal muscles on both sides of the spine.

RESULTS:

Increasing preload forces led to an increase in neuromuscular responses of thoracic paraspinal muscles and vertebral segmental displacements during the preload phase of SMT. Increasing the preload force also yielded a significant decrease in sagittal vertebral displacement and paraspinal muscle activity during and immediately after the thrust phase of spinal manipulation. Changes observed during the SMT thrust phase could be explained by the proportional increase in preload force or the related changes in rate of force application. Although only healthy participants were tested in this study, preload forces may be an important parameter underlying SMT mechanism of action. Future studies should investigate the clinical implications of varying SMT dosages.

CONCLUSION:

The present results suggest that neuromuscular and biomechanical responses to SMT may be modulated by preload through changes in the rate of force application. Overall, the present results suggest that preload and rate of force application may be important parameters underlying SMT mechanism of action.

KEYWORDS: Chiropractic; Dose Response Relationship; Electromyography; Force; Kinematics, Manipulation; Spinal Manipulation

PMID: 24928637

Premanipulation

J Manipulative Physiol Ther. 2014 Jun;37(5):294-9. doi: 10.1016/j.jmpt.2014.01.006.

Instantaneous rate of loading during manual high-velocity, low-amplitude spinal manipulations.

Gudavalli MR.

Abstract

OBJECTIVE:

The objective of this study was to determine the instantaneous rate of loading during manual high-velocity, low-amplitude spinal manipulations (HVLA SMs) in the lumbar and thoracic regions and compare to the average rates of loading.

METHODS:

Force-time profiles were recorded using a hand force transducer placed between the hand of a doctor of chiropractic and the subject's back during 14 HVLA SM thrusts on asymptomatic volunteers while 3 doctors of chiropractic delivered the spinal manipulations. Doctors also delivered 36 posterior to anterior thoracic manipulations on a mannequin. Data were collected at a sampling rate of 1000 Hz using Motion Monitor software. Force-time profile data were differentiated to obtain instantaneous rates of loading. The data were reduced using a custom-written MathCad program and analyzed descriptively.

RESULTS:

The instantaneous rates of loading were 1.7 to 1.8 times higher than average rates of loading, and instantaneous rates of unloading were 2.1 to 2.6 times the average rates of unloading during HVLA SMs. Maximum instantaneous rates of loading occurred 102 to 111 milliseconds prior to peak load. Maximum instantaneous rates of unloading occurred 121 to 154 milliseconds after the peak load. These data may be useful for further understanding of HVLA SMs.

CONCLUSIONS:

The instantaneous rates of loading and where they occurred may be useful data for understanding and describing HVLA SMs.

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KEYWORDS:

Biomechanics; Chiropractic; Manipulation; Spinal

PMID: 24928638

Manip and carotid strain

J Manipulative Physiol Ther. 2012 Nov 6. pii: S0161-4754(12)00156-X. doi: 10.1016/j.jmpt.2012.09.005.

Internal Carotid Artery Strains During High-Speed, Low-Amplitude Spinal Manipulations of the Neck.

Herzog W1, Tang C, Leonard T.

Abstract

OBJECTIVE:

The primary objective of this study was to quantify the strains applied to the internal carotid artery (ICA) during neck spinal manipulative treatments and range of motion (ROM)/diagnostic testing of the head and neck.

METHODS:

Strains of the ICA (n = 12) were measured in 6 fresh, unembalmed cadaveric specimens using sonomicrometry. Peak and average strains of the ICA obtained during cervical spinal manipulations given by experienced doctors of chiropractic were compared with the corresponding strains obtained during ROM and diagnostic testing of the head and neck.

RESULTS:

Peak and average strains of the ICA for cervical spinal manipulative treatments were significantly smaller ($P < .001$) than the corresponding strains obtained for the ROM and diagnostic testing. All strains during ROM and treatment testing were dramatically smaller than the initial failure strains of the ICA.

CONCLUSIONS:

This study showed that maximal ICA strains imparted by cervical spinal manipulative treatments were well within the normal ROM. Chiropractic manipulation of the neck did not cause strains to the ICA in excess of those experienced during normal everyday movements. Therefore, cervical spinal manipulative therapy as performed by the trained clinicians in this study, did not appear to place undue strain on the ICA and thus does not seem to be a factor in ICA injuries.

