ABSTRACTS

LBP

Cold hyperalgesia

Clin J Pain. 2014 Oct;30(10):886-93. doi: 10.1097/AJP.0000000000000045.

Contributions of mood, pain catastrophizing, and cold hyperalgesia in acute and chronic low back pain: a comparison with pain-free controls.

Hübscher M[1], Moloney N, Rebbeck T, Traeger A, Refshauge KM.

Abstract

OBJECTIVES:

Quantitative sensory testing (QST) has been used to elucidate the peripheral and central mechanisms that underlie changes in pain sensitivity associated with low back pain (LBP). However, it remains unclear to what degree peripheral and central changes contribute to the generation and maintenance of LBP. The aim of this study was to compare thermal pain sensitivity, measured using QST, in participants with acute LBP, chronic LBP, and pain-free controls.

MATERIALS AND METHODS:

Participant groups with acute LBP (N=20), chronic LBP (N=30), and pain-free controls (N=30) were assessed by thermal QST. The unique contributions of pain-related psychological and QST variables to predict membership to the acute and chronic pain groups were also determined.

RESULTS:

We found that participants with chronic LBP demonstrated significantly lower cold pain threshold (CPT) in the primary area of pain (low back) as well as in an area anatomically remote from the primary area of pain (forearm) when compared with controls. Participants with acute LBP did not show significantly elevated pain sensitivity. CPT at the remote site was a significant independent predictor of membership to the chronic pain group, after the adjustment for mood and pain catastrophizing. CPT explained 8% of the total variance of 46% related to group membership.

DISCUSSION:

We found evidence for localized and generalized cold hyperalgesia in chronic, but not acute LBP. We might speculate that hyperalgesia develops as a consequence of long-lasting LBP, but prospective studies are needed to confirm this assumption.

PMID: 24145929

Quality of life

Eur Spine J. 2014 Nov 13.

Is low back pain associated with worse health-related quality of life 6 months later?

Nolet PS[1], Kristman VL, Côté P, Carroll LJ, Cassidy JD.

Abstract

PURPOSE:

The purpose of this study was to investigate the impact of low back pain (LBP) on future health-related quality of life (HRQoL). Current evidence suggests that individuals with LBP have poorer HRQoL than those without LBP. However, most of the evidence comes from cross-sectional studies where LBP and HRQoL are determined at the same time. One prospective study examined the association between days with LBP and HRQoL but did not account for the intensity of LBP. Therefore, this association needs to be tested in a large prospective population-based sample with a valid measure of LBP and adequate control of known confounders.

METHODS:

We formed a cohort of 1,110 randomly sampled Saskatchewan adults in September 1995. LBP at baseline was measured with the chronic pain questionnaire. The SF-36 questionnaire was used to measure physical and mental HRQoL at 6 months follow-up. Multivariable linear regression was used to estimate the association between graded LBP at baseline and HRQoL at 6 months while controlling for the effects of confounding.

RESULTS:

The 6-month follow-up rate was 70.7 % (785/1,110). LBP had a dose-response relationship with worsening physical HRQoL at 6 months, after controlling for age, income, arthritis, neck pain, and kidney disorders: grade III-IV LBP (β = -10.23; 95 % CI -12.46, -7.99), grade II LBP (β = -6.72, 95 % CI -8.79, -4.65), and grade I LBP (β = -1.77; 95 % CI -3.18, -0.36). There was no dose-response relationship between LBP and mental HRQoL at 6 months.

CONCLUSIONS:

Low back pain has an impact on future physical HRQoL. Strategies for reducing the effects of LBP on HRQoL should be an important focus for clinicians, researchers, and health policy makers.

PMID: 25391622

Pain during pregnancy and exercise

J Rehabil Med. 2014 Nov 6. doi: 10.2340/16501977-1906.

Effect of a regular exercise programme on pelvic girdle and low back pain in previously inactive pregnant women: A randomized controlled trial.

Haakstad LA[1], Bø K.

Abstract

Objective: To determine whether participation in a group fitness class for pregnant women can prevent and treat pelvic girdle pain and low back pain.

Design: An observer-blinded randomized controlled trial. Participants: A total of 105 sedentary, nulliparous pregnant women, mean age 30.7 years (standard deviation (SD) 4.0), mean pre-pregnancy body mass index (BMI) 23.8 (SD 4.3), were assigned to either control or exercise groups at mean gestation week 17.7 (SD 4.2).

Methods: The exercise intervention followed the guidelines of American College of Obstetricians and Gynecologists and included a 60 min general fitness class, with 40 min of endurance training and 20 min of strength training including stretching, performed at least twice per week for a minimum of 12 weeks. Outcome measures were number of women reporting pelvic girdle pain and low back pain after the intervention (mean pregnancy week 36.6 (SD 0.9)) and postpartum (mean 7.7 (SD 1.7)).

Results: There were no statistically significant differences between the exercisers and controls in numbers reporting the 2 conditions after the intervention (pelvic girdle pain: odds ratio (OR) = 1.34, CI = 0.56-3.20 or low back pain: OR = 1.10, CI = 0.47-2.60) or postpartum (pelvic girdle pain: OR = 0.38, CI = 0.13-1.10 or low back pain: OR = 1.45, CI = 0.54-3.94). A comparison of the women who had attended at least 80% of the weekly exercise classes with the control participants did not change the results.

Conclusion: Participation in regular group fitness classes during pregnancy did not alter the proportion of women reporting pelvic girdle pain or low back pain during pregnancy or after childbirth.

PMID: 25385408

DISC

Disc nutrition

Spine (Phila Pa 1976). 2014 Nov 15;39(24):E1411-7. doi: 10.1097/BRS.0000000000000560.

Simulation of the progression of intervertebral disc degeneration due to decreased nutritional supply.

Gu W[1], Zhu Q, Gao X, Brown MD.

Abstract

STUDY DESIGN:

Simulate the progression of human disc degeneration.

OBJECTIVE:

The objective of this study was to quantitatively analyze and simulate the changes in cell density, nutritional level, proteoglycan (PG) content, water content, and volume during human disc degeneration using a numerical method.

SUMMARY OF BACKGROUND DATA:

Understanding the cause and progression of intervertebral disc degeneration is crucial for developing effective treatment strategies for intervertebral disc degeneration-related diseases. During tissue degeneration, the disc undergoes losses of cell viability and activities, changes in extracellular matrix composition and structure, and compromise of the tissue-level integrity and function, which is significantly influenced by the intercoupled biological, chemical, electrical, and mechanical signals in the disc. Characterizing these signals in human discs in vivo is difficult.

METHODS:

A realistic 3-dimensional finite element model of the human intervertebral disc was developed on the basis of biomechanoelectrochemical continuum mixture theory. The theoretical framework and the constitutive relationships were all biophysics based. All the material properties were obtained from experimental results. The cell-mediated disc degeneration process caused by lowered nutritional levels at disc boundaries was simulated and validated by comparing with experimental results.

RESULTS:

Cell density reached equilibrium state in 30 days after reduced nutritional supply at the disc boundary, whereas the PG and water contents reached a new equilibrium state in 55 years. The simulated results for the distributions of PG and water contents within the disc were consistent with the results measured in the literature, except for the distribution of PG content in the sagittal direction.

CONCLUSION:

Poor nutritional supply has a long-term effect on disc degeneration.

PMID: 25188596

SURGERY

Microdiscectomy

Asian J Endosc Surg. 2014 Nov 3. doi: 10.1111/ases.12143.

Comparison of the invasiveness of conventional discectomy and microendoscopic discectomy for lumbar disc herniation: Differences in the methods of approach.

Hara M[1], Takahashi H, Yokoyama Y, Wada A, Hasegawa K, Iida Y.

Abstract

INTRODUCTION:

The aim of this study was to investigate whether differences in the methods of approach to the vertebral arch influence the invasiveness of conventional discectomy and microendoscopic discectomy (MED).

METHODS:

In this study, 41 Wistar rats were divided into four groups: controls (no surgery) (n = 10), shams (skin incision only) (n = 11), MED (n = 10), and conventional discectomy (n = 10). We performed ethological and blood biochemical examinations for three of the groups, excluding the control group, and a histological examination for three of the groups, excluding the sham group. In the ethological examination, we measured the threshold of postoperative pain using the von Frey test. In the blood chemical examination, we measured blood creatine phosphokinase and inflammatory cytokines, and compared the severity of tissue damage by histological examination using hematoxylin-eosin and immunohistochemical staining.

RESULTS:

The conventional discectomy group showed a significantly lower threshold of postoperative pain, compared with the MED group ($P < 0.05$). Blood biochemical investigation revealed that the creatine phosphokinase ($P < 0.05$) and tumor necrosis factor-α levels ($P < 0.05$) of the conventional discectomy group were significantly higher than those in the MED group. In the histological examination, it was found that a wide range of paraspinal muscle damage occurred in the conventional discectomy group ($P < 0.05$) and that the damage was mostly confined to the periosteum and nearby nerve endings.

CONCLUSION:

MED was found to be less invasive than conventional discectomy based on ethological, blood biochemical, and histological examinations.

KEYWORDS: Conventional discectomy; microendoscopic discectomy; operative invasiveness

PMID: 25365970

VISCERA

Vit. D and pregnancy

Curr Opin Obstet Gynecol. 2014 Dec;26(6):438-47. doi: 10.1097/GCO.0000000000000117.

Vitamin D and pregnancy outcomes.

Wei SQ.

Abstract

PURPOSE OF REVIEW:
This article presents an overview of the most recent scientific evidence of the role of maternal vitamin D on pregnancy outcomes, with a particular emphasis on those articles in the English-language literature published between 1 January 2013 and 1 July 2014 in PubMed.

RECENT FINDINGS:
Low levels of vitamin D status, as measured by 25-hydroxyvitamin D [25(OH)D], are common in pregnant women. Meta-analysis of observational studies has demonstrated positive associations between vitamin D status and adverse pregnancy outcomes such as preeclampsia, gestational diabetes mellitus, preterm birth and small-for-gestational age. There was heterogeneity among studies in terms of design, population, geographic location, definitions of exposure and outcome, gestational age at sampling, confounding factors and approach to analyses. Randomized controlled trials (RCTs) indicate that vitamin D supplementation during pregnancy optimizes maternal and neonatal vitamin D status.

SUMMARY:
Recent evidence supports that low maternal vitamin D status is associated with an increased risk of adverse pregnancy outcomes. Interventional studies demonstrate that vitamin D supplementation during pregnancy optimizes maternal and neonatal vitamin D status. Large, well designed, multicentre RCTs are required to determine whether vitamin D supplementation in pregnant women with low vitamin D status reduces the risk of adverse pregnancy outcomes.

PMID: 25310531

Vulvodynia

J Sex Med. 2014 Oct 30. doi: 10.1111/jsm.12718.

Impact of a Multidisciplinary Vulvodynia Program on Sexual Functioning and Dyspareunia.

Brotto LA[1], Yong P, Smith KB, Sadownik LA.

Abstract

INTRODUCTION:
For many years, multidisciplinary approaches, which integrate psychological, physical, and medical treatments, have been shown to be effective for the treatment of chronic pain. To date, there has been anecdotal support, but little empirical data, to justify the application of this multidisciplinary approach toward the treatment of chronic sexual pain secondary to provoked vestibulodynia (PVD).

AIM:
This study aimed to evaluate a 10-week hospital-based treatment (multidisciplinary vulvodynia program [MVP]) integrating psychological skills training, pelvic floor physiotherapy, and medical management on the primary outcomes of dyspareunia and sexual functioning, including distress.

METHOD:
A total of 132 women with a diagnosis of PVD provided baseline data and agreed to participate in the MVP. Of this group, n = 116 (mean age 28.4 years, standard deviation 7.1) provided complete data at the post-MVP assessment, and 84 women had complete data through to the 3- to 4-month follow-up period.

RESULTS:
There were high levels of avoidance of intimacy (38.1%) and activities that elicited sexual arousal (40.7%), with many women (50.4%) choosing to focus on their partner's sexual arousal and satisfaction at baseline. With treatment, over half the sample (53.8%) reported significant improvements in dyspareunia. Following the MVP, there were strong significant effects for the reduction in dyspareunia ($P = 0.001$) and sex-related distress ($P < 0.001$), and improvements in sexual arousal ($P < 0.001$) and overall sexual functioning ($P = 0.001$). More modest but still statistically significant were improvements in sexual desire, lubrication, orgasmic function, and sexual satisfaction. All improvements were retained at 2- to 3-month follow-up.

CONCLUSION:
This study provides strong support for the efficacy of a multidisciplinary approach (psychological, pelvic floor physiotherapy, and medical management) for improving dyspareunia and all domains of sexual functioning among women with PVD. The study also highlights the benefits of incorporating sexual health education into general pain management strategies for this population. Brotto LA, Yong P, Smith KB, and Sadownik LA. Impact of a multidisciplinary vulvodynia program on sexual functioning and dyspareunia. J Sex Med **;**:**-**.

