
The mechanobiology of articular cartilage: bearing the burden of osteoarthritis.

Sanchez-Adams J
Ledy HA
McNulty AL
O'Connor CJ
Guilak F

ABSTRACT

Articular cartilage injuries and degenerative joint diseases are responsible for progressive pain and disability in millions of people worldwide, yet there is currently no treatment available to restore full joint functionality. As the tissue functions under mechanical load, an understanding of the physiologic or pathologic effects of biomechanical factors on cartilage physiology is of particular interest. Here, we highlight studies that have measured cartilage deformation at scales ranging from the macroscale to the microscale, as well as the responses of the resident cartilage cells, chondrocytes, to mechanical loading using in vitro and in vivo approaches. From these studies, it is clear that there exists a complex interplay among mechanical, inflammatory, and biochemical factors that can either support or inhibit cartilage matrix homeostasis under normal or pathologic conditions. Understanding these interactions is an important step toward developing tissue engineering approaches and therapeutic interventions for cartilage pathologies, such as osteoarthritis.

Curr Rheumatol Rep. 2014 Oct;16(10):451. doi: 10.1007/s11926-014-0451-6.

A case-control study examining inconsistencies in pain management following fractured neck of femur: an inferior analgesia for the cognitively impaired.

McDermott JH
Nichols DR
Lovell ME

ABSTRACT

Previous research suggests individuals who suffer from cognitive impairment are less able to vocalise pain than the rest of the cognitively-intact population. This feature of cognitive impairment may be leading to a chronic underdetection of pain as current assessment tools strongly rely on the participation of the patient. To explore inconsistencies in pain management within the acute setting, we conducted a retrospective assessment of 224 patients presenting with fractured neck of femur at a large teaching hospital's accident and emergency (A&E) department between 2 June 2011 and 2 June 2012. These patients were split into either a cognitively-impaired or cognitively-intact cohort based on their Abbreviated Mental Test Scores. Patients with cognitive impairment, on average, received a weaker level of analgesia than individuals without impairment both in the ambulance and in A&E. In the ambulance, 45% of cognitively-impaired patients were prescribed no pain relief compared with just 8% of those individuals who remain cognitively intact. After arrival at A&E, these inconsistencies continued with 69% of the cognitively-intact cohort receiving the strongest opioid analgesia compared with just 37% of the cognitively-impaired cohort. The cognitively-impaired cohort would also wait on average an hour longer before receiving this initial pain relief. We believe that these differences stem from cognitively-impaired patients being unable to vocalise their pain through traditional assessment methods. This work discusses the potential development or adoption of a tool which can be applied in the acute setting and relies less on vocalisation but more on the objective features of pain, so making it applicable to cognitively-impaired individuals

Emerg Med J. 2014 Oct;31(e1):e2-8. doi: 10.1136/emered-2013-203007. Epub 2013 Oct 17.

Radiographic assessment of ligamentous injuries in distal radius fractures after open reduction and internal fixation.

Naran S
Zaulan Y
Shakir S
Gilula LA
Werner FW
Wollstein R

ABSTRACT

OBJECTIVES:

Concomitant ligamentous injury in distal radius fractures (DRF) may explain continued pain following surgery. The purpose of this study was to compare radiographic measurements assessing scaphoid translation in DRF after reduction, to measurements performed on normal radiographs. This may allow noninvasive evaluation of radiocarpal ligamentous integrity.

METHODS:

Fifty postoperative radiographs were evaluated. The distance between the ulnar border of the radial styloid and the radial border of the scaphoid was measured midway between the styloid tip and scaphoid base, and then divided by scaphoid width at the same level. The measured ratios were compared to previously established normal data, established radiographic measurements of fracture reduction, fracture characteristics and fixation methods.

RESULTS:

Radiographic scaphoid position measurements differed significantly from normals ($p = 0.0001$). Fracture characteristics, surgical difficulty, and technique were not associated with scaphoid position.

CONCLUSIONS:

Despite accurate surgical reduction, abnormal positioning of the scaphoid may persist. This may reflect ligamentous injury, which generates suboptimal clinical results. Identifying and addressing ligamentous injury during surgery may prevent the development of instability and improve outcome after DRF.