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PMID: 23140796

Manipulation and thalamic response

J Manipulative Physiol Ther. 2014 Jun;37(5):277-86. doi: 10.1016/j.jmpt.2014.04.001.

Effect of spinal manipulation thrust magnitude on trunk mechanical activation thresholds of lateral thalamic neurons.

Reed WR1, Pickar JG2, Sozio RS3, Long CR4.

Abstract

OBJECTIVES:

High-velocity low-amplitude spinal manipulation (HVLA-SM), as performed by doctors who use manual therapy (eg, doctors of chiropractic and osteopathy), results in mechanical hypoalgesia in clinical settings. This hypoalgesic effect has previously been attributed to alterations in peripheral and/or central pain processing. The objective of this study was to determine whether thrust magnitude of a simulated HVLA-SM alters mechanical trunk response thresholds in wide dynamic range (WDR) and/or nociceptive specific (NS) lateral thalamic neurons.

METHODS:

Extracellular recordings were carried out in the thalamus of 15 anesthetized Wistar rats. Lateral thalamic neurons having receptive fields, which included the lumbar dorsal-lateral trunk, were characterized as either WDR (n=22) or NS (n=25). Response thresholds to electronic von Frey (rigid tip) mechanical trunk stimuli were determined in 3 directions (dorsal-ventral, 45° caudalward, and 45° cranialward) before and immediately after the dorsal-ventral delivery of a 100-millisecond HVLA-SM at 3 thrust magnitudes (control, 55%, 85% body weight).

RESULTS:

There was a significant difference in mechanical threshold between 85% body weight manipulation and control thrust magnitudes in the dorsal-ventral direction in NS neurons (P=.01). No changes were found in WDR neurons at either HVLA-SM thrust magnitude.

CONCLUSIONS:

This study is the first to investigate the effect of HVLA-SM thrust magnitude on WDR and NS lateral thalamic mechanical response threshold. Our data suggest that, at the single lateral thalamic neuron level, there may be a minimal spinal manipulative thrust magnitude required to elicit an increase in trunk mechanical response thresholds.

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KEYWORDS:

Chiropractic; Lumbar Vertebrae; Nociceptive Neurons; Spinal Manipulation; Thalamus

PMID: 24928636

Manipulation under anesthesia

Manipulative Physiol Ther. 2014 Jul 3. pii: S0161-4754(14)00090-6. doi: 10.1016/j.jmpt.2014.05.002.

Outcomes for Chronic Neck and Low Back Pain Patients After Manipulation Under Anesthesia: A Prospective Cohort Study.

Peterson CK1, Humphreys BK2, Vollenweider R3, Kressig M3, Nussbaumer R4.

Abstract

BACKGROUND:

The purpose of this study was to investigate outcomes of chronic patients unresponsive to previous spinal manipulative therapy subsequently treated with manipulation under anesthesia (MUA).

METHODS:

A prospective outcome cohort study was performed on 30 patients who had not improved with previous treatment and who underwent a single MUA by a doctor of chiropractic. The numeric rating scale for pain (NRS) and Bournemouth Questionnaire (BQ) were collected at 2 weeks and 1 day before MUA. At 2 and 4 weeks after MUA, the Patient's Global Impression of Change, NRS, and BQ were collected. The intraclass correlation coefficient evaluated stability before treatment. Percentage of patients "improved" was calculated at 2 and 4 weeks. Wilcoxon test compared pretreatment NRS and BQ scores with posttreatment scores. Mann-Whitney U test compared individual questions on the BQ between improved and not improved patients. Logistic regression compared BQ questions to "improvement."

RESULTS:

Good stability of NRS and BQ scores before MUA (intraclass correlation coefficient=0.46-0.95) was found. At 2 weeks, 52% of the patients reported improvement with 45.5% improved at 4 weeks. Significant reductions in NRS scores at 4 weeks ($P=.01$) and BQ scores at 2 ($P=.008$) and 4 weeks ($P=.001$) were reported. Anxiety/stress levels were significantly different at 2 and 4 weeks between improved and not improved patients ($P=.007$). None of the BQ questions were predictive of improvement.