KEYWORDS: Dyspareunia; Genital Pain; Multidisciplinary Treatment; Pelvic Floor Physiotherapy; Provoked Vestibulodynia; Psychological Therapy; Sex Therapy; Vulvar Vestibulitis Syndrome **PMID: 25354520**

Constipation

Chronic constipation and co-morbidities: A prospective population-based nested case-control study

United European Gastroenterology Journal, 11/18/2014 **Clinical Article**
Choung RS, et al.

Abstract

Background Chronic constipation (CC) is common in the community but surprisingly little is known about relevant gastro-intestinal (GI) and non-GI co-morbidities.

Objective The purpose of this study was to assess the epidemiology of CC and in particular provide new insights into the co-morbidities linked to this condition.

Methods In a prospective, population-based nested case-control study, a cohort of randomly selected community residents ($n = 8006$) were mailed a validated self-report gastrointestinal symptom questionnaire. CC was defined according to Rome III criteria. Medical records of each case and control were abstracted to identify potential CC comorbidities.

Results Altogether 3831 (48%) subjects returned questionnaires; 307 met criteria for CC. Age-adjusted prevalence in females was 8.7 (95% confidence interval (CI) 7.1–10.3) and 5.1 (3.6–6.7) in males, per 100 persons. CC was not associated with most GI pathology, but the odds for constipation were increased in subjects with anal surgery relative to those without (odds ratio (OR) = 3.3, 95% CI 1.2–9.1). In those with constipation vs those without, neurological diseases including Parkinson's disease (OR = 6.5, 95% CI 2.9–14.4) and multiple sclerosis (OR = 5.5, 95% CI 1.9–15.8) showed significantly increased odds for chronic constipation, adjusting for age and gender. In addition, modestly increased odds for chronic constipation in those with angina (OR = 1.4, 95% CI 1.1–1.9) and myocardial infarction (OR = 1.5, 95% CI 1.0–2.4) were observed.

Conclusions Neurological and cardiovascular diseases are linked to constipation but in the community constipation is unlikely to account for most lower GI pathology.

THORACIC SPINE

Thoracic mobility and respiration and C spine ROM

Manual Therapy
Volume 19, Issue 5, Pages 440–444, October 2014

Respiratory dysfunction in patients with chronic neck pain – Influence of thoracic spine and chest mobility

B. Wirth M. Amstalden M. Perk U. Boutellier B.K. Humphreys

Abstract

Patients with chronic neck pain exhibit various musculoskeletal deficits and respiratory dysfunction. As there is a link between thoracic and cervical spine motion, the aim of this study was to investigate the relationship between thoracic spine and chest mobility with respiratory function and neck disability. Nineteen patients with chronic neck pain (7 male, 46.6 ± 10.5 years) and 19 healthy subjects (7 male, 46.5 ± 9.9 years) participated. Spirometry was conducted to determine maximal voluntary ventilation (MVV), maximal inspiratory (Pi_{max}) and maximal expiratory pressure (Pe_{max}). Thoracic spine mobility was measured using the Spinal Mouse®. Chest expansion was assessed by subtracting chest circumference during maximal inspiration and expiration. Neck function was investigated by examining range of motion, forward head posture, neck flexor muscle synergy endurance and self-assessment (Neck disability index (NDI)). Correlation analyses and multiple linear regression analyses were conducted using MVV, Pi_{max} and Pe_{max} as independent variables. Thoracic spine mobility during flexion and chest expansion correlated significantly to MVV ($r = 0.45$ and 0.42), all neck motions (r between 0.39 and 0.59) and neck muscle endurance ($r_S = 0.36$). Pe_{max} and Pi_{max}were related to NDI ($r = -0.58$ and −0.46). In the regression models, chest expansion was the only significant predictor for MVV, and Pe_{max} was determined by neck muscle endurance.

These results suggest that chronic neck pain patients should improve the endurance of the neck flexor muscles and thoracic spine and chest mobility. Additionally, these patients might benefit from respiratory muscle endurance training, possibly by increasing chest mobility and $Pe_{max.}$

Keywords:
Neck pain, Respiratory dysfunction, Thoracic spine

UPPER C SPINE

Carotid artery dissection

Journal of Manipulative & Physiological Therapeutics
DOI: http://dx.doi.org/10.1016/j.jmpt.2013.09.005

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

Chadwick L.R. Chung, DC Pierre Côté, DC, PhD Paula Stern, DC Georges L'Espérance, MD

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.

Key Indexing Terms: ***Manipulation, Spinal, Chiropractic, Carotid Artery, Injuries***

Manips and carotid artery

Journal of Manipulative & Physiological Therapeutics

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

Walter Herzog, PhD Conrad Tang, DC Tim Leonard, PhD

DOI: http://dx.doi.org/10.1016/j.jmpt.2012.09.005

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.

Key Indexing Terms: ***Stroke, Manipulation, Cervical, Carotid Artery Injuries, Biomechanics, Safety, Chiropractic***

Odontoid fractures

Spine (Phila Pa 1976). 2014 Nov 15;39(24):E1403-10. doi: 10.1097/BRS.0000000000000609.

Odontoid fracture biomechanics.

Ivancic PC.

Abstract

STUDY DESIGN:
In vitro biomechanical study.

OBJECTIVES:
To investigate mechanisms of odontoid fracture.

SUMMARY OF BACKGROUND DATA:
Odontoid fractures in younger adults occur most often due to high-energy trauma including motor vehicle crashes and in older adults due to fall from standing height.

METHODS:
Horizontally aligned head impacts into a padded barrier were simulated using a human upper cervical spine specimen (occiput through C3) mounted to a surrogate torso mass on a sled and carrying a surrogate head. We divided 13 specimens into 3 groups on the basis of head impact location: upper forehead in the midline, upper lateral side of the forehead, and upper lateral side of the head. Post-impact fluoroscopy and anatomical dissection documented the injuries. Time-history biomechanical responses were determined.

RESULTS:
Four of the 5 specimens subjected to impact to the upper forehead in the midline sustained type II or high type III odontoid fractures due to abrupt deceleration of the head and continued forward torso momentum. Average peak force reached 1787.1 N at the neck at 50.3 milliseconds. Subsequently, the motion peaks occurred for the head relative to C3 reaching 15.2° for extension, 2.1 cm for upward translation, and 5.3 cm for horizontal compression, between 62 and 68 milliseconds.

CONCLUSION:
We identified impact to the upper forehead in the midline as a mechanism that produced odontoid fracture and associated atlas and ligamentous injuries similar to those observed in real-life trauma. We were not able to create odontoid fractures during impacts to the upper lateral side of the forehead or upper lateral side of the head. Dynamic odontoid fracture was caused by rapid deceleration of the head, which transferred load inferiorly combined with continued torso momentum, which caused spinal compression and anterior shear force and forward displacement of the axis relative to the atlas.

LEVEL OF EVIDENCE: 5 (laboratory investigation). ***PMID: 25271495***

CRANIUM/TMJ

PT and TMJ

Journal of Craniomaxillofacial Surgery

Effect of Early Physiotherapy on the Recovery of Mandibular Function After Orthognathic Surgery for Class III Correction: Part I—Jaw-Motion Analysis

Terry Te-Yi Teng, DDS, MS Ellen Wen-Ching Ko, DDS, MS, Associate professor Director Chiung Shing Huang, DDS, PhD Yu-Ray Chen, MD

Abstract

The aim of this prospective study was to compare the mandibular range of motion in Class III patients with and without early physiotherapy after orthognathic surgery (OGS). This study consisted of 63 Class III patients who underwent 2-jaw OGS. The experimental group comprised 31 patients who received early systematic physical rehabilitation. The control group consisted of 32 patients who did not have physical rehabilitation. Twelve variables of 3-dimensional (3D) jaw-motion analysis (JMA) were recorded before surgery (T1) and 6 weeks (T2) and 6 months (T3) after surgery. A 2-sample t test was conducted to compare the JMA results between the two groups at different time points. At T2, the JMA data were measured to be 77.5%–145.7% of presurgical values in the experimental group, and 60.3%–90.6% in the control group. At T3, the measurements were 112.2%–179.2% of presurgical values in the experimental group, and 77.6%–157.2% in the control group. The patients in the experimental group exhibited more favorable recovery than did those in the control group, from T1 to T2 and T1 to T3. However, after termination of physiotherapy, no significant difference in the extent of recovery was observed between groups up to 6 months after OGS.

Keywords: ***skeletal Class III malocclusion, mandibular range of motion, 3D jaw-motion analysis (JMA), orthognathic surgery,physiotherapy***

Periodontal Disease

J Clin Periodontol. 2014 Nov 10. doi: 10.1111/jcpe.12335.

Cardiovascular Risks Associated with Incident and Prevalent Periodontal Disease.

Yu YH[1], Chasman DI, Buring JE, Rose L, Ridker PM.

Abstract

AIM:
While prevalent periodontal disease associates with cardiovascular risk, little is known about how incident periodontal disease influences future vascular risk. We compared effects of incident versus prevalent periodontal disease in developing major cardiovascular diseases (CVD), myocardial infarction (MI), ischemic stroke and total CVD.

MATERIAL AND METHODS:
In a prospective cohort of 39863 predominantly white women, age > 45 years and free of cardiovascular disease at baseline were followed for an average of 15.7 years. Cox proportional hazard models with time-varying periodontal status (prevalent [18%], incident [7.3%] vs. never [74.7%]) were used to assess future cardiovascular risks.

RESULTS:
Incidence rates of all CVD outcomes were higher in women with prevalent or incident periodontal disease. For women with incident periodontal disease, risk factor adjusted hazard ratios (HRs) were 1.42 (95% CI, 1.14-1.77) for major CVD, 1.72 (1.25-2.38) for MI, 1.41(1.02-1.95) for ischemic stroke, and 1.27(1.06-1.52) for total CVD. For women with prevalent periodontal disease, adjusted HRs were 1.14 (1.00-1.31) for major CVD, 1.27 (1.04-1.56) for MI, 1.12(0.91-1.37) for ischemic stroke, and 1.15(1.03-1.28) for total CVD.

CONCLUSION:
New cases of periodontal disease, not just those that are pre-existing, place women at significantly elevated risks for future cardiovascular events.

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KEYWORDS: C-reactive protein; Diabetes; Smoking; cardiovascular diseases; family history of MI; periodontal diseases; survival analyses **PMID: 25385537**

CLAVICLE

Clavicle fracture

The long-term outcome of displaced mid-third clavicle fractures on scapular and shoulder function: variations between immediate surgery, delayed surgery, and nonsurgical management

Journal of Shoulder and Elbow Surgery, 11/19/2014 **Evidence Based Medicine**
George DM, et al. –

Background

Conservative management for uncomplicated displaced clavicle fractures is common practice. Delay of surgical fixation may result in less favorable outcomes.

Methods

A retrospective cohort study was conducted of 60 patients with a closed mid-third clavicle fracture that did not meet current operative or nonoperative guidelines; 20 primary (plate fixation <6 weeks), 20 delayed (plate fixation >6 weeks), and 20 matched conservative patients were included. Each patient completed 2 questionnaires, the Disabilities of the Arm, Shoulder, and Hand and the American Shoulder and Elbow Surgeons, as well as visual analog scales for pain, cosmetic satisfaction, and overall satisfaction. In addition, 10 patients from each group underwent clinical review of scapular rotation by the lateral scapular slide test, clinical impingement, range of motion assessment, and radiologic review of clavicle union and length.

Results

The American Shoulder and Elbow Surgeons patient self-reported questionnaire demonstrated a median score of 5.5 for the delayed group, 2 for the primary group, and 1 for the conservative group (P = .032). The median Disabilities of the Arm, Shoulder, and Hand score was 7.92 for the delayed group, 3.32 for the primary group, and 1.67 for the conservative group (P = .212). Six patients in the delayed group had scapular malrotation compared with 2 in the primary group and none in the conservative group (P = .008). Flexion and external rotation in 90° abduction were decreased in the conservative group (P = .049 and .041, respectively).

Conclusion

We support the conservative management of uncomplicated displaced clavicle fractures but recognize that a lower threshold for early surgery should be considered where optimal shoulder function is required.

GLENOHUMERAL/SHOULDER

Bicipital groove

The anatomy and histology of the bicipital tunnel of the shoulder

Journal of Shoulder and Elbow Surgery, 11/19/2014 **Review Article**

Taylor SA, et al.

Background

The bicipital tunnel is the extra-articular, fibro-osseous structure that encloses the long head of the biceps tendon.

Methods

Twelve cadaveric shoulder specimens underwent in situ casting of the bicipital tunnel with methyl methacrylate cement to demonstrate structural competence (n = 6) and en bloc harvest with gross and histologic evaluation (n = 6). The percentage of empty tunnel was calculated histologically by subtracting the proportion of cross-sectional area of the long head of the biceps tendon from that of the bicipital tunnel for each zone.

Results

Cement casting demonstrated that the bicipital tunnel was a closed space. Zone 1 extended from the articular margin to the distal margin of the subscapularis tendon. Zone 2 extended from the distal margin of the subscapularis tendon to the proximal margin of the pectoralis major tendon. Zone 3 was the subpectoral region. Zones 1 and 2 were both enclosed by a dense connective tissue sheath and demonstrated the presence of synovium. Zone 3 had significantly greater percentage of empty tunnel than zones 1 and 2 did ($P < .01$).

