

5. SPINAL SURGERY

Walking abilities

Predictors of walking ability after surgery for lumbar spinal canal stenosis: A prospective study

Hiroto Takenaka, PT, MA¹ Mitsuhiro Kamiya, MD, Ph.D.³ Hideshi Sugiura, MD, Ph.D.² Kasuri Nishihama, PT, MS¹ Atsuki Ito, PT¹ Junya Suzuki, PT, MS¹ Morio Kawamura, MD, Ph.D.⁴, Shuntaro Hanamura, MD, Ph.D.³ Hirokatsu Hanamura, MD, Ph.D.³

DOI: <https://doi.org/10.1016/j.spinee.2019.07.002>

Background context Few studies have investigated predictors of objective walking distance in patients with lumbar spinal canal stenosis (LSS).

Purpose This study aimed to clarify objective predictors of postoperative 6-minute walk distance (6MWD) in patients with LSS and to develop prediction equations.

Study Design This was a prospective study. Data were analyzed by multiple linear regression analyses. **Patient sample** Patients with LSS were enrolled.

Outcome Measures Predictors of 6MWD after surgery were evaluated, including patient characteristics (sex, age, height, and body weight), pain (visual analog scale; low back pain, lower limb pain, and lower limb numbness), surgical factors (number of operation segments [1 or ≥ 2], surgery type [fusion or decompression], and minimum area of the dural sac), and objective physical function (6MWD and trunk muscle strength).

Methods Patients with LSS were consecutively included and assessed preoperatively (n=113) and 6 months postoperatively (n=78). Simple and multiple linear regression analyses were performed with 6MWD at 6 months post-operation as the dependent variable. We have study funding sources (Nagano Medical Foundation) and no study-specific conflicts of interest-associated biases.

Results At 6 months follow-up, 6MWD (457.7 ± 105.5 m) improved significantly compared to preoperative 6MWD (275.0 ± 157.2 m) ($P < 0.01$). Trunk muscle strength and pain improved significantly compared to the preoperative score ($P < 0.01$). The predictors of postoperative 6MWD were age, body weight, number of operation segments (1 or ≥ 2), surgery type (fusion or decompression), preoperative trunk extensor strength, and preoperative 6MWD (adjusted $R^2 = 0.65$, $P < 0.01$). The proposed prediction equation was as follows: postoperative 6MWD (m) = $549.5 - 5.3 \times \text{age (yrs)} - 1.8 \times \text{body weight (kg)} - 68.3 \times \text{surgery type (0: decompression, 1: fusion)} - 58.6 \times \text{operation segment (0: one segment, 1: } \geq 2 \text{ segments)} + 3.5 \times \text{trunk extensor strength (kg)} + 0.2 \times \text{preoperative 6MWD (m)}$.

Conclusions Younger age, lower body weight, one level operative segment, decompression surgery, and better preoperative scores for trunk extensor strength and 6MWD predicted better scores for 6 months postoperative 6MWD. Preoperative reduction in body weight and increase of trunk extensor strength might be associated with improved postoperative

Fusion not any better

Spine J. 2019 Jun 10. pii: S1529-9430(19)30797-1. doi: 10.1016/j.spinee.2019.06.003.

Decompression Alone vs Decompression plus Fusion for Claudication Secondary to Lumbar Spinal Stenosis.

Thomas K¹, Faris P², McIntosh G³, Manners S⁴, Abraham E⁵, Bailey CS⁶, Paquet J⁷, Cadotte D⁸, Jacobs WB⁹, Rampersaud YR¹⁰, Manson NA¹¹, Hall H¹², Fisher CG¹³.

BACKGROUND:

Degenerative lumbar spinal stenosis is a common condition, predominantly affecting middle-aged and elderly people. This study focused on patients with neurogenic claudication secondary to lumbar stenosis without spondylolisthesis or deformity.

PURPOSE:

To determine whether the addition of fusion to decompression resulted in improved clinical outcomes at 3, 12- and 24-months post-surgery.

STUDY DESIGN/SETTING:

The Canadian Spine Outcomes and Research Network (CSORN) prospective database that includes pre- and post-operative data from tertiary care hospitals.