CONCLUSION:

Approximately half of patients previously unresponsive to conservative treatment reported clinically relevant improvement at 2 and 4 weeks post-MUA.

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KEYWORDS:

Anesthesia; Chiropractic; Outcomes Research; Spinal Manipulation

PMID: 24998720

Scoliosis

Gait

Spine J. 2014 Aug 1;14(8):1510-9. doi: 10.1016/j.spinee.2013.08.050. Epub 2013 Oct 4.

Effect of long-term orthotic treatment on gait biomechanics in adolescent idiopathic scoliosis.

Mahaudens P1, Raison M2, Banse X3, Mousny M4, Detrembleur C5.

Abstract

BACKGROUND CONTEXT: A previous study showed subtle biomechanical changes in the gait of unbraced adolescent idiopathic scoliosis (AIS) patients such as a reduction of pelvic, hip, knee, and ankle displacements. However, lumbopelvic muscles' timing activity was bilaterally increased during gait and correlated to excessive oxygen consumption as compared with healthy subjects. Usually, a brace, when indicated, is worn strictly for 22 hours every day in skeletally immature idiopathic scoliotic girls. To our knowledge, no study has assessed the long-term brace effect (6 months) on functional activities such as level walking.

PURPOSE: To assess the stiffening effects of 6 months' brace wearing on instrumented gait analysis in girls with thoracolumbar/lumbar adolescent idiopathic scoliosis.

STUDY DESIGN/SETTING: Clinical prospective study.

PATIENT SAMPLE: Thirteen girls diagnosed as progressive adolescent idiopathic scoliosis with left thoracolumbar/lumbar curves (curves ranging 25°-40°).

OUTCOME MEASURES: All patients underwent a radiographic and instrumented gait analysis, including assessment of kinematics, mechanics, electromyography (EMG), and energetics of walking.

METHODS: The scoliotic girls were prospectively studied at S1 (before bracing) and 6 months later at S2 (out-brace: treatment effect). The gait parameters were compared with those of 13 matched healthy girls. A t paired test was conducted to evaluate the effect of the 6-month orthotic treatment in AIS girls. Student t test was performed to compare the scoliotic group at S2 and the healthy subjects to identify if the observed changes in gait parameters meant improvement or worsening of gait.

RESULTS: After 6 months of orthotic treatment in AIS, thoracolumbar/lumbar curves and apical rotation remained reduced by 25% and 61%, respectively. During gait, frontal pelvis and hip motions were significantly increased. Muscular mechanical work increased becoming closer but still different as compared with healthy subjects. Bilateral lumbopelvic muscles were almost 40% more active in AIS at S1 compared with healthy subjects and did not change at S2 except for the erector spinae muscles EMG activity, which decreased significantly. Energy cost exceeded by 30% in AIS at S1 compared with healthy subjects and did not change at 6 months' follow-up.

CONCLUSIONS: After 6 months of orthotic treatment, in an out-brace situation, the main structural thoracolumbar/lumbar curve remained partly corrected. Frontal pelvis and hip motion increased, contributing to an improvement of muscular mechanical work during walking. EMG activity duration of lumbopelvic muscles did not change except for the erector spinae muscles, which was decreased but without any beneficial change in the energy cost of walking. In summary, brace treatment, after 6 months, did not significantly influence the gait variables in AIS girls deleteriously, but did not reduce the excessive energy cost, which was 30% above the values of normal adolescents.

Bracing

BMC Musculoskelet Disord. 2014 Aug 6;15(1):263.

The effectiveness of combined bracing and exercise in adolescent idiopathic scoliosis based on SRS and SOSORT criteria: a prospective study.

Negrini S, Donzelli S, Lusini M, Minnella S, Zaina F.

Abstract

BACKGROUND:

Recently an RCT confirmed brace efficacy in adolescent idiopathic scoliosis (AIS) patients. Previously, a Cochrane review suggested also producing studies according to the Scoliosis Research Society (SRS) criteria on the effectiveness of bracing for AIS. Even if the SRS criteria propose a prospective design, until now only one out of 6 published studies was prospective. Our purpose was to evaluate the effects of bracing plus exercises following the SRS and the international Society on Scoliosis Orthopedic and Rehabilitation Treatment (SOSORT) criteria for AIS conservative treatment.