Conclusion

The bicipital tunnel is a closed space with 3 distinct zones. Zones 1 and 2 have similar features, including the presence of synovium, but differ from zone 3. A significant bottleneck occurs between zone 2 and zone 3, most likely at the proximal margin of the pectoralis major tendon. The bicipital tunnel is a closed space where space-occupying lesions may produce a bicipital tunnel syndrome. Careful consideration should be given to surgical techniques that decompress both zones 1 and 2 of the bicipital tunnel.

Trauma and soft tissue injury

Arch Orthop Trauma Surg. 2014 Nov 14.

Soft tissue injury of the shoulder after single non-dislocating trauma: prevalence and spectrum of intraoperative findings during shoulder arthroscopy and treatment results.

Banerjee M[1], Balke M, Bouillon B, Titze F, Shafizadeh S.

Abstract

BACKGROUND AND PURPOSE:
The purpose of our study was to present the spectrum and prevalence of intraarticular lesions in patients with shoulder pain after a single non-dislocating shoulder trauma and to evaluate the clinical results according to pathology and workers' compensation status.

METHODS:
Sixty consecutive patients (61 shoulders) with shoulder pain following a single non-dislocating shoulder trauma had shoulder arthroscopy. The indication for surgery was either persistent pain for 3 months or longer after trauma and/or an intraarticular lesion on MRI. Patients with history of shoulder complaints, previous shoulder surgery, a complete rotator cuff tear or a fracture of the shoulder girdle were excluded. Intraarticular findings during shoulder arthroscopy were retrospectively analyzed. After a minimum follow-up of 1 year patients were contacted by telephone interview and ASES score, Simple Shoulder Test, Subjective Shoulder Value and residual pain were assessed for the entire population and for patients with and without workers' compensation.

RESULTS:
The most common intraarticular findings were SLAP (44.3 %) and Pulley (19.7 %) lesions followed by lesions of the anterior or posterior labrum (14.8 %). The mean age of the 13 women and 47 men was 41.9 years (SD 10.9). Patients with workers' compensation had significantly lower scores than patients without and had a significantly lower return to work rate than patients without.

INTERPRETATION:
In patients with persistent shoulder pain after sprain or contusion arthroscopy revealed a broad spectrum of intraarticular findings. Patients with workers' compensation claims had worse results than those without.

LEVEL OF EVIDENCE: Case series (Level IV). PMID: 25394541

ROTATOR CUFF

Supraspinatus and biceps tendons

Relationship between chronic pathologies of the supraspinatus tendon and the long head of the biceps tendon: systematic review *Full Text*

BMC Musculoskeletal Disorders, 11/19/2014 **Evidence Based Medicine**
Redondo

Background
Chronic supraspinatus tendinopathy is a common clinical problem that causes functional and labor disabilities in the population. It is the most frequent cause of shoulder pain. This pathology may be frequently associated to the affectation of the long head of biceps tendon (LHBT), the main stabilizer of the glenohumeral joint together with the supraspinatus. The main aim of this work is to study the prevalence of lesions in LHBT associated to the chronic pathology of the supraspinatus tendon.

Methods
A systematic review was carried out between May to July 2013 in the electronic databases: CINAHL, WOK, Medline, Scopus, PEDro, IME (CSIC) and Dialnet. The keywords used were: 1) in English: chronic, supraspinatus "long head of the biceps tendon", biceps, rotator cuff, tendinosis, tendinopathy, evaluation, examination; 2) in Spanish: supraespinoso, biceps, tendinopatia. Inclusion criteria of the articles included subjects with a previously diagnosed chronic pathology of rotator cuff (RC) without previous surgery or any other pathologies of the shoulder complex. The total number of articles included in the study were five.

Results
The results show an epidemiological relationship between both tendons. The age of the subjects included in the review was between 35 and 80 years, and some of the studies seem to indicate that the tendinopathy is more frequent in men than in women. The sample size of the studies varies according to the design, the highest being composed of 229 subjects, and the minimum of 28. Not all the articles selected specify the diagnostic testing, though the ones most normally used are arthroscopy, ultrasound, magnetic resonance imaging and assessment tests. The percentage of associated lesions of LHBT and supraspinatus tendon is between 78.5% and 22%, with a major prevalence in the studies with a smaller sample.

Conclusions
The review of literature corroborates an association between the chronic pathology of the supraspinatus tendon and LHBT due to the epidemiological data. In addition, some authors confirm the existence of an anatomical and functional relationship between LHBT and the supraspinatus tendon, the latter being part of the LHBT pulley.

HIP

Preterm and hip problems

Arthritis Care Res (Hoboken). 2014 Nov 3. doi: 10.1002/acr.22475.

Association of low birth weight and preterm birth with the incidence of knee and hip arthroplasty for osteoarthritis.

Hussain SM[1], Wang Y, Wluka AE, Shaw JE, Magliano DJ, Graves S, Cicuttini FM.

Abstract

Objectives: Low birth weight (LBW) and preterm birth have been associated with adverse adult outcomes including hypertension, insulin resistance, cardiovascular disease and reduced bone mass. It is unknown whether LBW and preterm birth affect the risk of osteoarthritis (OA). This study aims to examine whether LBW and preterm birth were associated with the incidence of knee and hip arthroplasty for OA.

Methods: 3,604 participants of the Australian Diabetes, Obesity and Lifestyle Study who reported their birth weight and history of preterm birth and were aged more than 40 years at the commencement of arthroplasty data collection. The incidence of knee and hip replacement for osteoarthritis during 2002-2011 was determined by linking cohort records to the Australian Orthopaedic Association National Joint Replacement Registry.

Results: One hundred and sixteen participants underwent knee arthroplasty and 75 underwent hip arthroplasty for OA. Low birth weight (yes vs. no, HR 2.04, 95% CI 1.11-3.75, p=0.02) and preterm birth (yes vs. no, HR 2.50, 95% CI 1.29-4.87, p=0.007) were associated with increased incidence of hip arthroplasty independent of age, sex, BMI, education level, hypertension, diabetes, smoking and physical activity. No significant association was observed for knee arthroplasty.

Conclusions: Although these findings will need to be confirmed, they suggest that individuals born with LBW or preterm are at increased risk of hip arthroplasty for OA in adult life. The underlying mechanisms warrant further investigation. © 2014 American College of Rheumatology.

 PMID: 25363369

REPLACEMENTS

Dominate vs non-dominate side

The significance of hand dominance in hip osteoarthritis

Seminars in Arthritis and Rheumatism, 11/17/2014 **Clinical Article**
Cawley DT, et al. –

Objectives

Hip arthroplasty registries, encompassing all-cause end-stage hip degeneration have shown that slightly more right hip replacements are performed than left. Given that greater than 85% of individuals are right handed, we sought to investigate the association between side of hand dominance and side of hip osteoarthritis.

Methods

This Level III observational study, evaluated exclusively end-stage osteoarthritis of the hip, using three independent centres totalling 386 consecutive arthroplasty patients. Logistic regression was used as a statistical model.

Results

322 patients with hip osteoarthritis were included in the final analysis, including 146 (45.5%) women, 176 (54.5%) men, mean age 68.1 years (SD 9.5 years). There were 133 (41.2%) right, 73 (22.6%) left, and 116 (35.9%) hips where the contralateral side had been previously replaced. The proportion of individuals requiring unilateral hip arthroplasty on their dominant side was 67.4%.

Conclusions

In the development of hip osteoarthritis, one is significantly more likely to require hip arthroplasty on their dominant side than in the contralateral hip. Assessment of hand dominance identifies cerebral laterality as a contributing factor in pre-disposing one's dominant side to hip osteoarthritis.

Income level

Arch Orthop Trauma Surg. 2014 Nov 7.

Association between household income and the outcome of arthroplasty: a register-based study of total hip and knee replacements.

Peltola M[1], Järvelin J.

Abstract

INTRODUCTION:
Previous research findings regarding the association between the outcomes of total hip and knee arthroplasty and patients' socioeconomic status have been contradictory. Consequently, we wanted to analyse whether individual-level household income was associated with the risk of revision arthroplasty and whether the time span in days from the primary arthroplasty to the revision operation varied according to income quintile.

MATERIALS AND METHODS:
All first total hip and knee arthroplasties performed due to primary osteoarthritis in Finland from 1998 to 2007 were included in the study. Cox proportional hazard regression modelling was applied in the analysis regarding the risk of revision after the primary operation, while Poisson regression modelling was applied in the analysis regarding differences in the time from the primary to the revision operation between income quintiles.

RESULTS:
The relationship between household income and the risk of revision arthroplasty was not statistically significant. The relationship remained insignificant, even when age, sex, and other confounding factors were adjusted for or analyses concerned revision in short or long term. In both the total hip arthroplasty and knee arthroplasty populations, patients in the lowest income quintiles underwent revision surgery earlier than patients in the highest income groups, but this difference was not statistically significant.

CONCLUSION:
The quality of arthroplasty as measured by the risk of revision does not seem to depend on patients' income quintile.

PMID: 25376712

OA

PT pre replacement

Arch Med Sci. 2014 Oct 27;10(5):985-91. doi: 10.5114/aoms.2014.46218. Epub 2014 Oct 23.

Effects of preoperative physiotherapy in hip osteoarthritis patients awaiting total hip replacement.

Czyżewska A, Glinkowski WM, Walesiak K, Krawczak K, Cabaj D, Górecki A.

Abstract

INTRODUCTION:
The World Health Organization (WHO) claimed osteoarthritis as a civilization-related disease. The effectiveness of preoperative physiotherapy among patients suffering hip osteoarthritis (OA) at the end of their conservative treatment is rarely described in the literature. The aim of this study was to assess the quality of life and musculoskeletal health status of patients who received preoperative physiotherapy before total hip replacement (THR) surgery within a year prior to admission for a scheduled THR and those who did not.

MATERIAL AND METHODS:
Forty-five patients, admitted to the Department of Orthopaedics and Traumatology of Locomotor System for elective total hip replacement surgery, were recruited for this study. The assessment consisted of a detailed interview using various questionnaires: the Harris Hip Score (HHS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the 36-Item Short Form Health Survey (SF-36), and the Hip disability and Osteoarthritis Outcome Score (HOOS), as well as physical examination. Patients were assigned to groups based on their attendance of preoperative physiotherapy within a year prior to surgery.

RESULTS:
Among patients who received preoperative physiotherapy a significant improvement was found for pain, daily functioning, vitality, psychological health, social life, and (active and passive) internal rotation ($p < 0.05$).

CONCLUSIONS:
Patients are not routinely referred to physiotherapy within a year before total hip replacement surgery. This study confirmed that pre-operative physiotherapy may have a positive influence on selected musculoskeletal system status indicators and quality of life in hip osteoarthritis patients awaiting surgery.

KEYWORDS: coxarthrosis; hip; osteoarthritis; preoperative physiotherapy; rehabilitation
PMID: 25395951

IMPINGEMENT/LABRAL

Labral tear and hip strength

Manual Therapy
Volume 19, Issue 5, Pages 405–410, October 2014

Hip flexor muscle size, strength and recruitment pattern in patients with acetabular labral tears compared to healthy controls

M. Dilani Mendis Stephen J. Wilson David A. Hayes Mark C. Watts Julie A. Hides

Abstract

Acetabular labral tears are a source of hip pain and are considered to be a precursor to hip osteoarthritis. Hip flexor muscles contribute to hip joint stability and function but it is unknown if their size and function is altered in the presence of labral pathology. This study aimed to investigate hip flexor muscle size, strength and recruitment pattern in patients with hip labral pathology compared to control subjects. 12 subjects diagnosed with an unilateral acetabular labral tear were compared to 12 control subjects matched for age and gender. All subjects underwent magnetic resonance imaging (MRI) of their lumbo-pelvic region. Average muscle cross-sectional area (CSA) of the iliacus, psoas, iliopsoas, sartorius, tensor fascia latae and rectus femoris muscles were measured. Hip flexion strength was measured by an externally fixed dynamometer. Individual muscle recruitment pattern during a resisted hip flexion exercise task was measured by muscle functional MRI.

Hip flexor muscle strength was found to be decreased in patients with labral pathology compared to control subjects ($p < 0.01$). No difference between groups or sides was found for hip flexor muscle size (all $p > 0.17$) and recruitment pattern (all $p > 0.53$).

Decreased hip flexor muscle strength may affect physical function in patients with hip labral pathology by contributing to altered gait patterns and functional tasks. Clinical rehabilitation of these patients may need to include strengthening exercises for the hip flexor muscles.

Keywords: ***Hip injuries, Osteoarthritis, Muscle strength, Magnetic resonance imaging***

KNEE

Leg length and knee rotation

Knee Surg Sports Traumatol Arthrosc. 2014 Dec;22(12):2982-2988. Epub 2014 Sep 26.

Predicting knee rotation by the projection overlap of the proximal fibula and tibia in long-leg radiographs.

Maderbacher G[1], Schaumburger J, Baier C, Zeman F, Springorum HR, Dornia C, Grifka J, Keshmiri A.