PATIENT SAMPLE:

The CSORN database was queried for consecutive spine surgery cases of degenerative lumbar stenosis receiving surgical decompression for neurogenic claudication or radiculopathy. Neurogenic claudication patients with baseline and 2-year follow-up data, from four sites, formed the study sample (n=306). The sample was categorized into two groups: 1) those that had decompression alone, and 2) those that underwent decompression plus fusion.

OUTCOME MEASURES:

Change in modified Oswestry Disability Index (ODI), numerical rating scale (NRS) for back/leg pain, the EuroQol EQ5D, the SF-12 Physical (PCS) and Mental Component Scores (MCS). The primary outcome measure was the ODI at two-years post-operative.

METHODS:

We conducted a multicenter, ambispective review of consecutive spine surgery patients enrolled between October 2012 and January 2018.

RESULTS:

Baseline characteristics were comparable between groups except for female sex and multi-level pathology (both with greater proportion in the decompression plus fusion group). The decompression plus fusion group had clinically meaningfully more operative time, blood loss, rate of perioperative complication and length of hospital stay (p<0.05). These differences were preserved following adjustment for baseline differences between groups. Both decompression and decompression plus fusion had a large clinically meaningful impact on generic and disease-specific patient reported outcome measures within 3 months of surgery which was maintained out to 24-month follow-up. At any follow-up time point, there was no statistical evidence of a difference in these effects favoring decompression plus fusion over decompression alone.

CONCLUSIONS:

The addition of fusion to decompression did not result in improved outcomes at 3, 12- or 24-month follow-up. The addition of fusion to decompression provides no advantage to decompression alone for the treatment of patients with neurogenic claudication secondary to lumbar stenosis without spondylolisthesis or deformity.

8. VISCERA

Type of exercise and impact on cardiac adiposity

JAMA Cardiol. 2019 Jul 3. doi: 10.1001/jamacardio.2019.2074.

Effect of Aerobic and Resistance Exercise on Cardiac Adipose Tissues: Secondary Analyses From a Randomized Clinical Trial.

Christensen RH¹, Wedell-Neergaard AS¹, Lehrskov LL¹, Legaard GE¹, Dorph E¹, Larsen MK¹, Launbo N¹, Fagerlind SR¹, Seide SK¹, Nymand S¹, Ball M¹, Vinum NB¹, Dahl CN¹, Henneberg M¹, Ried-Larsen M¹, Boesen MP², Christensen R^{3,4}, Karstoft K¹, Krogh-Madsen R¹, Rosenmeier JB⁵, Pedersen BK¹, Ellingsgaard H¹.

IMPORTANCE: Epicardial and pericardial adipose tissues are emerging as important risk factors for cardiovascular disease, and there is a growing interest in discovering strategies to reduce the accumulation of fat in these depots.

OBJECTIVE: To investigate whether a 12-week endurance or resistance training intervention regulates epicardial and pericardial adipose tissue mass.

DESIGN, SETTING, AND PARTICIPANTS: Secondary analysis of a randomized, assessor-blinded clinical trial initiated on August 2016 and completed April 2018. This single-center, community-based study included 50 physically inactive participants with abdominal obesity.

INTERVENTIONS: Participants were randomized to a supervised high-intensity interval endurance training (3 times a week for 45 minutes), resistance training (3 times a week for 45 minutes), or no exercise (control group).

MAIN OUTCOMES AND MEASURES: Change in epicardial and pericardial adipose tissue mass assessed by magnetic resonance imaging, based on a prespecified secondary analysis plan including 3 of 5 parallel groups.