METHODS:

Study design/setting: prospective cohort study nested in a clinical database of all outpatients of a clinic specialized in scoliosis conservative treatment. Patient sample: seventy-three patients (60 females), age 12 years 10 months +/-17 months, 34.4+/-4.4 Cobb degrees, who satisfied SRS criteria were included out of 3,883 patients at first evaluation. Outcome measures: Cobb angle at the end of treatment according to SRS criteria : (unchanged; worsened 6[degree sign] or more, over 45[degree sign] and surgically treated, and rate of improvement of 6[degree sign] or more). Braces were prescribed for 18-23 hours/day according to curves magnitude and actual international guidelines. Weaning was gradual after Risser 3. All patients performed exercises and were managed according to SOSORT criteria. Results in all patients were analyzed according to intent-to-treat at the end of the treatment. Funding and Conflict of Interest: no.

RESULTS:

Overall 46 patients (49.3%) improved. Seven patients (9.6%) worsened, of which 1 patient progressed beyond 45[degree sign] and was fused. Referred compliance was assessed during a mean period of 3 years 4 months +/-20 months; the median adherence was 99.1% (range 22.2-109.2%). Employing intent-to-treat analysis, there were failures in 11 patients (15.1%). At start, these patients had statistically significant low BMI and kyphosis, high thoracic rotation and higher Cobb angles. Drop-outs showed reduced compliance and years of treatment; their average scoliosis at discontinuation was low: 22.7[degree sign] (range 16-35[degree sign]) at Risser 1.3 +/- 1.

CONCLUSIONS:

Bracing in patients with AIS who satisfy SRS criteria is effective. Combining bracing with exercise according to SOSORT criteria shows better results than the current literature.

PMID: 25095800

Muscle density

J Manipulative Physiol Ther. 2014 Jun;37(5):326-33. doi: 10.1016/j.jmpt.2014.03.001.

Assessment of paraspinal muscle hardness in subjects with a mild single scoliosis curve: a preliminary myotonometer study.

Oliva-Pascual-Vaca Á1, Heredia-Rizo AM2, Barbosa-Romero A3, Oliva-Pascual-Vaca J4, Rodríguez-Blanco C5, Tejero-García S6.

Abstract

OBJECTIVE:

The purpose of this study was to evaluate the hardness of the paraspinal muscles in the convexity and concavity of patients with scoliosis curvatures and in the upper trapezius (UT) muscle in subjects with mild idiopathic scoliosis (IS) and to observe the correlation between the myotonometer (MYO) measurements and the value of body mass index (BMI) and the Cobb angle.

METHODS:

The sample included 13 patients with a single-curve mild IS (Risser sign ≤ 4) at thoracic, lumbar, or thoracolumbar level (mean Cobb angle of 11.53°). Seven females and 6 males were recruited, with a mean age of 12.84 ± 3.06 (9-18) years. A MYO was used to examine the differences in muscle hardness on both sides of the scoliosis curvature at several points: (a) apex of the curve, (b) upper and lower limits of the curve, and (c) the midpoint between the apex and the upper limit and between the apex and the lower limit. The UT was also explored.

RESULTS:

Although the MYO recorded lower values in all points on the concave side of the scoliosis, there were no significant differences in the comparison between sides ($P > .05$). No association was observed between BMI and MYO values, whereas the Cobb angle negatively correlated with muscle hardness only at 2 points on the convex side.

CONCLUSION:

The preliminary findings show that, in subjects with a single-curve mild IS, muscular hardness in the UT and paraspinal muscles, as assessed using a MYO, was not found to differ between the concave and the convex sides at different reference levels.

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KEYWORDS:

Adolescent; Muscle Tonus; Physical Examination; Scoliosis; Spine

PMID: 24928641

ATHLETICS

Impact of strength and endurance training

J Strength Cond Res. 2014 Jul 15.

Order effects of combined strength and endurance training on testosterone, cortisol, growth hormone and IGFBP-3 in concurrent-trained men.

Rosa C1, Vilaça-Alves J, Fernandes HM, Saavedra FJ, Pinto RS, Machado Dos Reis V.