Abstract

PURPOSE:
Rotation of the lower limbs in long-leg radiographs has a significant impact on imaging the mechanical femorotibial angle, the femoral anatomic mechanical angle, the mechanical lateral distal femoral angle (mLDFA) and the mechanical medial proximal tibial angle (mMPTA). In this study, we assessed the rotation of the lower limbs in conventional radiographs and hypothesized that the relative position of the proximal fibula to the proximal tibia on long-leg radiographs is related to the rotation of the knee joint.

METHODS:
Radiological examinations in different rotational positions of the knee joint (incremental 40° internal to 40° external rotation) were imitated by 50 computed tomography scans (50 patients, 25 men and 25 women). The extent of the projection overlaps of the fibula, the fibular tip and the distance from the fibular tip to the lateral cortex were determined for every rotational position.

RESULTS:
Multiple regression analysis showed a very strong correlation between the measured fibular parameters and knee rotation between 20° of internal rotation and 40° of external rotation ($R^2 \sim 0.94$, $p < 0.001$). By means of these results, we created a formula for predicting knee rotation: [Formula: see text]This strong correlation could not be found between 20° and 40° of internal rotation.

DISCUSSION:
Because incorrect internal and external rotation negatively influence the correct measurement of angles (mechanical femorotibial angle, femoral anatomic mechanical angle, the mLDFA and the mMPTA), long-leg radiographs should be assessed for proper rotation angles before measurement. Using the provided formula rotation of the lower limb in weight-bearing, long-leg radiographs can be reliably predicted.

LEVEL OF EVIDENCE: Diagnostic study, Level II. *PMID: 25253236*

Normal vs. varus knees

Knee Surg Sports Traumatol Arthrosc. 2014 Dec;22(12):2891-2899. Epub 2014 Sep 27.

A morphometric study of normal and varus knees.

Puthumanapully PK[1], Harris SJ, Leong A, Cobb JP, Amis AA, Jeffers J.

Abstract

PURPOSE:
The aim of the study was to investigate varus and normal knee morphologies to identify differences that may affect knee replacement alignment or design for varus knees.

METHODS:
Computed tomography scans of varus and normal knees were analyzed, and geometric shapes, points and axes were fit to the femur and tibia independently. These points were then projected in the three anatomical planes to measure the variations between the two groups.

RESULTS:
In the femur, varus knees had less femoral anteversion ($p < 0.0001$) and a larger medial extension facet ($p < 0.05$) compared with normal knees. In the tibia, the tubercle was found to be externally rotated in varus knees (12°), with a significant increase in the coronal slope ($p = 0.001$) and the extension facet angle ($p = 0.002$).

CONCLUSIONS:
The study highlighted the differences and similarities found between the two groups, which raises awareness on changes required during surgical intervention and component placement or design for a varus knee. This is particularly relevant for the design of patient-specific instrumentation and implants.

LEVELS OF EVIDENCE: Diagnostic study, Level III. ***PMID: 25261224***

KNEE/ACL

ACL Deficients gait

J Orthop Sci. 2014 Nov 14.

Anterior translation and rotational stability of anterior cruciate ligament-deficient knees during walking: speed and turning direction.

Yim JH[1], Seon JK, Kim YK, Jung ST, Shin CS, Yang DH, Rhym IS, Song EK.

Abstract

BACKGROUND:
Anterior cruciate ligament (ACL) rupture is one of the most common injuries associated with the knee. After ACL injury, knee joint stability can be altered, resulting in abnormal loading during functional activities. Since ACL-deficient (ACLD) knees are also vulnerable to translational and rotational instability, patients need to be wary of certain motions encountered in daily life. The present study investigated the effect of walking speed and pivoting directional change during gait on knee joint kinematics of ACLD knees. We hypothesized that faster walking and crossover turning would induce severe kinematic changes.

METHODS:
Thirty-five patients (22 males and 13 females) having a unilateral isolated subacute ACLD knee (from 1 to 3 months after injury) and contralateral intact (CLI) knee participated in this study. Spatiotemporal parameters, three-dimensional (3D) knee joint angles, and anterior-posterior (AP) translation were obtained by a 3D high-speed motion-capturing system. The CLI knee of each patient served as the control. The calculated AP stability and knee joint angles were used to test the research hypothesis. Mixed two-way repeated measures analysis of variance was performed to clarify the effects of walking speed and pivoting direction with a significance of 0.05. When a significance of mean comparison was detected, a post hoc test was performed.

RESULTS:
Significant and consistent increased AP translation of the tibia relative to the femur at the whole stance phase of the gait cycle was evident in ACLD knees compared to CLI knees for normal and faster (20 % greater than normal) walking speeds. Faster walking speed did not induce significantly more anterior location of the tibia. In addition, ACLD knees were significantly less extended than CLI knees during a large portion of midstance. Although there was a consistent varus offset between the curves of ACLD and CLI knees, the difference did not reach statistical significance during the stance phase. Also, ACLD knees did not show any significant difference in tibial rotation compared to CLI knees during the entire stance phase of the gait cycle. For pivoting turns, ACLD knees showed significantly less extended and varus offset than CLI knees only during the cutting turn. ACLD knees exhibited less tibial internal rotation during the crossover turn and less tibial external rotation during the cutting turn than CLI knees.

CONCLUSIONS:
In ACLD knees, the tibia tended to shift more anteriorly and changed with less extension at walking. However, faster walking speed did not induce any significant difference compared with normal-speed walking. In addition, ACLD knees displayed kinematic changes during pivoting, but not the crossover turn.

PMID: 25395272

Role of meniscus in ACL deficient knees

nt Orthop. 2014 Nov 15.

The influence of the medial meniscus in different conditions on anterior tibial translation in the anterior cruciate deficient knee.

Lorbach O[1], Kieb M, Herbort M, Weyers I, Raschke M, Engelhardt M.

Abstract

PURPOSE:
The purpose of this study was the evaluation of knee laxity in the ACL-deficient knee with combined meniscal tear, meniscal suture and partial medial meniscectomy.

METHODS:
Kinematics of the intact knee were determined in 18 human cadaver specimens in response to a 134-N anterior tibial load (aTT) as well as a combined rotatory load of 10 Nm valgus and 4 Nm internal tibial rotation using a robotic/universal force moment sensor testing system. The anterior cruciate ligament was resected. Subsequently, a vertical bucket-handle medial meniscal tear was created followed by a standard meniscus repair using horizontal inside-out stitches or a partial medial meniscectomy. Knee kinematics were calculated following every sub-step.

RESULTS:
A significant increase of anterior tibial translation was found in the ACL-deficient knee compared to the intact knee at 30° and 90° of flexion ($p = 0.001$; $p \leq 0.001$). Additional tear of the medial meniscus significantly increased anterior tibial translation ($p = 0.01$). In response to a simulated pivot shift, anterior tibial translation of the intact knee did not increase significantly after ACL resection ($p = 0.067$). However, ACL deficiency with an additional medial meniscus tear led to a significant increase compared to the intact knee at 0° of flexion ($p = 0.009$).

CONCLUSIONS:
Additional injury of the medial meniscus increased aTT as well as aTT under a combined rotatory load in the ACL-deficient knee whereas repair of the meniscus significantly decreased aTT. Therefore, the meniscus status does have a significant impact on knee kinematics in the ACL-deficient knee. The present biomechanical study further highlights the importance of preserving the meniscus especially in patients with additional ACL injuries.

PMID: 25398470

MENISCUS

Tools to assess effectiveness of surgery

Med Sci Sports Exerc. 2014 Nov 13.

Do Moments and Strength Predict Cartilage Changes following Partial Meniscectomy?

Hall M[1], Wrigley TV, Metcalf BR, Cicuttini FM, Wang Y, Hinman RS, Dempsey AR, Mills PM, Lloyd DG, Bennell KL.

Abstract

PURPOSE:
Higher knee load and quadriceps weakness are potential factors involved in the pathogenesis of knee osteoarthritis following arthroscopic partial meniscectomy (APM). In people following APM, this study evaluated the association between external knee joint moments and quadriceps strength and 2-year change in indices of cartilage integrity in the medial tibiofemoral compartment and patella.

METHODS:
70 people with medial APM were assessed 3-months following APM (baseline) and reassessed 2 years later (follow-up). At baseline, isokinetic quadriceps strength and the external knee adduction moment (peak and impulse), and knee flexion moment (peak) during walking were assessed. Magnetic resonance imaging was used to assess cartilage (cartilage volume and cartilage defects) in the medial tibial compartment and patella at baseline and follow-up.

RESULTS:
Increased peak knee adduction moment during fast pace walking at baseline was associated with onset or deterioration of medial tibiofemoral cartilage defects (OR = 2.06, 95% CI 1.03 to 4.12, p=0.042) over 2 years. Increased peak knee flexion moment during normal pace walking at baseline was associated with loss of patellar cartilage volume over 2 years (β = -0.24, 95% -0.47 to -0.01, p = 0.04). No significant association was observed for quadriceps strength.

CONCLUSION:
In middle-aged adults following APM, a higher peak knee adduction moment and peak knee flexion moment at 3 months following medial APM may be associated with adverse structural changes at the medial tibia and patella over the subsequent 2 years. These preliminary findings warrant further investigation as interventions aimed at reducing these moments may be designed if appropriate.

PMID: 25397607

PATELLA

Tibial rotation and patella kinematics

Knee Surg Sports Traumatol Arthrosc. 2014 Nov 16.

Significant influence of rotational limb alignment parameters on patellar kinematics: an in vitro study.

Keshmiri A[1], Maderbacher G, Baier C, Zeman F, Grifka J, Springorum HR.

Author information

- [1]Department of Orthopaedic Surgery, University of Regensburg, Kaiser-Karl-V Allee 3, 93077, Bad Abbach, Germany, keshmiri_armin@yahoo.de.

Abstract

PURPOSE:
Component malrotation has a major impact on patellar kinematics in total knee arthroplasty. The influence of natural rotational limb alignment on patellar kinematics is unclear so far. Based on recent clinical investigations, we hypothesized that rotational limb alignment significantly influences patellar kinematics.

METHODS:
Patellar kinematics of ten cadaveric knees was measured using computer navigation during passive motion. Data were correlated with different rotational limb alignment parameters of preoperative CT scans.

RESULTS:
Femoral antetorsion showed a significant influence on patellar rotation, while tibial tubercle-posterior cruciate ligament distance additionally displayed a significant influence on patellar mediolateral shift ($p < 0.05$). Femoral posterior condylar angle was sensitive to patellar epicondylar distance, rotation and tilt ($p < 0.05$). Patellar rotation was influenced by five out of eight rotational limb alignment parameters ($p < 0.05$).

CONCLUSIONS:
Rotational limb alignment should be paid more attention in terms of clinical evaluation of patellar tracking and future biomechanical and clinical investigations.

PMID: 25399346

Patella malalignment

Knee Surg Sports Traumatol Arthrosc. 2014 Nov 15.

The effects of the sagittal plane malpositioning of the patella and concomitant quadriceps hypotrophy on the patellofemoral joint: a finite element analysis.

Aksahin E[1], Kocadal O, Aktekin CN, Kaya D, Pepe M, Yılmaz S, Yuksel HY, Bicimoglu A.

Author information

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Abstract

PURPOSE:
Anterior knee pain is a common symptom after intramedullary nailing in tibia shaft fracture. Moreover, patellofemoral malalignment is also known to be a major reason for anterior knee pain. Patellofemoral malalignment predisposes to increased loading in patellar cartilage. In the previous study, we have demonstrated the quadriceps atrophy and patellofemoral malalignment after intramedullary nailing due to tibia shaft fracture. In this study, our aim was to clarify the effects of quadriceps atrophy and patellofemoral malalignment with the pathologic loading on the joint cartilage.

METHODS:
Mesh models of patellofemoral joint were constructed with CT images and integrated with soft tissue components such as menisci and ligaments. Physiological and sagittal tilt models during extension and flexion at 15°, 30° and 60° were created generating eight models. All the models were applied with 137 N force to present the effects of normal loading and 115.7 N force for the simulation of quadriceps atrophy. Different degrees of loading were applied to evaluate the joint contact area and pressure value with the finite element analysis.

RESULTS:
There was increased patellofemoral contact area in patellar tilt models with respect to normal models. The similar loading patterns were diagnosed in all models at 0° and 15° knee flexion when 137 N force was applied. Higher loading values were obtained at 30° and 60° knee flexions in sagittal tilt models. Furthermore, in the sagittal tilt models, in which the quadriceps atrophy was simulated, the loadings at 30° and 60° knee flexion were higher than in the physiological ones.

CONCLUSIONS:
Sagittal malalignment of the patellofemoral joint is a new concept that results in different loading patterns in the patellofemoral joint biomechanics. This malalignment in sagittal plane leads to increased loading values on the patellofemoral joint at 30° and 60° of the knee flexions. This new concept should be kept in mind during the course of diagnosis and treatment in patients with anterior knee pain. Definition of the exact biomechanical effects of the sagittal tilting will lead to the development of new treatment modalities.

PMID: 25398369

FOOT AND ANKLE

Flatfoot deformity

Foot Ankle Int. 2014 Nov 7. pii: 1071100714558846.

New Radiographic Parameter Assessing Hindfoot Alignment in Stage II Adult-Acquired Flatfoot Deformity.