RESULTS:

Of 50 participants (mean [SD] age, 41 [14] years, 10 men [26%]; mean [SD] body mass index [calculated as weight in kilograms divided by height in meters squared], 32 [5]), 39 [78%] completed the study. Endurance training and resistance training reduced epicardial adipose tissue mass by 32% (95% CI, 10%-53%) and 24% (95% CI, 1%-46%), respectively, compared with the no exercise control group (56% [95% CI, 24%-88%]; $P = .001$ and 48% [95% CI, 15%-81%]; $P < .001$, respectively). While there was a nonsignificant reduction in pericardial adipose tissue mass after endurance training (11% [95% CI, -5% to 27%]; $P = .17$), resistance training significantly reduced pericardial adipose tissue mass by 31% (95% CI, 16%-47%; $P < .001$) when compared with the no exercise control group. Compared with the no exercise control group, there was an increase in left ventricular mass by endurance (20 g [95% CI, 11%-30%]; $P < .001$) and resistance training (18 g [95% CI, 8%-28%]; $P < .001$). Other cardiometabolic outcomes remained unchanged after the 12-week trial period.

CONCLUSIONS AND RELEVANCE:

In individuals with abdominal obesity, both endurance and resistance training reduced epicardial adipose tissue mass, while only resistance training reduced pericardial adipose tissue mass. These data highlight the potential preventive importance of different exercise modalities as means to reduce cardiac fat in individuals with abdominal obesity.

13 B. TMJ/ORAL**Conservative approach helps****Original Article****Clinical efficacy of a simplified approach to managing chronic temporomandibular disorders: evidence from a 1-year case series**

panelAjith D.PolonowitaBDS, MDS, MRACDS, FOMAA^aW. MurrayThomsonBDS, MA, MComDent, PhD^bDennis N.ThorburnBDS, FDSRCS^c

<https://doi.org/10.1016/j.oooo.2019.06.008>Get rights and content

Objective

Chronic temporomandibular disorder (cTMD) produces orofacial pain and limited jaw function and impacts on quality of life. A clinical case series of patients referred to a hospital specialist service is described here.

Study Design

In a 1-year consecutive case series of 162 patients with cTMDs, each patient had been managed with self-awareness and jaw exercises, as well as oral appliances. Pain severity and chewing function were scored by using a visual analogue scale (VAS), and quality of life was assessed by using the Oral Health Impact Profile–Temporomandibular Dysfunction (OHIP-TMD).

Results

Females comprised 87% (average age 49 years). Treatment time averaged 20.8 months, and the average pain duration was 2.8 years. The mean VAS pain score fell from 6.9 (standard deviation [SD] 1.6) to 2.0 (SD 1.9) after treatment, giving a “large” effect size of 3.1. Chewing difficulty improvement also showed a “large” effect size (2.5). For the 33 patients for whom longitudinal OHIP-TMD data were available, the mean pretreatment and posttreatment scores of 51.2 (SD 20.9) and 26.2 (SD 17.7) showed a “large” effect size of 1.2.

Conclusions

A simple noninvasive protocol for managing cTMD with self-help, exercises, and oral devices resulted in clinically and statistically meaningful improvements in pain, function, and quality of life.

13 D. SLEEP**Link between sleep and breast CA**

Eur J Cancer Prev. 2019 Jul;28(4):323-329. doi: 10.1097/CEJ.0000000000000458.

Long-term sleep habits and the risk of breast cancer among Chinese women: a case-control study.

Yang W^{1,2}, Shi Y³, Ke X², Sun H², Guo J², Wang X².

Previous observational studies have inconsistently suggested that poor sleep is a novel risk factor for breast cancer (BC). However, these studies mainly focused on sleep duration; other sleep domains were rarely reported.

The aim of this study was to evaluate the association of a broad range of sleep domains with the risk of BC incidence. We used a community-based 1 : 1 individual matched case-control design that included 401 female patients with incident BC and 401 age-matched and area-matched female controls in Jiujiang, China. Long-term sleep habits were assessed comprehensively using a validated 17-item Sleep Factors Questionnaire. Adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were calculated using conditional logistic regression. Light exposure at night (highest vs. lowest level, aOR=1.19, 95% CI: 1.06-2.68), habitual timing of sleep (after 12 a.m. midnight vs. before 22 p.m., aOR=1.12, 95% CI: 1.03-2.62), night/shift work (yes vs. no, aOR=1.38, 95% CI: 1.04-2.71), and frequency of night-time wakings (>2 per night vs. never, aOR=1.21, 95% CI: 1.10-2.96) were associated with an increased risk of BC after mutually adjusting for other sleep parameters. These positive associations remained irrespective of menopausal status and tumor estrogen receptor status.