Abstract

Purpose: Concurrent training has been widely used in fitness centers in order to simultaneously optimize cardiovascular and neuromuscular fitness, and induce a high-energy expenditure. Therefore, the aim of this study was to compare the acute effects of two different orders of concurrent training on hormonal responses in concurrent trained men.

Method: Fourteen men (mean±SD: 24.7±5.1 years old) were randomly divided into 2 groups: endurance training followed by strength (ES, n= 7) and strength training followed by endurance (SE, n= 7). Serum concentrations of testosterone, cortisol, growth hormone and IGFBP3 were measured before and after both training orders.

Findings: A significant interaction between exercise order and time was only found in the IGFBP-3 levels (p=0.022). The testosterone and IGFBP-3 concentrations significantly increased in the ES group after the exercise trainings ($57.7 \pm 35.1\%$, $p = 0.013$ and $17.0 \pm 15.5\%$, $p = 0.032$, respectively), but did not change significantly in the SE group ($15.5 \pm 36.6\%$, $p = 0.527$ and $-4.2 \pm 13.9\%$, $p = 0.421$, respectively). Conversely, cortisol and growth hormone concentrations significantly increased in both ES ($169.2 \pm 191.0\%$, $p = 0.021$ and $13296.8 \pm 13009.5\%$, $p = 0.013$, respectively) and SE ($92.2 \pm 81.5\%$, $p = 0.017$ and $12346.2 \pm 9714.1\%$, $p = 0.001$, respectively) groups compared with baseline values. No significant correlations were found between the changes in the hormonal concentrations.

Conclusions: In conclusion, these results suggest that immediately post-exercise testosterone and IGFBP-3 responses are significantly increased only after the ES order. Therefore, an ES training order should be prescribed if the main focus of the training intervention is to induce an acute post-exercise anabolic environment.

Baseball pitchers screening

Am J Sports Med. 2014 Jun 3;42(8):1993-1999.

Risk Factors for Shoulder and Elbow Injuries in High School Baseball Pitchers: The Role of Preseason Strength and Range of Motion.

Tyler TF1, Mullaney MJ2, Mirabella MR3, Nicholas SJ2, McHugh MP4.

Abstract

BACKGROUND:

Shoulder strength and motion deficits in high school baseball pitchers have been implicated in injury risk.

PURPOSE/HYPOTHESIS:

To prospectively determine if preseason strength and range of motion (ROM) are predictive of injury in high school baseball pitchers. It was hypothesized that ROM asymmetries and weakness would be predictive of injury.

STUDY DESIGN:

Case-control study; Level of evidence, 3.

METHODS:

Preseason strength and ROM measurements were made on 101 pitchers from 4 different high schools over 4 seasons (total 166 pitcher-seasons: 25 freshman, 46 junior varsity, and 95 varsity player-seasons). Glenohumeral internal rotation (IR), glenohumeral external rotation, and posterior shoulder ROM were measured bilaterally. Strength in IR, external rotation, supraspinatus (empty-can test), and scapular retraction was measured bilaterally (handheld dynamometer). Injury incidence (injuries per 1000 pitches) was computed for players categorized as above normal (≥ 1 SD above the mean), normal (within 1 standard deviation of the mean), and below normal (≤ 1 SD below the mean) for each potential risk factor. Injury was defined as a missed game or practice because of shoulder or elbow problem.

RESULTS:

There were 28 upper extremity injuries (19 shoulder, 9 elbow; incidence, 0.58 injuries/1000 pitches). There was a trend for supraspinatus weakness to be associated with increased injury risk (relative risk [RR], 3.60; 95% CI, 0.75-17.32; $P = .09$). When analyzing major injuries only (>3 missed games), preseason supraspinatus weakness was significantly associated with increased injury risk (RR, 4.58; 95% CI, 1.40-15.01; $P = .02$). Paradoxically, pitchers with no IR loss were at increased risk compared with pitchers with $\geq 20^\circ$ loss (RR, 4.85; 95% CI, 1.01-23.29; $P = .04$). Other ROM and strength measures were unrelated to injury risk.