Williamson ER[1], Chan JY[1], Burket Koltsov JC[1], Deland JT[1], Ellis SJ[2].

Author information

- [1]Department of Foot and Ankle Surgery, Hospital for Special Surgery, New York, NY, USA.
- [2]Department of Foot and Ankle Surgery, Hospital for Special Surgery, New York, NY, USA elliss@hss.edu.
- Abstract

BACKGROUND:
The hindfoot moment arm is a reliable measurement of hindfoot valgus deformity in stage II adult-acquired flatfoot deformity (AAFD) and can be used to guide intraoperative correction of the hindfoot. There is currently little understanding of how the hindfoot moment arm relates to angular measurements of hindfoot alignment. The purpose of this study was to develop a new hindfoot alignment angle that can reliably quantify hindfoot valgus in patients with AAFD and to establish the relationship of this angle with the hindfoot moment arm.

METHODS:
Preoperative hindfoot alignment radiographs were reviewed for 10 consecutive patients (10 feet) who were indicated for reconstruction for stage II AAFD. A second group of 10 patients (10 feet) without flatfoot were identified to serve as normal controls. The hindfoot moment arm and the new hindfoot alignment angle were measured in blinded fashion by 2 readers. Reliability was assessed using intraclass correlation coefficients (ICCs). The difference in angle between normal and flatfoot patients was assessed with a Mann-Whitney U test. A linear regression model was used to assess the relationship between hindfoot moment arm and the new hindfoot alignment angle.

RESULTS:
Intra- and interrater reliability for the hindfoot alignment angle was excellent (ICC = 0.979 and 0.965, respectively). Flatfoot patients had greater mean angles than did normal patients (22.5 ± 4.9 vs 5.6 ± 5.4 degrees, $P < .001$). The hindfoot moment arm was correlated significantly with the hindfoot alignment angle ($P < .001$), increasing by 0.81 mm for every degree increase in angle (adjusted $R^2 = 0.9046$).

CONCLUSION:
These results indicate that the new hindfoot alignment angle is a reliable measure of hindfoot valgus and can differentiate between flatfoot and normal patients. In addition, the strong linear relationship between the hindfoot alignment angle and moment arm may allow for the use of this angle in the intraoperative correction of hindfoot valgus.

LEVEL OF EVIDENCE: Level III, retrospective case control study.
 KEYWORDS: adult-acquired flatfoot deformity; flatfoot reconstruction; hindfoot alignment; hindfoot valgus PMID: 25380772

Lateral column foot pain

Curr Sports Med Rep. 2014 Nov-Dec;13(6):370-6. doi: 10.1249/JSR.0000000000000099.

Diagnostic considerations of lateral column foot pain in athletes.

Traister E[1], Simons S.

Abstract

Foot maladies are often classified descriptively by general foot locations, i.e., forefoot, midfoot, and rearfoot. However, common vernacular verbiage, implicating a common biomechanical purpose, also applies pathology to the medial or lateral foot column.

Although imprecisely defined, lateral column injuries to the foot encompass conditions that affect any of the lateral side of the foot from the calcaneus to the toes. The lateral column of the foot includes the calcaneus, the cuboid, the fourth and fifth metatarsals as well as the calcaneocuboid, cuboido-metatarsal, and intermetatarsal joints.

It may be helpful to think in a "lateral column" fashion when evaluating and treating certain lateral foot injuries, load patterns, and biomechanical or anatomical faults. Misdiagnosed injuries in this area of the foot can be a source of great morbidity to the athlete. It is important for the clinician to be aware of common conditions presenting as pain to the lateral side of the foot.

PMID: 25391092

Rear foot measurements

Manual Therapy
Volume 19, Issue 5, Pages 379–385, October 2014

Clinical measures of hip and foot–ankle mechanics as predictors of rearfoot motion and posture

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Abstract

Health professionals are frequently interested in predicting rearfoot pronation during weight-bearing activities.

Previous inconsistent results regarding the ability of clinical measures to predict rearfoot kinematics may have been influenced by the neglect of possible combined effects of alignment and mobility at the foot–ankle complex and by the disregard of possible influences of hip mobility on foot kinematics. The present study tested whether using a measure that combines frontal-plane bone alignment and mobility at the foot–ankle complex and a measure of hip internal rotation mobility predicts rearfoot kinematics, in walking and upright stance. Twenty-three healthy subjects underwent assessment of forefoot–shank angle (which combines varus bone alignments at the foot–ankle complex with inversion mobility at the midfoot joints), with a goniometer, and hip internal rotation mobility, with an inclinometer. Frontal-plane kinematics of the rearfoot was assessed with a three-dimensional system, during treadmill walking and upright stance. Multivariate linear regressions tested the predictive strength of these measures to inform about rearfoot kinematics. The measures significantly predicted ($p \leq 0.041$) mean eversion–inversion position, during walking ($r^2 = 0.40$) and standing ($r^2 = 0.31$), and eversion peak in walking ($r^2 = 0.27$). Greater values of varus alignment at the foot–ankle complex combined with inversion mobility at the midfoot joints and greater hip internal rotation mobility are related to greater weight-bearing rearfoot eversion. Each measure (forefoot–shank angle and hip internal rotation mobility) alone and their combination partially predicted rearfoot kinematics.

These measures may help detecting foot–ankle and hip mechanical variables possibly involved in an observed rearfoot motion or posture.

Keywords:
Clinical measures, Foot pronation, Hip, Prediction

Subtalar motion

Foot Ankle Int. 2014 Nov 7. pii: 1071100714559540.

Sagittal Subtalar and Talocrural Joint Assessment With Weight-Bearing Fluoroscopy During Barefoot Ambulation.

McHenry BD[1], Exten EL[2], Long J[3], Law B[2], Marks RM[2], Harris G[4].

Abstract

BACKGROUND:

Identifying talar position during ambulation has proved difficult as the talus lacks palpable landmarks for skin marker placement and more invasive methodologies such as bone pins are not practical for most clinical subjects. A fluoroscopic motion system was used to track the talus and calcaneus, allowing kinematic analysis of the talocrural and subtalar joints.

METHODS:

Thirteen male subjects (mean age 22.9 ± 3.0 years) previously screened for normal gait were tested. A fluoroscopy unit was used to collect images at 120 fps during stance. Sagittal motion of the talocrural and subtalar joints were analyzed.

RESULTS:

The intersubject mean and standard deviation values for all 58 trials of 13 subjects are reported. Maximum talocrural joint plantarflexion of 11.2 degrees (4.3 degrees of standard deviation) occurred at 11% stance and maximum dorsiflexion of -6.9 degrees (5.6 degrees of standard deviation) occurred at 85%. Maximum subtalar joint plantarflexion of 4.8 degrees (1.0 degrees of standard deviation) occurred at 96% stance and maximum dorsiflexion of -3.6 degrees (2.3 degrees of standard deviation) occurred at 30%. Talocrural and subtalar range of motion values during stance were 18.1 and 8.4 degrees, respectively.

CONCLUSION:

Existing fluoroscopic technology was capable of defining sagittal plane talocrural and subtalar motion during gait. These kinematic results compare favorably with more invasive techniques. This type of assessment could support more routine analysis of in vivo bony motion during gait.

CLINICAL RELEVANCE:

Fluoroscopic technology offers improved sagittal plane motion evaluation during weight-bearing with potential application in patients with end-stage ankle arthritis, postoperative ankle replacements and fusions, and orthotics and braces.

KEYWORDS: ankle joint; biomechanics; fluoroscopy; gait analysis; hindfoot; sagittal motion; subtalar joint; talocrural joint; weight-bearing ***PMID: 25380773***

MANUAL THERAPY

Upper C spine rotational thrust

Reproducibility of the kinematics in rotational high-velocity, low-amplitude thrust of the upper cervical spine

Journal of Manipulative and Physiological Therapeutics, 11/18/2014 **Clinical Article**
Gianola S, et al.

Abstract

Objective

This study aimed to investigate the reproducibility of the kinematics in rotational high-velocity, low-amplitude (HVLA) thrust of the upper cervical spine.

Methods

Twenty fresh human cervical specimens were studied in a test-retest situation with 2 manual therapists. Kinematics of C1-C2 and C0-C1 were examined during segmental rotational HVLA manipulation through an ultrasound-based tracking system. The thrust moment was analyzed by 3-dimensional aspects: the range of motion of axial rotation, flexion-extension, lateral banding, and the cross-correlation between the axial rotation and the coupled lateral banding components.

Results

During rotational HVLA thrust on C1-C2, the main axial rotation demonstrates an intraexaminer relationship varying from almost perfect to fair (intraclass correlation coefficient =0.71; intraclass correlation coefficient = 0.35) and a substantial interexaminer correlation of 0.73.

Conclusions

This study showed substantial levels of reliability for the main axial rotation component of segmental manual rotational HVLA thrust on C1-C2. Intra- and interrater reliability for flexion-extension, lateral bending, and cross-correlation was low

Upper C spine manipulation

Manual Therapy
Volume 19, Issue 5, Pages 472–477, October 2014

Global and regional kinematics of the cervical spine during upper cervical spine manipulation: A reliability analysis of 3D motion data

Pierre-Michel Dugailly Benoît Beyer Stéphane Sobczak Patrick Salvia Véronique Feipel

Studies reporting spine kinematics during cervical manipulation are usually related to continuous global head–trunk motion or discrete angular displacements for pre-positioning. To date, segmental data analyzing continuous kinematics of cervical manipulation is lacking. The objective of this study was to investigate upper cervical spine (UCS) manipulation *in vitro*. This paper reports an inter- and intra-rater reliability analysis of kinematics during high velocity low amplitude manipulation of the UCS. Integration of kinematics into specific-subject 3D models has been processed as well for providing anatomical motion representation during thrust manipulation.

Three unembalmed specimens were included in the study. Restricted dissection was realized to attach technical clusters to each bone of interest (skull, C_1–C_4 and sternum). During manipulation, bone motion data was computed using an optoelectronic system. The reliability of manipulation kinematics was assessed for three experimented practitioners performing two trials of 3 repetitions on two separate days.

During UCS manipulation, average global head–trunk motion ROM (±SD) were 14 ± 5°, 35 ± 7° and 14 ± 8° for lateral bending, axial rotation and flexion-extension, respectively. For regional ROM (C_0–C_2), amplitudes were 10 ± 5°, 30 ± 5° and 16 ± 4° for the same respective motions. Concerning the reliability, mean RMS ranged from 1° to 4° and from 3° to 6° for intra- and inter-rater comparisons, respectively.

The present results confirm the limited angular displacement during manipulation either for global head–trunk or for UCS motion components, especially for axial rotation. Additionally, kinematics variability was low confirming intra- and inter-practitioners consistency of UCS manipulation achievement.

Keywords:
Manipulation, Kinematics, Upper cervical spine, Reliability

C spine manips and impact on the disc

J Manipulative Physiol Ther. 2014 Oct;37(8):561-8. doi: 10.1016/j.jmpt.2014.05.007. Epub 2014 Sep 8.

Real-time monitoring of stresses and displacements in cervical nuclei pulposi during cervical spine manipulation: a finite element model analysis.

Wu LP[1], Huang YQ[2], Manas D[3], Chen YY[4], Fan JH[5], Mo HG[6].

Abstract

OBJECTIVE:
The objective of this study was to research the distribution of stresses and displacements in cervical nuclei pulposi during simulated cervical spine manipulation (CSM).

METHODS:
A 3-dimensional finite element model of C3/4~C6/7 was established. The detailed mechanical parameters of CSM were analyzed and simulated. During the process, the changes in stresses and displacements of cervical nuclei pulposi within the model were displayed simultaneously and dynamically.

RESULTS:
Cervical spine manipulation with right rotation was targeted at the C4 spinous process of the model. During traction, levels of stresses and displacements of the nuclei pulposi exhibited an initial decrease followed by an increase. The major stresses and displacements affected the C3/4 nucleus pulposus during rotation in CSM, when its morphology gradually changed from circular to elliptical. The highest stress (48.53 kPa) occurred at its right superior edge, on rotating 40° to the right. It protruded toward the right superior, creating a gap in its left inferior aspect. The highest displacement, also at 40° right, occurred at its left superior edge and measured 0.7966 mm. Dimensions of stresses and displacements reduced quickly on rapid return to neutral position.

CONCLUSION:
The morphology of the C3/4 nucleus pulposus changed during CSM with right rotation, and it created a gap in its left inferior aspect. Biomechanically, it is more safe and rational to rotate toward the healthy side than the prolapsed side of the intervertebral disk during CSM. Upon ensuring due safety, the closer the application force is to the diseased intervertebral disk, the better is the effect of CSM.

KEYWORDS: Cervical Vertebrae; Displacement; Finite Element Analysis; Manipulation; Nucleus Pulposus; Spinal; Stress PMID: 25213020

Changes in spasticity with dry needling

J Manipulative Physiol Ther. 2014 Oct;37(8):569-79. doi: 10.1016/j.jmpt.2014.06.003. Epub 2014 Sep 8.

Changes in spasticity, widespread pressure pain sensitivity, and baropodometry after the application of dry needling in patients who have had a stroke: a randomized controlled trial.