There was no association between sleep duration, sleep quality, sleep medication use, insomnia frequency, daytime nap, and the risk of BC.

Our results indicate that sleep problems including light exposure at night, night/shift work, late sleeping, and frequent night waking could increase the risk of BC development, independent of other sleep factors.

14. HEADACHES

Anxiety

Headache. 2019 Jun 5. doi: 10.1111/head.13568.

Anxiety Sensitivity as a Risk Indicator for Anxiety, Depression, and Headache Severity in Women With Migraine.

Farris SG¹, Burr EK¹, Abrantes AM^{2,3}, Thomas JG^{2,4}, Godley FA⁵, Roth JL^{2,6}, Lipton RB^{7,8}, Pavlovic JM^{7,8}, Bond DS^{2,4}.

OBJECTIVE:

The primary aim of this exploratory study was to assess the relationship between anxiety sensitivity and emotional disorders, migraine characteristics, and migraine-related fear and avoidance behaviors in women with probable migraine.

BACKGROUND:

Anxiety and depressive disorders are the most frequent comorbid psychiatric conditions in migraine, particularly in women; however, the underlying reasons for these comorbidities are uncertain. Anxiety sensitivity, the tendency to catastrophically appraise anxiety and bodily sensations in terms of their physical, social, or cognitive consequences, is a psychological factor that may contribute to the comorbidity of anxiety and depressive disorders and migraine. It was hypothesized that anxiety sensitivity would be associated with greater migraine severity and psychiatric symptoms.

METHOD:

Participants were women (n = 100) who screened positive for migraine on the validated ID Migraine Screener participated in an anonymous single-session online survey-based study on migraine. The Anxiety Sensitivity Index-3 total and subscales scores were used to assess anxiety sensitivity. Anxiety and depression symptoms were assessed with the brief Patient Health Questionnaire.

RESULTS:

On average, anxiety sensitivity was clinically elevated (mean \pm SD: 24.0 \pm 15.2). Anxiety sensitivity cognitive and social concerns were most strongly correlated with severity of anxiety (r's = .38-.46) and depressive symptoms (r = .35-.39, P's < .001), and all anxiety sensitivity facets were related to fear of head pain (r's = .35-.38, P's < .001). Anxiety sensitivity cognitive concern facet was uniquely related to headache patterns, including longer migraine attack duration (r = .22, P = .029) and pain intensity (r = .24, P = .029), pain-related avoidance, including avoiding movement and more frequent misuse of prescribed or non-prescribed pain medication (r's = .20-.21, P's < .01).

CONCLUSIONS:

These novel findings indicate that anxiety sensitivity, specifically fearful appraisal of bodily sensations, are linked to both psychiatric symptoms and migraine severity in women. In this cross-sectional study, causal sequence cannot be determined. If anxiety sensitivity leads to more severe pain and psychiatric distress, targeting anxiety sensitivity could lead to better headache outcomes.

18. CLAVICLE**AC OA**

J Shoulder Elbow Surg. 2019 Jul 3. pii: S1058-2746(19)30250-2. doi: 10.1016/j.jse.2019.04.004.

Seven-year course of asymptomatic acromioclavicular osteoarthritis diagnosed by MRI.

Frigg A¹, Song D², Willi J², Freiburghaus AU³, Grehn H⁴.

BACKGROUND:

Asymptomatic acromioclavicular osteoarthritis (AC-OA) is a frequent finding in shoulder magnetic resonance imaging (MRI). Its natural course is unknown. Therefore, the question arises whether a resection should be performed simultaneously with shoulder surgery for another reason to prevent future pain and reoperation. The purpose of this study was to investigate the mid-term course of asymptomatic AC-OA.

METHODS:

Overall, 114 asymptomatic AC-OA diagnosed on MRI were followed for 7 years between 2011 and 2018. At baseline, MRI signal enhancement in the clavicle and acromion, OA grade, physical demand as well as the parameters (1) Constant Score Visual Analogue Scale, (2) pain on AC-joint compression, and (3) cross-body adduction test were measured. All patients were followed up after 7 years by interview, and in case of symptoms by clinical examination. The endpoint "deterioration" was reached if 2 of the 3 parameters turned worse.