CONCLUSION:

Although excessive loss of IR ROM is thought to be a risk factor for injury, the opposite was the case in this study. The absence of IR ROM loss in high school pitchers may indicate inadequate prior exposure to pitching, resulting in increased injury risk. Preseason supraspinatus weakness was associated with increased risk for a major injury, and preventative supraspinatus strengthening may be beneficial.

KEYWORDS: baseball; elbow; epidemiology; shoulder
PMID: 24893778

PAIN

Adolescent neck and shoulder pain

J Adolesc Health. 2014 Apr 16. pii: S1054-139X(14)00105-0. doi: 10.1016/j.jadohealth.2014.02.016.

Adolescent Neck and Shoulder Pain-The Association With Depression, Physical Activity, Screen-Based Activities, and Use of Health Care Services.

Myrtveit SM1, Sivertsen B2, Skogen JC3, Frostholm L4, Stormark KM5, Hysing M5.

Abstract

PURPOSE:

Neck and shoulder pain is frequent in adolescents, and multiple factors seem to affect the risk of such symptoms. We aimed to investigate the prevalence of neck and shoulder pain in Norwegian adolescence and to examine whether behavioral and emotional factors were associated with the risk of neck and shoulder pain. Finally we aimed to investigate whether neck and shoulder pain was related to the use of health services.

METHOD:

Data from the population-based study ung@hordaland were used. Participants were asked how often during the last 6 months they had experienced neck and shoulder pain. The association between frequent neck and shoulder pain and physical activity, symptoms of depression, and screen-based activities was evaluated using logistic regression analyses stratified by gender. The relative risk of visiting health services when reporting neck and shoulder pain was calculated using multiple logistic regression analyses.

RESULTS:

Frequent neck and shoulder pain was reported by 20.0% (1,797 of the total 8,990) and more often by girls than boys ($p < .001$). A high score of depressive symptoms was the strongest risk factor for neck and shoulder pain in both boys and girls (odds ratio = 6.14 [95% confidence interval 4.48-8.42] and odds ratio = 3.10 [95% confidence interval 2.63-3.67], respectively). Frequent screen-based activities slightly increased the risk while physical activity was protective. Individuals reporting neck and shoulder pain more often visited their general practitioner (47.1% vs. 31.8%) and school health services (24.6% vs. 13.5%).

CONCLUSION:

Frequent neck and shoulder pain was reported in 20% of Norwegian adolescents. Symptoms of depression and screen-based activities increased the risk of neck and shoulder pain while physical activity was protective. Individuals reporting neck and shoulder pain visited health services more frequently than others.

KEYWORDS:

Adolescent health; Depression; Health services; Neck and shoulder pain; Physical activity; Risk factors; Screen-based activities

Music modulation

J Pain. 2014 Jul 28. pii: S1526-5900(14)00822-0. doi: 10.1016/j.jpain.2014.07.006.

Music modulation of pain perception and pain-related activity in the brain, brainstem, and spinal cord: an fMRI study.

Dobek CE1, Beynon ME1, Bosma RL1, Stroman PW2.

Abstract

Purpose: The oldest known method for relieving pain is music, and yet, to date, the underlying neural mechanisms have not been studied. Here, we investigate these neural mechanisms by applying a well-defined painful stimulus while participants listened to their favorite music, or no music.

Method: Neural responses in the brain, brainstem, and spinal cord, were mapped with functional magnetic resonance imaging (fMRI) spanning the cortex, brainstem, and spinal cord.

Findings: Subjective pain ratings were observed to be significantly lower when pain was administered with music than without music. The pain stimulus without music elicited neural activity in brain regions that are consistent with previous studies. Brain regions associated with pleasurable music listening included limbic, frontal, and auditory regions, when comparing music to non-music pain conditions. In addition, regions demonstrated activity indicative of descending pain modulation when contrasting the two conditions. These regions include the dorsolateral prefrontal cortex (DLPFC), periaqueductal grey (PAG), rostral ventromedial medulla (RVM), and the dorsal gray matter of the spinal cord.

Conclusions: This is the first imaging study to characterize the neural response of pain and how it is mitigated by music listening, and provides **new** insights into the neural mechanism of music-induced analgesia within the central nervous **system**.

PERSPECTIVE:

This article presents the first investigation of neural processes underlying music analgesia in human participants. Music modulates pain responses in the brain, brainstem and spinal cord, and neural activity changes are consistent with engagement of the descending analgesia **system**.