Salom-Moreno J[1], Sánchez-Mila Z[2], Ortega-Santiago R[1], Palacios-Ceña M[3], Truyol-Domínguez S[4], Fernández-de-Las-Peñas C[5].

Abstract

OBJECTIVE:
The purpose of this study was to determine the effects of deep dry needling (DDN) on spasticity, pressure sensitivity, and plantar pressure in patients who have had stroke.

METHODS:
A randomized controlled trial was conducted. Thirty-four patients who previously had a stroke were randomly assigned either an experimental group that received a single session of DDN over the gastrocnemius and tibialis anterior muscles on the spastic leg or a control group that received no intervention. Spasticity (evaluated with the Ashworth Scale); pressure pain thresholds over the deltoid muscle, second metacarpal, and tibialis anterior muscle; and plantar pressure (baropodometry) were collected by a blinded assessor before and 10 minutes after intervention.

RESULTS:
A greater number of individuals receiving DDN exhibited decreased spasticity after the intervention ($P < .001$). The analysis of covariance showed that pressure pain thresholds increased bilaterally in patients receiving DDN compared with those who did not receive the intervention ($P < .001$). The analysis of covariance also found that patients receiving DDN experienced bilateral increases of support surface in the forefoot, unilateral increase of the support surface in the rear foot of the treated (affected) side, and bilateral decreases in mean pressure (all, $P < .02$) as compared with those who did not receive DDN.

CONCLUSIONS:
Our results suggest that a single session of DDN decreases spasticity and widespread pressure sensitivity in individuals with poststroke spasticity. Deep dry needling also induced changes in plantar pressure by increasing the support surface and decreasing the mean pressure.

KEYWORDS: Acupuncture; Muscle Spasticity; Pain Threshold; Stroke PMID: 25199825

Manipulation

Manual Therapy
Volume 19, Issue 5, Pages 411–417, October 2014

Immediate effects of spinal manipulation on nitric oxide, substance P and pain perception

Francisco Molina-Ortega Rafael Lomas-Vega Fidel Hita-Contreras Gustavo Plaza Manzano
,
Alexander Achalandabaso Antonio J. Ramos-Morcillo Antonio Martínez-Amat

Abstract

Previous studies have analyzed the effects of spinal manipulation on pain sensitivity by using several sensory modalities, but to our knowledge, no studies have focused on serum biomarkers involved in the nociceptive pathway after spinal manipulation. Our objectives were to determine the immediate effect of cervical and dorsal manipulation over the production of nitric oxide and substance P, and establishing their relationship with changes in pressure pain thresholds in asymptomatic subjects. In this single-blind randomized controlled trial, 30 asymptomatic subjects (16 men) were randomly distributed into 3 groups (n = 10 per group): control, cervical and dorsal manipulation groups. Blood samples were extracted to obtain serum. ELISA assay for substance P and chemiluminescence analysis for nitric oxide determination were performed. Pressure pain thresholds were measured with a pressure algometer at the C5–C6 joint, the lateral epicondyle and the tibialis anterior muscle. Outcome measures were obtained before intervention, just after intervention and 2 h after intervention. Our results indicated an increase in substance P plasma level in the cervical manipulation group (70.55%) when compared with other groups ($p < 0.05$). This group also showed an elevation in the pressure pain threshold at C5–C6 (26.75%) and lateral epicondyle level (21.63%) immediately after the intervention ($p < 0.05$). No changes in nitric oxide production were observed. In conclusion, mechanical stimulus provided by cervical manipulation increases substance P levels and pressure pain threshold but does not change nitric oxide concentrations. Part of the hypoalgesic effect of spinal manipulation may be due to the action of substance P.

STM

Fascial manipulation in carpel tunnel

Journal of Bodywork and Movement Therapies
DOI: http://dx.doi.org/10.1016/j.jbmt.2014.08.002

Conservative treatment of carpal tunnel syndrome: Comparison between laser therapy and fascial manipulation®

Elisa Pratelli, MD , Marco Pintucci, PT , Pina Cultrera, MD Enrico Baldini, MD Antonio Stecco, MD PhD Antonio Petrocelli, MD Pietro Pasquetti, MD

Summary

The etiopathogenesis of Carpal Tunnel Syndrome (CTS) is multifactorial and most cases are classified as idiopathic (Thurston 2013). A randomized controlled trial was performed to compare the effectiveness of Fascial Manipulation®(FM) and Low-Level Laser Therapy (LLLT) for CTS. This prospective trial included 42 patients (70 hands with symptoms) with clinical and electroneuromyographic diagnosis of CTS. The patients were randomly assigned to receive multiple sessions of FM or multiple session of LLLT. The Visual Analogic Scale (VAS) and Boston Carpal Tunnel Questionnaire (BCTQ) were performed at baseline, end of treatment and after three months.

The group that received FM showed a significant reduction in subjective pain perception and an increased function assessed by BCTQ at the end of the treatment and follow-up. The group that received LLLT showed an improvement in the BCTQ at the end of the treatment but the improvement level was not sustained at the three month follow-up. FM is a valid alternative treatment for CTS.

Keywords:
Carpal tunnel syndrome, Low level laser therapy, Manual therapy, Fascial manipulation

Review of STM

An evidence-informed review of the current myofascial pain literature – January 2015

Journal of Bodywork & Movement Therapies , 11/20/2014 **Review Article**
Dommerholt J, et al. –

This article provides an up–to–date review of the most recent publications about myofascial pain, trigger points (TrPs) and other related topics. The section on Soft Tissue Approaches considered multiple studies and case reports of the efficacy of myofascial release (MFR), classic and deep muscle massage, fascial techniques, and connective tissue massage. TrP dry needling (DN) is becoming a common approach and the authors included multiple studies, reviews, and case reports, while the section on Injection Techniques features an article on TrP injections following mastectomy and several articles about the utilization of botulinum toxin.

Shin splints and massage

Journal of Bodywork and Movement Therapies
DOI: http://dx.doi.org/10.1016/j.jbmt.2014.11.003

Massage treatment and medial tibial stress syndrome; a commentary to provoke thought about the way massage therapy is used in the treatment of MTSS

Sarah Fogarty, PhD (Dr)
University of Western Sydney

Summary

As students and practitioners we are taught about the treatment and causative factors of medial shin pain, in particular' shin splints' or the more recent term; medial tibial stress syndrome (MTSS). During the years there have been many theories, conjecture and misunderstandings about the mechanisms of 'shin splints/medial tibial stress syndrome' however the ramifications of these mechanisms on how massage treatment is delivered have not being discussed. The evidence for the treatment of MTSS is largely clinical with little evidence of any treatment being proven to be effective in treating MTSS. The aim of this article is to present a summary of the mechanisms of MTSS and a commentary to provoke thought about the way massage therapy is used in the treatment of MTSS based on these mechanisms

MUSCLES

Fascia and exercise

Journal of Bodywork and Movement Therapies
DOI: http://dx.doi.org/10.1016/j.jbmt.2014.08.010

Transmission of muscle force to fascia during exercise

Thomas Findley, M.D, Ph.D Hans Chaudhry, Ph.D Sunil Dhar, Ph.D

Summary

Objective

As the muscle contracts, fibers get thicker, forcing the fascial tubular layers surrounding the muscle (endomysium, perimysium and epimysium) to expand in diameter and hence to shorten in length. We develop a mathematical model to determine the fraction of force generated by extremity muscles during contraction that is transmitted to the surrounding tubes of fascia.

Methods

Theory of elasticity is used to determine the modulus of elasticity, radial strain and the radial stress transmitted to the fascia.

Results

Starting with published data on dimensions of muscle and muscle force, we find radial stress is 50% of longitudinal stress in the soleus, medial gastrocnemius, and elbow flexor and extensor muscles.

Conclusion

Substantial stress is transmitted to fascia during muscular exercise, which has implications for exercise therapies if they are designed for fascial as well as muscular stress. This adds additional perspective to myofascial force transmission research.

Keywords: ***Force transmission, Fascia, Ankle muscles, Elbow muscles, Exercise***

BET

Active sitting

Journal of Bodywork and Movement Therapies
DOI: http://dx.doi.org/10.1016/j.jbmt.2014.07.001

Rethinking design parameters in the search for optimal dynamic seating

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Summary

Dynamic *seating* design purports to lessen damage incurred during sedentary occupations by increasing sitter movement while modifying muscle activity. Dynamic *sitting* is currently defined by O'Sullivan et al. (2013a) as relating to 'the increased motion in sitting which is facilitated by the use of specific chairs or equipment' (p. 628). Yet the evidence is conflicting that dynamic seating creates variation in the sitter's lumbar posture or muscle activity with the overall consensus being that current dynamic seating design fails to fulfill its goals.

Research is needed to determine if a new generation of chairs requiring active sitter involvement fulfills the goals of dynamic seating and aids cardio/metabolic health. This paper summarises the pursuit of knowledge regarding optimal seated spinal posture and seating design. Four new forms of dynamic seating encouraging active sitting are discussed. These are 1) The Core-flex with a split seatpan to facilitate a walking action while seated 2) the Duo balans requiring body action to create rocking 3) the Back App and 4) Locus pedestal stools both using the sitter's legs to drive movement. Unsubstantiated claims made by the designers of these new forms of dynamic seating are outlined. Avenues of research are suggested to validate designer claims and investigate whether these designs fulfill the goals of dynamic seating and assist cardio/metabolic health. Should these claims be efficacious then a new definition of dynamic sitting is suggested; 'Sitting in which the action is provided by the sitter, while the dynamic mechanism of the chair accommodates that action'.

Keywords:
Designing dynamic seating, Defining dynamic sitting, Advising neutral lumbar posture

EXERCISE

Pilates and abdominal exercises

Journal of Bodywork and Movement Therapies

Electromyographic activity of rectus abdominis muscles during dynamic Pilates abdominal exercises

Gabriela Bueno Silva, PE MireleMinussi Morgan, PE Wellington Roberto Gomes de Carvalho, PE, MSc, PhD Elisangela Silva, PE, MSc (PhD student) Wagner Zeferino de Freitas, PE, MSc (PhD student) Fabiano Fernandes da Silva, PE, MSc (PhD student) Renato Aparecido de Souza, PE, MSc, PhD (Dr.)

DOI: http://dx.doi.org/10.1016/j.jbmt.2014.11.010

Summary

Objective

To assess the electrical behaviour of the upper rectus abdominis (URA) and lower rectus abdominis (LRA) by electromyography (EMG) during the following dynamic Pilates abdominal exercises: *roll up, double leg stretch, coordination, crisscross and foot work*. The results were compared with EMG findings of traditional abdominal exercises (*sit up* and *crunch*). Methods: Seventeen female subjects (with no experience of the Pilates method) were recruited. The URA and LRA were evaluated while 12 isotonic contractions were performed using the Pilates principles or traditional abdominal exercises. The data were normalised by a maximal voluntary isometric contraction. Normality was accepted, and ANOVA followed by Tukey test was used to determine data differences ($P < 0.05$). Results: Pilates exercises *double leg stretch, coordination, crisscross* and *foot work* promoted greater muscle activation than traditional exercises, mainly in URA. Thus, these exercises have the potential to be prescribed for muscle strengthening programmes.

Keywords:
Abdominal Exercises, Electromyography, Pilates

Pilates versus general ex for LBP

Pilates versus general exercise on pain and functionality in non-specific chronic low back pain subjects: A randomised, controlled trial

Journal of Bodywork & Movement Therapies , 11/21/2014 **Clinical Article**
Mostagi FQRC, et al.

The purpose of this study was to assess the effectiveness of the Pilates method, when compared to general exercises, on pain and functionality after eight weeks and a follow–up of three months, in subjects with non–specific chronic low back pain (NSCLBP). There were no differences between the Pilates and general exercises with regard to pain and functionality in NSCLBP subjects but general exercises were better than Pilates for increasing functionality and flexibility.

Methods

- A randomised controlled trial composed of 22 subjects was proposed.
- Subjects were allocated into two groups: the Pilates group (PG) (n=11) and the general exercise group (GEG) (n=11).
- The PG protocol was based on the Pilates method and the GEG performed exercises to manage NSCLBP.

Results

- There were no differences between the groups.
- When analysed over time, the GEG demonstrated improvements in functionality between baseline and the end of treatment (P =.02; Cohen's = .34) and baseline and follow–up (P = .04; Cohen's = .31).

Proprioceptive exercise

Effects of proprioceptive exercises on pain and function in chronic neck- and low back pain rehabilitation: a systematic literature review *Full Text*

BMC Musculoskeletal Disorders, 11/20/2014 Evidence Based Medicine Clinical Article
McCaskey MA, et al.

Proprioceptive training (PrT) is popularly applied as preventive or rehabilitative exercise method in various sports and rehabilitation settings. Its effect on pain and function is only poorly evaluated. The aim of this systematic review was to summarise and analyse the existing data on the effects of PrT on pain alleviation and functional restoration in patients with chronic (>=3 months) neck– or back pain. There are few relevant good quality studies on proprioceptive exercises. A descriptive summary of the evidence suggests that there is no consistent benefit in adding PrT to neck– and low back pain rehabilitation and functional restoration.