RESULTS:

Asymptomatic AC-OA remained asymptomatic in 83% of cases, 7% turned better, 10% turned worse. Physical demand and osteoarthritis grade increased the risk of deterioration, whereas MRI signal enhancement in the clavicle or acromion had no influence on outcome. During follow-up, the frequency of pain on AC-joint compression increased from 11% to 16% ($P = .24$), the frequency of a positive cross-body adduction test increased from 6% to 20% ($P = .017$), and the mean Constant Score Visual Analogue Scale increased from 10 to 13 points ($P < .001$) indicating less pain.

CONCLUSIONS:

Asymptomatic AC-OA remained asymptomatic in 90% over 7 years. A simultaneous resection of an asymptomatic AC-OA during shoulder surgery for another reason is not indicated in every patient.

19. GLENOHUMERAL/SHOULDER**Bilateral shoulder findings**

J Shoulder Elbow Surg. 2019 Jul 3. pii: S1058-2746(19)30234-4. doi: 10.1016/j.jse.2019.04.001.

Bilateral magnetic resonance imaging findings in individuals with unilateral shoulder pain.

Barreto RPG¹, Braman JP², Ludewig PM³, Ribeiro LP¹, Camargo PR⁴.

BACKGROUND:

Magnetic resonance imaging (MRI) is commonly used to diagnose structural abnormalities in the shoulder. However, subsequent findings may not be the source of symptoms. The aim of this study was to determine comparative MRI findings across both shoulders of individuals with unilateral shoulder symptoms.

MATERIALS AND METHODS:

We prospectively evaluated 123 individuals from the community who had self-reported unilateral shoulder pain with no signs of adhesive capsulitis, no substantial range-of-motion deficit, no history of upper-limb fractures, no repeated shoulder dislocations, and no neck-related pain. Images in the coronal, sagittal, and axial planes with T1, T2, and proton density sequences were generated and independently and randomly interpreted by 2 examiners: a board-certified, fellowship-trained orthopedic shoulder surgeon and a musculoskeletal radiologist. Absolute and relative frequencies for each MRI finding were calculated and compared between symptomatic and asymptomatic shoulders. Agreement between the shoulder surgeon and the radiologist was also determined.

RESULTS:

Abnormal MRI findings were highly prevalent in both shoulders. Only the frequencies of full-thickness tears in the supraspinatus tendon and glenohumeral osteoarthritis were higher (approximately 10%) in the symptomatic shoulder according to the surgeon's findings. Agreement between the musculoskeletal radiologist and shoulder surgeon ranged from slight to moderate (0.00-0.51).

CONCLUSION:

Most abnormal MRI findings were not different in frequency between symptomatic and asymptomatic shoulders. Clinicians should be aware of the common anatomic findings on MRI when considering diagnostic and treatment planning.

20 A. ROTATOR CUFF

Strength deficits not always found

Does strength deficit correlate with shoulder function in patients with rotator cuff tears? Characteristics of massive tears

Jong PilYoonMD^bDong HyunKimMD^bSeok WonChungMD, PhD^cJoon YubKimMD^dHyun-JooLeeMD^bSeoIlMD^bKyeong HyeonParkMD^bHoseokLeeMD^c
<https://doi.org/10.1016/j.jse.2019.03.015>Get rights and content

Background

The correlation between shoulder strength deficits and function in rotator cuff tears remains uncertain. This study aimed to determine the correlation between shoulder strength deficits and shoulder function evaluated by various clinical scoring systems.

Methods

A total of 262 patients (mean age, 59.67 years [standard deviation, 8.06 years]) who underwent full-thickness rotator cuff repair were included. Patients in group I ($n = 188$) had small to large rotator cuff tears, whereas those in group II ($n = 74$) had massive rotator cuff tears. Demographic factors, isokinetic test results, and shoulder function evaluated using various scoring systems were obtained. Correlation differences according to severity of the rotator cuff tear were evaluated.