KEYWORDS:

brainstem; cortex; functional magnetic resonance imaging; human; music; pain; spinal cord; thermal

Shoulder pain processing

Clin J Pain. 2014 Sep;30(9):775-86. doi: 10.1097/AJP.0000000000000029.

Investigation of central pain processing in postoperative shoulder pain and disability.

Valencia C1, Fillingim RB, Bishop M, Wu SS, Wright TW, Moser M, Farmer K, George SZ.

Abstract

BACKGROUND:

Measures of central pain processing like conditioned pain modulation and suprathreshold heat pain response (SHPR) have been described to assess different components of central pain modulatory mechanisms. Central pain processing potentially plays a role in the development of postsurgical pain, however, the role of conditioned pain modulation and SHPR in explaining postoperative clinical pain and disability is still unclear.

METHODS:

Seventy-eight patients with clinical shoulder pain were included in this study. Patients were examined before shoulder surgery, at 3 months, and 6 months after surgery. The primary outcome measures were pain intensity and upper extremity disability.

RESULTS:

Analyses revealed that the change score (baseline- 3 mo) of fifth pain rating of SHPR accounted for a significant amount of variance in 6-month postsurgical clinical pain intensity and disability after age, sex, preoperative pain intensity, and relevant psychological factors were considered.

CONCLUSIONS:

The present study suggests that baseline measures of central pain processing were not predictive of 6-month postoperative pain outcome. Instead, the 3-month change in SHPR might be a relevant factor in the transition to an elevated 6-month postoperative pain and disability outcomes. In patients with shoulder pain, the 3-month change in a measure of central pain processing might be a relevant factor in the transition to elevated 6-month postoperative pain and disability scores.

PMID: 24042347

NUTRITION/VITAMINS

Sodas and RA

Am J Clin Nutr. 2014 Jul 16. pii: ajcn.086918.

Sugar-sweetened soda consumption and risk of developing rheumatoid arthritis in women.

Hu Y, Costenbader KH, Gao X, Al-Daabil M, Sparks JA, Solomon DH, Hu FB, Karlson EW, Lu B.

Abstract

BACKGROUND:

Sugar-sweetened soda consumption is consistently associated with an increased risk of several chronic inflammatory diseases such as type 2 diabetes and cardiovascular diseases. Whether it plays a role in the development of rheumatoid arthritis (RA), a common autoimmune inflammatory disease, remains unclear.

OBJECTIVE: The aim was to evaluate the association between sugar-sweetened soda consumption and risk of RA in US women.

DESIGN: We prospectively followed 79,570 women from the Nurses' Health Study (NHS; 1980-2008) and 107,330 women from the NHS II (1991-2009). Information on sugar-sweetened soda consumption (including regular cola, caffeine-free cola, and other sugar-sweetened carbonated soda) was obtained from a validated food-frequency questionnaire at baseline and approximately every 4 y during follow-up. Incident RA cases were validated by medical record review. Time-varying Cox proportional hazards regression models were used to calculate HRs after adjustment for confounders. Results from both cohorts were pooled by an inverse-variance-weighted, fixed-effects model.

RESULTS: During 3,381,268 person-years of follow-up, 857 incident cases of RA were documented in the 2 cohorts. In the multivariable pooled analyses, we found that women who consumed ≥ 1 servings of sugar-sweetened soda/d had a 63% (HR: 1.63; 95% CI: 1.15, 2.30; P-trend = 0.004) increased risk of developing seropositive RA compared with those who consumed no sugar-sweetened soda or who consumed < 1 serving/mo. When we restricted analyses to those with later RA onset (after age 55 y) in the NHS, the association appeared to be stronger (HR: 2.64; 95% CI: 1.56, 4.46; P-trend < 0.0001). No significant association was found for sugar-sweetened soda and seronegative RA. Diet soda consumption was not significantly associated with risk of RA in the 2 cohorts.

CONCLUSION: Regular consumption of sugar-sweetened soda, but not diet soda, is associated with increased risk of seropositive RA in women, independent of other dietary and lifestyle factors.