Methods

- Relevant electronic databases were searched from their respective inception to February 2014.
- Randomised controlled trials comparing PrT with conventional therapies or inactive controls in patients with neck– or low back pain were included.
- Two review authors independently screened articles and assessed risk of bias (RoB).
- Data extraction was performed by the first author and crosschecked by a second author.
- Quality of findings was assessed and rated according to GRADE guidelines.
- Pain and functional status outcomes were extracted and synthesised qualitatively and quantitatively.

Results

- In total, 18 studies involving 1380 subjects described interventions related to PrT (years 1994–2013).
- 6 studies focussed on neck–, 12 on low back pain.
- Three main directions of PrT were identified: Discriminatory perceptive exercises with somatosensory stimuli to the back (pPrT, n = 2), multimodal exercises on labile surfaces (mPrT, n = 13), or joint repositioning exercise with head–eye coordination (rPrT, n = 3).
- Comparators entailed usual care, home based training, educational therapy, strengthening, stretching and endurance training, or inactive controls.
- Quality of studies was low and RoB was deemed moderate to high with a high prevalence of unclear sequence generation and group allocation (>60%).
- Low quality evidence suggests PrT may be more effective than not intervening at all.
- Low quality evidence suggests that PrT is no more effective than conventional physiotherapy.
- Low quality evidence suggests PrT is inferior to educational and behavioural approaches.

Yoga and LBP

Cost-effectiveness of early interventions for non-specific low back pain: A randomized controlled study investigating medical yoga, exercise therapy and self-care advice *Full Text*

Journal of Rehabilitation Medicine, 11/17/2014 **Clinical Article**
Aboagye E, et al.

The aim of this study is to evaluate the cost–effectiveness of medical yoga as an early intervention compared with evidence–based exercise therapy and self–care advice for non–specific low back pain. Six weeks of uninterrupted medical yoga thera–py is a cost–effective early intervention for non–specific low back pain, when treatment recommendations are adhered to.

Methods

- Randomized controlled trial with a cost–effectiveness analysis.
- A total of 159 participants randomized into the medical yoga group (n=52), the exercise therapy group (n=52) and the self–care advice group (n=55).
- The health outcome measure EQ–5D was applied to measure quality of life data combined with cost data collected from treatment groups from baseline to 12 months follow–up.
- Outcome measure was health–related quality of life (HRQL).
- Incremental cost per quality adjusted life year (QALY) was also calculated.
- Cost–effectiveness analysis was conducted primarily from the societal and employer perspectives.

Results

- Medical yoga is cost–effective compared with self–care advice if an employer considers the significant improvement in the HRQL of an employee with low back pain justifies the additional cost of treatment (i.e. in this study EUR 150).
- From a societal perspective, medical yoga is a cost–effective treatment compared with exercise therapy and self–care advice if an additional QALY is worth EUR 11,500.
- Sensitivity analysis suggests that medical yoga is more cost–effective than its alternatives

CORE

Star excursion and core

J Back Musculoskelet Rehabil. 2014 Nov 5.

Effect of trunk muscles training using a star excursion balance test grid on strength, endurance and disability in persons with chronic low back pain.

Ganesh GS[1], Chhabra D[2], Pattnaik M[1], Mohanty P[1], Patel R[1], Mrityunjay K[3].

Abstract

BACKGROUND AND OBJECTIVES:
Though core muscles strengthening using upper limbs in various positions and lower limbs in lying have been studied previously in patients with chronic low back pain (CLBP), no study has specifically looked in to the effects of a training program that requires prior motor planning in standing (functional position). The objective of this study was to evaluate the effectiveness of star excursion balance test (SEBT) grid training in improving the outcomes in patients with CLBP.

MATERIALS AND METHOD:
Sixty patients with mechanical CLBP who fulfilled our criteria were randomized in to two groups; experimental group received physical diagnostic specific interventions, core muscles strengthening and muscles training using the SEBT grid. The participants in control group received stationary cycling instead of SEBT grid training and the other interventions were uniform. The duration of study was 4 weeks. The dependent variables were analyzed using repeated measures 2 × 3 ANOVA.

RESULTS:
At the end of study, both the groups showed a significant reduction in disability and improvement in strength and endurance ($p < 0.05$). Post-hoc analysis showed that SEBT grid training was better than conventional exercises. Follow-up at 16 weeks revealed a statistically insignificant loss in strength and endurance in control group patients. This reduction was not associated with an increase in disability score. The experimental group patients continued showing improvement.

CONCLUSION:
The results of our study show that core muscles strengthening using a SEBT grid are more effective than conventional programs. We hypothesize SEBT training to have a significant role in skill learning. We recommend SEBT grid training to be incorporated in the treatment planning of persons with CLBP.

KEYWORDS: Low back pain; exercise; motor skills; muscle strength; musculoskeletal manipulations ***PMID: 25373742***

POSTURE

Straighten your back command

Manual Therapy
Volume 19, Issue 5, Pages 392–398, October 2014
Active self-correction of back posture in children instructed with ‘straighten your back’ command

Dariusz Czaprowski Paulina Pawłowska Łukasz Stoliński Tomasz Kotwicki

Abstract
The ability to adopt the properly corrected body posture is one of the factors determining the effectiveness of therapeutic programmes. This study determined the active self-correction expressed by the change of sagittal spinal curvatures (in standing and sitting positions) in 249 children (136 females, 113 males, aged 10–14 years) instructed with ‘straighten your back’ command (SYB). Spinal curvatures (sacral slope-SS, lumbar lordosis-LL, global, lower and upper thoracic kyphosis-TK, LK, UK, respectively) were assessed using Saunders inclinometer. The assessment was done in spontaneous standing and sitting positions and in the positions adopted after the SYB.

In a standing position SYB led to the significant ($P < 0.001$) increase in SS, and the significant ($P < 0.01$) decrease in LL, TK, LK, UK. In a sitting position SYB led to significant changes ($P < 0.001$) from kyphotic to lordotic position of SS and LL and to the significant ($P < 0.001$) reduction of TK (36.5° ± 10.8 vs. 23.5° ± 11) and the flattening of LK (15.2° ± 8.7 vs. 1.0° ± 8.4). There were gender-based discrepancy regarding active self-correction only for LL in a standing and UK in a sitting position. Females demonstrated a significant decrease in LL ($P < 0.001$). UK significantly increased only in males ($P < 0.001$).

The ‘straighten your back’ command leads to moving the spine away from mid-range towards end range of motion. Therefore, the command should not be used to elicit the most optimal back posture. Further studies are needed to determine if the active self-correction is different in females and males.

Keywords:
Self-correction, Body posture, Spine curvatures

Tibial position and posture

J Orthop Sci. 2014 Nov 5.

Femorotibial relationship changes as the posture changes from patellae-forward stance to preferred toe-out stance.

Noh JH[1], Bae DK, Yoon KH, Song SJ, Roh YH, Ryu CH.

Abstract

BACKGROUND:
Full-length standing anteroposterior radiograph is a standard protocol to evaluate the lower limb alignment in frontal plane. However, most people tend to stand or walk with feet pointing outward. The purpose of this study is to assess the femorotibial relationship as the posture changes from patellae-forward stance for the conventional technique of a full-length standing anteroposterior radiograph to a toe-out quiet stance using a fluoroscope.

METHODS:
Femoral and tibial rotation and femorotibial rotation were measured in 60 healthy lower limbs using fluoroscopy during postural change from patellae-forward stance to toe-out quiet stance.

RESULTS:
The average toe-out angle was 21.4°. The average femoral, tibial, and femorotibial rotations during postural change were 6.1°, 4.0°, and 2.1°, respectively ($p = 0.000$). The correlation coefficient for femoral and tibial rotation was 0.747 ($p = 0.000$). The correlation coefficient for femoral and femorotibial rotation was 0.670 ($p = 0.000$), and for tibial and femorotibial rotation was 0.006 ($p = 0.962$). The correlation between toe-out angle and femorotibial rotation was statistically significant ($r^2 = 0.096$, $p = 0.016$). The correlations between toe-out angle and femoral rotation, and between toe-out angle and tibial rotation were not statistically significant ($r^2 = 0.047$, $p = 0.095$, and $r^2 = 0.000$, $p = 0.9$, respectively).

CONCLUSIONS:
The subject's posture significantly affects the femorotibial relationship. When a subject changes posture from a patellae-forward stance to a toe-out quiet stance, the femur rotates internally on the tibia.

LEVEL OF EVIDENCE: Diagnostic, level II. *PMID: 25370173*

SCOLIOSIS

Disc and scoliosis

Spine (Phila Pa 1976). 2014 Nov 15;39(24):E1441-7. doi: 10.1097/BRS.0000000000000603.

Coronal curvature and spinal imbalance in degenerative lumbar scoliosis: disc degeneration is associated.

Bao H[1], Zhu F, Liu Z, Zhu Z, He S, Ding Y, Qiu Y.

STUDY DESIGN: A retrospective radiographical study.
OBJECTIVE: To determine the association between disc degeneration and spinal malalignment on both coronal and sagittal planes in patients with degenerative lumbar scoliosis (DLS).
SUMMARY OF BACKGROUND DATA: In recent years, a thorough understanding of spinal coronal balance and sagittal alignment has become more and more important in treating patients with DLS. Although degeneration of discs has been generally accepted as the main cause of DLS, to date no study has documented the relationships between disc degeneration and the curve magnitude as well as spinal imbalance.
METHODS:
In this study, 57 patients with DLS were recruited. Degeneration of the apical disc, lower end vertebral (EV) discs and regional lumbar discs (L1-L2 and L5-S1) were quantitatively evaluated by the Pfirrmann score based on T2-weighted magnetic resonance images. Radiographical parameters including Cobb angle, coronal trunk shift, sagittal vertical axis (SVA), thoracic kyphosis (TK), lumbar lordosis (LL), pelvic incidence, pelvic tilt, and sacral slope were measured from long-cassette standing upright radiographs. Subjects were assigned to 4 groups: both coronal and sagittal balanced (C+ S+); coronal imbalanced but sagittal balanced (C- S+); coronal balanced but sagittal imbalanced (C+ S-); and both coronal and sagittal imbalanced (C- S-). The Spearman correlation was used to identify the relationship between the Pfirrmann score of disc degeneration and radiographical parameters. Analysis of variance 2×2 factorial design was performed to identify the decisive factors affecting coronal and sagittal balance.

RESULTS:
On the basis of the criteria for each group, 19 patients were assigned to group A (C+ S+), 10 patients to group B (C- S+), 11 patients to group C (C+ S-), and 17 patients to group D (C- S-). The Pfirrmann score of regional lumbar disc degeneration strongly correlated with Cobb angle, SVA, TK, and LL ($r = -0.364$, -0.386, 0.283, and 0.479, respectively, $P < 0.01$). Specifically, the Pfirrmann score of apical disc degeneration correlated with Cobb angle, whereas degeneration of lower EV discs correlated with SVA, TK, and LL. On the basis of analysis of variance 2×2 factorial design, the score of the lower EV disc degeneration significantly correlated with sagittal balance ($P < 0.05$).

CONCLUSION:
This study demonstrated that the lower EV disc degeneration strongly correlated with sagittal imbalance in patients with DLS, implying that disc degeneration may be regarded as a potential risk factor for sagittal imbalance. This result strengthened the importance of not selecting the lower EV as the lower instrumented vertebra during the surgical decision making, which may lead to deterioration of sagittal balance. Disc degeneration was also strongly correlated with sagittal malalignment, as demonstrated by a more positive SVA, decreased TK and LL, providing insight into reasons for low quality of life in elderly patients with DLS.

LEVEL OF EVIDENCE: 3. ***PMID: 25202936***

ATHLETICS
Cycling and LBP

J Back Musculoskelet Rehabil. 2014 Nov 11.

Ultrasound assessment of trunk muscles and back flexibility, strength and endurance in off-road cyclists with and without low back pain.

Rostami M[1], Ansari M[2], Noormohammadpour P[2], Ali Mansournia M[3], Kordi R[1].

Abstract

OBJECTIVES:
To compare the thickness of lateral abdominal muscles and Cross Sectional Area (CSA) of lumbar Multifidus Spinae (LM) muscles of competitive off-road cyclists with and without Low Back Pain (LBP). We also aimed to compare the maximum isometric back strength and endurance, as well as flexibility of lower back in cyclists with LBP and in the controls.

METHODS: The thickness of Transversus Abdominis (TrA), Internal Oblique (IO) and External Oblique (EO) along with the CSA of LM muscles of 14 professional competitive off-road cyclists with LBP and 24 controls were measured by ultrasound (US) in hook-lying position on the examination table, and mounted on the bicycle. In addition, the back strength and endurance of the subjects and the flexibility of the participants were measured.

RESULTS: Data showed a significantly lower thickness of Transversus Abdominis (TrA) and CSA of LM muscles in cyclists with LBP comparing to controls in all positions. No significant result regarding the flexibility of the subjects in case group comparing with the controls was found (p=0.674). In addition, it was found that there is no significant difference in isometric back strength of the subjects between the groups (p=0.105). However, we found that subjects with LBP have a lower endurance in back dynamometry with 50% of their maximum isometric back strength (p=0.016).