Results

We found weak correlations between shoulder strength deficits (peak torque and total work) and clinical outcomes in patients with rotator cuff tears ($r = -0.288$). For patients in group I (nonmassive tears), we found a weaker correlation ($r = -0.242$) according to the tear pattern. However, shoulder strength deficits in group II patients (massive tears) were strongly correlated with American Shoulder and Elbow Surgeons ($r = -0.598$), Constant ($r = -0.582$), and Short Form 36 ($r = -0.511$) scores, especially regarding internal rotator strength deficits.

Conclusions

Shoulder strength deficits measured via isokinetic testing and shoulder function were weakly correlated in patients with rotator cuff tears. However, shoulder strength deficits in patients with massive tears considerably worsened shoulder function and systemic disability, but not regional disability. In particular, internal rotator strength deficits were strongly correlated with poor shoulder function.

32 A. KNEE/ACL**Cartilage changes in repairs**

BMC Musculoskelet Disord. 2019 Jul 4;20(1):312. doi: 10.1186/s12891-019-2687-9.

Tibiofemoral joint structural change from 2.5 to 4.5 years following ACL reconstruction with and without combined meniscal pathology.

Wang X^{1,2}, Bennell KL¹, Wang Y³, Wrigley TV¹, Van Ginckel A^{1,4}, Fortin K¹, Saxby DJ^{5,6,7}, Cicuttini FM³, Lloyd DG^{5,6,7}, Vertullo CJ^{6,8}, Feller JA^{9,10}, Whitehead T⁹, Gallie P¹¹, Bryant AL¹².

BACKGROUND:

People who have had anterior cruciate ligament reconstruction (ACLR) are at a high risk of developing tibiofemoral joint (TFJ) osteoarthritis (OA), with concomitant meniscal injury elevating this risk. This study aimed to investigate OA-related morphological change over 2 years in the TFJ among individuals who have undergone ACLR with or without concomitant meniscal pathology and in healthy controls. A secondary aim was to examine associations of baseline TFJ cartilage defects and bone marrow lesions (BML) scores with tibial cartilage volume change in ACLR groups.

METHODS:

Fifty seven ACLR participants aged 18-40 years (32 isolated ACLR, 25 combined meniscal pathology) underwent knee magnetic resonance imaging (MRI) 2.5 and 4.5 years post-surgery. Nine healthy controls underwent knee MRI at the ~2-year intervals. Tibial cartilage volume, TFJ cartilage defects and BMLs were assessed from MRI.

RESULTS:

For both ACLR groups, medial and lateral tibial cartilage volume increased over 2 years ($P < 0.05$). Isolated ACLR group had greater annual percentage increase in lateral tibial cartilage volume compared with controls and with the combined group ($P = 0.03$). Cartilage defects remained unchanged across groups. Both ACLR groups showed more lateral tibia BML regression compared with controls ($P = 0.04$). Baseline cartilage defects score was positively associated with cartilage volume increase at lateral tibia ($P = 0.002$) while baseline BMLs score was inversely related to medial tibia cartilage volume increase ($P = 0.001$) in the pooled ACLR group.

CONCLUSIONS:

Tibial cartilage hypertrophy was apparent in ACLR knees from 2.5 to 4.5 years post-surgery and was partly dependent upon meniscal status together with the nature and location of the underlying pathology at baseline. Magnitude and direction of change in joint pathologies (i.e., cartilage defects, BMLs) were less predictable and either remained stable or improved over follow-up.

35. KNEE/TOTAL**Improved proprioception**

Review Article

Total Knee Arthroplasty in Patients With Knee Osteoarthritis: Effects on Proprioception. A Systematic Review and Best Evidence Synthesis

panelGiorgiodi Laura FratturaMD^aStefanoZaffagniniMD^bGiuseppeFilardoMD, PhD^cIacopoRomandiniMD^bAugustoFuscoMD, PhD^dChristianCandrianMD^a
<https://doi.org/10.1016/j.arth.2019.06.005>Get rights and content

Background

Impact of total knee arthroplasty (TKA) on proprioception remains to be determined. The aim of this systematic review is to analyze factors influencing proprioception in patients with knee osteoarthritis (OA) undergoing TKA.