PMID: 25030783

Milk and bone density

J Allergy Clin Immunol. 2014 Aug 1. pii: S0091-6749(14)00892-6. doi: 10.1016/j.jaci.2014.06.026.

Decreased bone mineral density in young adult IgE-mediated cow's milk-allergic patients.

Nachshon L1, Goldberg MR1, Schwartz N2, Sinai T3, Amitzur-Levy R4, Elizur A5, Eisenberg E6, Katz Y7.

Abstract

BACKGROUND:

IgE-mediated cow's milk-allergic (IgE-CMA) patients provide a valuable model for studying the relationship between dairy intake and bone mineral density (BMD) because they are unable to consume even minor amounts of dairy foods.

OBJECTIVE:

To determine the effects of dairy restriction on BMD in young adult IgE-CMA patients.

METHODS:

A prospective observational study was conducted from July 2012 to June 2013 at the Allergy unit of the Assaf-Harofeh Medical Center. Densitometric measurements of postpubertal patients diagnosed with IgE-CMA (group I, n = 33) were compared with those of volunteers matched for age and sex without IgE-CMA (control group II, n = 24). In a second analysis, group I and II patients were compared with IgE-CMA patients who after desensitization consumed milk for 12 to 39 months before analysis (group III, n = 12).

RESULTS:

Densitometric measurements (average T scores and Z scores) of the hip, femoral neck, and lumbar spine of IgE-CMA patients were significantly lower than of those in the control group ($P < .0001$). A T score below -2.5 SD, identifying a risk for osteoporosis, was found in 27% of IgE-CMA patients but in none of the controls ($P = .0071$). Calcium intake was severely reduced in allergic patients than in controls ($P < .0001$). BMD measurements in group III were significantly greater than in group I ($P < .0001$) and unchanged from the control group.

CONCLUSIONS:

Patients with IgE-CMA have a significant risk of reduced BMD and early osteoporosis, which appears to be reversible on milk desensitization. Adequate calcium intake is not achieved while on a nondairy diet, requiring investigation into optimal nutritional protocols for these patients.

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KEYWORDS:

Bone mineral density; cow's milk allergy; osteoporosis

PMID: 25091435

PHARMACOLOGY

Medication use and LBP

Pain Med. 2014 Aug 4. doi: 10.1111/pme.12515.

Analgesic Use in Older Adults with Back Pain: The BACE Study.

Enthoven WT1, Scheele J, Bierma-Zeinstra SM, Bueving HJ, Bohnen AM, Peul WC, van Tulder MW, Berger MY, Koes BW, Luijsterburg PA.

Abstract

BACKGROUND:

Older patients with back pain are more likely to visit their general practitioner (GP) and are more likely to be prescribed analgesics.

OBJECTIVE:

To assess analgesic use in older adults with back pain in general practice.

METHODS:

The BACE study in the Netherlands is a prospective cohort study. Patients (aged >55 years) with back complaints were recruited when consulting their GP or shortly thereafter. Measurements took place at baseline and at 3- and 6-month follow-up. For medication use, patients were asked if they had used any medication for their back pain in the previous 3 months and, if so, to specify the medication name, dosage used, frequency of usage, and whether the medication was prescribed or purchased over the counter.

RESULTS:

Of the 1,402 patients who were approached to enter the study, 675 were included. Of these patients, 484 (72%) reported medication use at baseline. Nonsteroidal anti-inflammatory drugs (NSAIDs) (57%) were more often used than paracetamol (49%). Paracetamol was mostly obtained over the counter (69%), and NSAIDs were mostly obtained by prescription (85%). At baseline, patients with severe pain (numerical rating scale score ≥ 7) used more paracetamol, opioids, and muscle relaxants. Patients with chronic pain (back pain >3 months) used more paracetamol, while patients with a shorter duration of pain used more NSAIDs. During follow-up there was an overall decline in medication use; however, at 3- and 6-month follow-up, 36% and 30% of the patients, respectively, still used analgesics.

CONCLUSIONS:

In these older adults consulting their GP with back pain, 72% used analgesics at baseline. Despite a decrease in medication use during follow-up, at 3 and 6 months a considerable proportion still used analgesics.

KEYWORDS: Analgesics; Back Pain; Older Adults

PMID: 2508770