CONCLUSION: In this study, useful information regarding possible factors associated with low back pain in off- road cyclists was found (lower thickness of TrA and LM muscles and decreased back endurance).

KEYWORDS: Ultrasound; cycling; flexibility; lateral abdominal muscle; lumbar multifidus spinae; strength ***PMID: 25391328***

PAIN

Inflammatory joint disease

National and multinational evidence-based recommendations for medical pain management in inflammatory joint disease: Systematic literature research and expert opinion in the 3e initiative

Aktuelle Rheumatologie, 11/21/2014 **Clinical Article**
Albrech K, et al.

The study demonstrate that in inflammatory joint disease, pain management is essential for sustaining the function of joints and maintaining the quality of life of affected patients. Furthermore, result suggest tha 14 evidence–based recommendations and an algorithm on the management of pain by pharmacotherapy in inflammatory joint disease were developed.

Methods

- A total of 453 rheumatologists from 17 countries participated in the international 3e Initiative.
- The group of German experts comprised 66 participants.
- Using a Delphi process with 3 rounds of discussion, 10 international and 2 national clinical questions were selected regarding the use of pain medications in inflammatory joint disease.
- A systematic literature research (SLR) was performed in May 2010 for each question using Medline, EMBASE, Cochrane Library and the 2008/2009 EULAR/ACR s.
- The national experts used the retrieved evidence to develop a set of national recommendations and assessed them for agreement and potential impact on clinical practice.
- Subsequently, the consensus recommendations were drafted.

Results

- A total of 49242 references were identified, from which 167 studies were included in the systematic review.
- Based on this evidence, 12 recommendations and an algorithm for pharmacological management of pain were developed in response to the multinational questions.
- The recommendations related to the efficacy and safety of various analgesics, their use in different comorbidities and during pregnancy and lactation, the utility of pain measurement scales, as well as pain management.
- With regard to the 2 additional national questions, 34 out of 7334 retrieved publications could be used to develop two recommendations on treatment monitoring and herbal medicine.

DRG's

Neuromodulation. 2014 Oct 29. doi: 10.1111/ner.12247.

The Dorsal Root Ganglion in Chronic Pain and as a Target for Neuromodulation: A Review.

Krames ES.

Abstract

BACKGROUND:
In the not-too-distant past, the dorsal root ganglion (DRG) was portrayed as a passive neural structure without involvement in the development or maintenance of chronic neuropathic pain (NP). The DRG was thought of as a structure that merely "supported" physiologic communication between the peripheral nervous system (PNS) and the central nervous system (CNS). Newer scientific information regarding the anatomic and physiologic changes that occur within the DRG as a result of environmental pressures has dispelled this concept and suggests that the DRG is an active participant in the development of NP. This new information, along with new clinical data showing that stimulation of the DRG reduces intensity of pain, suggests that the DRG can be a robust target for neuromodulation therapies.

METHODS:
A review of the anatomical and physiological literature regarding the role of the DRG in the development of NP was performed utilizing SciBase, PubMed, and Google Scholar. The information gathered was used to lay an anatomic and physiologic foundation for establishing the DRG as a relevant target for neuromodulation therapies and to formulate a hypothesis as to how electrical stimulation of the DRG might reverse the process and perception of NP.

CONCLUSIONS:
The DRG is an active participant in the development of NP. DRG stimulation has multiple effects on the abnormal changes that occur within the DRG as a result of peripheral afferent fiber injury. The sum total of these stimulation effects is to stabilize and decrease hyperexcitability of DRG neurons and thereby decrease NP.

KEYWORDS: Dorsal root ganglion; electrical stimulation; mechanisms of action; neuropathic pain; pathophysiology PMID: 25354206

Depression and cognitive function

Associations between aspects of pain and cognitive performance and the contribution of depressive symptoms in mid-life women: A cross-sectional analysis

Maturitas, 11/10/2014 Clinical Article
Tomey K, et al.

In this study, authors evaluated associations between pain, cognitive performance and depressive symptoms. These results suggest that in mid–life women, greater pain is associated with poorer cognitive performance, and depressive symptoms play an important role in this association. Clinicians should be aware of these relationships when evaluating patients.

- A cross–sectional analysis was used with data from the Study of Women's Health Across the Nation (SWAN).
- Associations between aspects of pain and cognitive performance were evaluated using statistical models with and without depressive symptoms.
- The cognitive performance score was a composite of three cognitive tests, the Digit Span Backward Test, the Symbol Digit Modalities Test and the East Boston Memory Test.
- Greater pain experiences that interfered with daily work were independently associated with poorer cognitive performance, [β (SE) –0.074 (0.021); p value < 0.01] and this association was partially explained by depressive symptoms [β (SE) –0.061 (0.022); p value < 0.01 after adjusting for depressive symptoms].
- Additionally, an independent association between a greater composite pain score and poorer cognitive performance was identified without adjusting for depressive symptoms, [β (SE) –0.002 (0.0009); p value < 0.05] but was no longer significant after adjusting for depressive symptoms.

NUTRITION/VITAMINS

Milk intake and increase mortality and risk of fractures

BMJ. 2014 Oct 28;349:g6015. doi: 10.1136/bmj.g6015.

Milk intake and risk of mortality and fractures in women and men: cohort studies.

Michaëlsson K[1], Wolk A[2], Langenskiöld S[3], Basu S[3], Warensjö Lemming E[4], Melhus H[5], Byberg L[6].

Abstract

OBJECTIVE:
To examine whether high milk consumption is associated with mortality and fractures in women and men.

DESIGN:
Cohort studies.

SETTING:
Three counties in central Sweden.

PARTICIPANTS:
Two large Swedish cohorts, one with 61 433 women (39-74 years at baseline 1987-90) and one with 45 339 men (45-79 years at baseline 1997), were administered food frequency questionnaires. The women responded to a second food frequency questionnaire in 1997.

MAIN OUTCOME MEASURE:
Multivariable survival models were applied to determine the association between milk consumption and time to mortality or fracture.

RESULTS:
During a mean follow-up of 20.1 years, 15 541 women died and 17 252 had a fracture, of whom 4259 had a hip fracture. In the male cohort with a mean follow-up of 11.2 years, 10 112 men died and 5066 had a fracture, with 1166 hip fracture cases. In women the adjusted mortality hazard ratio for three or more glasses of milk a day compared with less than one glass a day was 1.93 (95% confidence interval 1.80 to 2.06). For every glass of milk, the adjusted hazard ratio of all cause mortality was 1.15 (1.13 to 1.17) in women and 1.03 (1.01 to 1.04) in men. For every glass of milk in women no reduction was observed in fracture risk with higher milk consumption for any fracture (1.02, 1.00 to 1.04) or for hip fracture (1.09, 1.05 to 1.13). The corresponding adjusted hazard ratios in men were 1.01 (0.99 to 1.03) and 1.03 (0.99 to 1.07). In subsamples of two additional cohorts, one in males and one in females, a positive association was seen between milk intake and both urine 8-iso-PGF2α (a biomarker of oxidative stress) and serum interleukin 6 (a main inflammatory biomarker).

CONCLUSIONS:
High milk intake was associated with higher mortality in one cohort of women and in another cohort of men, and with higher fracture incidence in women. Given the observational study designs with the inherent possibility of residual confounding and reverse causation phenomena, a cautious interpretation of the results is recommended.

 PMID: 25352269

Vit D and GI cancer

World J Gastroenterol. 2014 Nov 7;20(41):15398-412. doi: 10.3748/wjg.v20.i41.15398.

Fish consumption and risk of gastrointestinal cancers: A meta-analysis of cohort studies.

Yu XF, Zou J, Dong J.

Abstract

AIM:

To assess quantitatively the relationship between fish intake and the incidence of gastrointestinal cancers in a meta-analysis of cohort studies.

METHODS:

We searched MEDLINE, Embase, Science Citation Index Expanded, and the bibliographies of retrieved articles. Prospective cohort studies were included if they reported relative risks (RRs) and corresponding 95% confidence intervals (CIs) of various cancers with respect to fish intake. When RRs were not available in the published article, they were computed from the exposure distributions. Two investigators extracted the data independently and discrepancies were resolved by discussion with a third investigator. We performed random-effect meta-analyses and meta-regressions of study-specific incremental estimates to determine the risk of cancer associated with a 20-g/d increment of fish consumption.

RESULTS:

Forty-two studies, comprising 27 independent cohorts, met our inclusion criteria. The studies included 2325040 participants and 24115 incident cases of gastrointestinal cancer, with an average follow-up of 13.6 years. Compared with individuals who did not eat, or seldom ate, fish, the pooled RR of gastrointestinal cancers was 0.93 (95%CI: 0.88-0.98) for regular fish consumers, 0.94 (0.89-0.99) for low to moderate fish consumers, and 0.91 (0.84-0.97) for high fish consumers. Overall, a 20-g increase in fish consumption per day was associated with a 2% reduced risk of gastrointestinal cancers (RR = 0.98; 95%CI: 0.96-1.01). In subgroup analyses, we noted that fish consumption was associated with reduced risk of colorectal (RR = 0.93; 95%CI: 0.87-0.99; $P < 0.01$), esophageal (RR = 0.91; 95%CI: 0.83-0.99; $P < 0.05$) and hepatocellular cancers (RR = 0.71; 95%CI: 0.48-0.95; $P < 0.01$).

CONCLUSION:

This meta-analysis suggested that fish consumption may reduce total gastrointestinal cancer incidence. Inverse relationships were also detected between fish consumption and specific types of cancers.

KEYWORDS: Cancer prevention; Diet; Fish intake; Gastrointestinal cancer PMID: 25386090

PHARMACOLOGY

GI bleeding and NSAID"S

Risk of upper and lower gastrointestinal bleeding in patients taking non-steroidal anti-inflammatory drugs, antiplatelet agents, or anticoagulants

Clinical Gastroenterology and Hepatology , 11/18/2014 Clinical Article
Lanas A, et al.

The authors aimed to quantify the relative risk (RR) of upper and lower gastrointestinal bleeding associated with use of non–steroidal anti–inflammatory drugs (NSAIDs), antiplatelet agents (APAs), or anticoagulants. Anticoagulants, low–dose aspirin, NSAIDs, and other non–aspirin–APA drugs are associated with increased risk of upper and lower gastrointestinal bleeding. Use of anticoagulants appears to be the strongest risk factor for gastrointestinal bleeding.

Methods

- The authors performed a case-control study using data collected from consecutive patients hospitalized for gastrointestinal bleeding (563 upper, mean age 63.6±16.7 years and 415 lower, mean age 70.8±13.8 years), confirmed by endoscopy or other diagnostic procedures.
- Unhospitalized patients were used as controls (n=1008), matched for age, hospital, and month of admission.
- Drug use was considered current when taken within 7 days or less before hospitalization.
- RRs and 95% CI were estimated by unconditional logistic regression analysis.

Results

- Use of anticoagulants, low-dose aspirin, and other drugs (non-aspirin-APA, 82.3% thyenopiridines) were associated with upper and lower gastrointestinal bleeding; the risk was 2-fold higher for anticoagulants (RR= 4.2; 95% confidence interval [CI], 2.9-6.2) than for low-dose aspirin (RR=2.1; 95% CI, 1.4-3.3) or other non-aspirin-APA drugs (RR=2.0; 95% CI, 1.6-2.6).
- NSAID use was also associated with increased risk of gastrointestinal bleeding, and greater for upper (RR= 2.6; 95% CI, 2.0-3.5) than lower gastrointestinal bleeding (RR=1.4; 95% CI, 1.0-1.9).
- Use of proton pump inhibitors was associated with reduced risk of upper, but not lower gastrointestinal bleeding.

Adverse effects of NSAID's

Nonsteroidal anti-inflammatory drugs, proton pump inhibitors, and gastrointestinal injury: contrasting interactions in the stomach and small intestine

Mayo Clinic Proceedings, 11/20/2014 Review Article
Marlicz W, et al.

Nonsteroidal anti–inflammatory drugs (NSAIDs) and proton pump inhibitors (PPIs) are among the most frequently prescribed groups of drugs worldwide. The use of NSAIDs is associated with a high number of significant adverse effects. In this review, the authors discuss this important clinical problem and review relevant aspects of epidemiology, pathophysiology, and management.

- The authors also present the hypothesis that even minor and subclinical injury to the intestinal mucosa can result in significant, though delayed, metabolic consequences, which may seriously affect the health of an individual.
- PubMed was searched using the following key words (each key word alone and in combination): gut microbiota, microbiome, non-steroidal anti inflammatory drugs, proton pump inhibitors, enteropathy, probiotic, antibiotic, mucosal injury, enteroscopy, and capsule endoscopy.
- Google engine search was also carried out to identify additional relevant articles.
- Both original and review articles published in English were reviewed.
- Capsule endoscopy studies reveal that even low-dose NSAIDs are responsible for gut mucosal injury and numerous clinical adverse effects, for example, bleeding and anemia, that might be difficult to diagnose.
- The frequent use of PPIs can exacerbate NSAID-induced small intestinal injury by altering intestinal microbiota.
- Thus, the use of PPI is considered to be an independent risk factor associated with NSAID-associated enteropathy