Methods

A systematic literature search was conducted on 3 medical electronic databases: PubMed, PeDRO, and Cochrane Collaboration. The Preferred Reporting Items for Systematic Reviews and Meta-analysis guidelines were used. Risk of bias analysis and best evidence synthesis were performed. Three main aspects were investigated: the presence of preoperative, surgical, and postoperative factors influencing proprioception in OA patients undergoing TKA.

Results

Search identified 1601 records. After screening, 19 papers were used for the analysis of 676 patients. Proprioception generally improved but often remained impaired after surgery. Strong evidence was found for no influence of prosthesis design on proprioception. Moderate evidence was found for patellar resurfacing not affecting proprioception, varus deformity negatively influencing proprioception, and time elapsed from surgery positively influencing proprioception. Limited evidence was found for valgus deformity, OA grade, intact anterior cruciate ligament, and anteroposterior joint laxity negatively affecting knee proprioception, and for muscle strength and sensorimotor training not affecting proprioception. Finally, conflicting evidence was found for better postoperative proprioception vs preoperative level.

Conclusion

Proprioception in OA patients undergoing TKA improves but remains impaired after surgery. The best evidence synthesis demonstrated no influence of prosthetic design, while the role of the treatment remains unclear. This warrants for further research efforts to study proprioceptive impairment to better manage OA patients undergoing TKA.

37. OSTEOARTHRITIS/KNEE**OA signs**

J Orthop Sports Phys Ther. 2019 Jul 10:1-25. doi: 10.2519/jospt.2019.8889.

Association Between Self-Reported Measures, Physical Examination and Early Magnetic Resonance Imaging Signs of Osteoarthritis in Patients With Patellofemoral Pain.

Eijkenboom JFA¹, Timmer ER¹, van der Heijden RA², de Kanter JML², Oei EHG², Bierma-Zeinstra SMA¹, van Middelkoop M¹.

STUDY DESIGN:

Cross-sectional.

BACKGROUND:

Structural abnormalities associated with osteoarthritis (OA) are found in some patients with patellofemoral pain (PFP).

OBJECTIVES:

Investigate the association between early signs of OA on MRI and characteristics from self-reported measures and physical examination in patients with PFP.

METHODS:

Data of patients with PFP from a cross-sectional case-control study were used (N=64, 55% female, mean age 23.4(7.0)). Structural OA features (osteophytes, bone marrow lesions, cartilage defects, Hoffa synovitis, patellar tendon abnormalities) and quantitative T2 measurements of cartilage composition were extracted from MRI. Associations between characteristics from self-reported measures (pain in rest, pain during stair walking, knee function, duration of complaints, hours of sports participation), physical examination (crepitus, quadriceps strength) and early MRI signs of OA were analyzed.

RESULTS:

Symptom duration was associated with bone marrow lesions in the patella (OR 1.10; 95%CI [1.00-1.21]). Hours of sports participation per week was inversely associated with patellar tendon abnormalities on MRI (OR 0.75; 95%CI [0.59-0.97]). Crepitus and bilateral nature of the complaints were associated with small cartilage defects in the patellar cartilage (OR 11.95; 95%CI [2.25-63.61] and 7.62; 95%CI [1.08-53.75] respectively). No significant associations were found between clinical characteristics and cartilage T2 relaxation time.

CONCLUSION:

Presence of crepitus, bilateral complaints, a long PFP symptom duration and reduced sport participation per week seem to be associated with early signs of OA in a young PFP population, which may represent a distinct subgroup of patients with PFP who have a high risk to develop PFOA.

LEVEL OF EVIDENCE:

Etiology, level 2c. *J Orthop Sports Phys Ther*, Epub 10 Jul 2019. doi:10.2519/jospt.2019.8889.

45 B. MANUAL THERAPY CERVICAL**Head position and blood flow****Effects of Head and Neck Positions on Blood Flow in the Vertebral, Internal Carotid, and Intracranial Arteries: A Systematic Review**

- AUTHORS

Rik Kranenburg, PT^{1,2}, Rob Tyer, PT³, Maarten Schmitt, PT, PhD⁴, Gert Jan Luijckx, MD-PhD⁵, Cees van der Schans, PT, PhD^{1,2,6}, Nathan Hutting, PT, PhD^{7,8}, Roger Kerry, PT, PhD⁹

Published: *Journal of Orthopaedic & Sports Physical Therapy*,
2019 **Volume:**0 **Issue:**0 **Pages:**1–59 **DOI:**10.2519/jospt.2019.8578

Study Design

Systematic review.

Background

Manual therapy interventions targeting the neck comprise various positions and movements of the cranio-cervical region. The hemodynamic changes in various spinal positions potentially have clinical relevance.

Objectives

To investigate the effects of cranio-cervical positions and movements on hemodynamic parameters (blood flow velocity and/or volume) of cervical and cranio-cervical arteries.

Methods

Four databases were searched (Pubmed, Embase, CINAHL and ICL). Subsequently, a hand search of reference lists was performed and experts were consulted. Full text experimental and quasi-experimental studies on influence of cervical positions to blood-flow of the vertebral, the internal carotid and the basilar artery were eligible for this review. Two independent reviewers selected and extracted the data using the double screening method.

Results

Of the 1453 identified studies 31 studies were included and comprised data on 2254 participants. Most studies mentioned no significant hemodynamic changes during maximal rotation (n=16). A significant decrease in hemodynamics was identified for the vertebral artery with a hemodynamic decrease in the position of maximum rotation (n=8) and combined movement of maximum extension and maximum rotation (n=4). A similar pattern of decreased hemodynamics was also identified for the internal carotid and intracranial arteries. Three studies focused on high velocity thrust positioning and movement, all reported no hemodynamic changes. The synthesized data suggest that in the majority of people most positions and movements of the cranio-cervical region do not have an effect on blood flow.

Conclusions

The findings of this systematic review suggest that cranio-cervical positioning may not alter blood flow as much as previously expected.

Level of Evidence

2a. *J Orthop Sports Phys Ther*, Epub 5 Jul 2019. doi:10.2519/jospt.2019.8578

45 C. MANUAL THERAPY THORACIC**Thoracic manipulation for hip and back pain**

J Orthop Sports Phys Ther. 2019 Jul 10:1-11. doi: 10.2519/jospt.2019.8309.

Short-term Response to Treatment Targeting the Thoracolumbar Junction in Patients With Hip Pain: A Case Series.

Meadows J¹, Denninger T², Peterson S^{3,4}, Milligan L⁵, Zapanta J⁶.

BACKGROUND:

In patients presenting with hip and groin symptoms, evaluation and treatment of the thoracolumbar junction (TLJ) may be underutilized. The TLJ is less recognized as a source of pain referral in these regions. The purpose of this case series was to describe the management of 3 patients with primary hip and groin pain who were treated with interventions targeting the TLJ.

DIAGNOSIS:

The 3 patients in this case series presented with subacute or chronic complaints of hip and groin pain that had failed to resolve with typical treatments. They had undergone several inconclusive clinical testing procedures. Each patient underwent a detailed physical therapy evaluation and was found to have pain and mobility deficits at the TLJ. Once the therapist had determined that the patients' symptoms were likely of musculoskeletal origin, treatment commenced. Joint mobilization and exercise directed at the TLJ were used in each case. Marked improvements in pain, thoracic range of motion, and functional deficits were observed within 3 to 4 weeks, after an average of 6 treatment sessions. All patients returned to prior activity levels. Patients in cases 1 and 3 had improvements in hip mobility and strength without direct treatment to the hip.

DISCUSSION:

This case series describes the management of 3 patients with hip and groin symptoms who were successfully treated with interventions targeting the TLJ. In patients reporting primary hip or groin pain, physical therapists should consider the TLJ as a potential source of symptoms and include treatment strategies directed at the TLJ, as warranted, after a careful examination and clinical-reasoning process.

LEVEL OF EVIDENCE:

Differential diagnosis, level 4. *J Orthop Sports Phys Ther*, Epub 10 Jul 2019.
doi:10.2519/jospt.2019.8309.