Eur J Orthop Surg Traumatol. 2014 Oct;24(7):1151-4. doi: 10.1007/s00590-013-1383-y.
Epub 2013 Dec 4.

Sacral perineural cyst mimicking inflammatory low back pain.

Ostojic P

ABSTRACT

This case describes a 46-year-old woman with local pelvic and perineal pain, persisting for 2 years at presentation. The pain worsened during the night and morning and was alleviated during daily activities. Low back pain was associated with morning stiffness lasting longer than 2 h. Sometimes, she felt pain and numbness along her left S1 dermatome, without overt bladder or bowel incontinence. Lasegue's sign was negative. Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were elevated (35 mm/h and 9.4, respectively) and Mennel's sign was present on both sides, indicating possible inflammation of the sacroiliac joints. However, radiographs of the lumbosacral spine and sacroiliac joints were normal. Magnetic resonance imaging (MRI) revealed a large spinal meningeal cyst in the sacrum (60 × 37 × 22 mm) consisting of multiple perineural cysts. The cyst eroded the surrounding sacral bone structures, narrowed several sacral foramina, and compressed neighboring nerve fibers. MRI findings on sacroiliac and hip joints were normal.

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Symptomatic ganglion cyst in a patient with knee pain.

Lantz JM
Shamim E
Elliott JM

ABSTRACT

The patient was a 39-year-old man who was referred to a physical therapist by his primary care physician for a chief complaint of left posterior knee pain. Radiographs of the left knee, which had been previously ordered by the patient's primary care physician, were interpreted as normal. Given the patient's worsening symptoms, no history of trauma or injury, and lack of improvement with prior conservative measures, the patient was referred to an orthopaedic surgeon. Magnetic resonance imaging of the left knee was ordered, which revealed a septated ganglion cyst within the femoral notch that caused moderate displacement of the cruciate ligaments.

J Orthop Sports Phys Ther. 2014 Oct;44(10):840. doi: 10.2519/jospt.2014.0412.

A more global approach to musculoskeletal pain: Expressive writing as an effective adjunct to physiotherapy.

Pepe L
Milani R
Di Trani M
Di Folco G
Lanna V
Solano L

ABSTRACT

The aim of this study was to investigate the effects of written emotional disclosure as an adjunct to physiotherapy. Forty outpatients with musculoskeletal pain were treated with Mézières physiotherapy for 10 sessions. Half of the subjects also wrote about difficult life experiences immediately after four of these sessions. Data analysis showed that although both the writing and non-writing groups displayed lower pain scores after physiotherapy, the difference was stronger in the writing group. Pain scores continued to decrease six months after physiotherapy in the writing group alone. The postural evaluation revealed a greater improvement in the writing group than in the non-writing group, while the TAS-20 and SCL-90 scores decreased in the writing group alone. These results indicate that written emotional disclosure is an effective adjunct to physiotherapy insofar as it promotes further health improvements at both the physical and psychological levels.

Psychol Health Med. 2014 Dec;19(6):687-97. doi: 10.1080/13548506.2013.859712.
Epub 2013 Nov 20.

The combined effect of physical, psychosocial/organisational and/or environmental risk factors on the presence of work-related musculoskeletal symptoms and its consequences.

Widanarko B
Legg S
Devereux J
Stevenson M

ABSTRACT

This study assessed the combined effect of physical and psychosocial/organisational and/or environmental factors on the presence of musculoskeletal symptoms (MSS) and its consequences (reduced activities and absenteeism due to MSS) in a random sample of 3003 workers in New Zealand. By telephone interview, participants reported their current workplace exposures and MSS (neck/shoulder, arm/elbow, wrist and low back) and its consequences. Data were analysed using multivariable logistic regression. Combined exposure to physical and psychosocial/organisational and/or environmental factors increased the odds of MSS in the neck/shoulder (OR 3.14, 95% CI 1.79-5.52), arms/elbow regions (OR 4.14, 95% CI 2.21-7.76) and low back (OR 1.74, 95% CI 1.28-2.37) and its consequences, i.e. reduced activities due to neck/shoulder symptoms (OR 5.45, 95% CI 2.28-13.00), absenteeism due to neck/shoulder symptoms (OR 5.19, 95% CI 2.24-12.01) and absenteeism due to low back symptoms (OR 4.37, 95% CI 2.92-6.53). In contrast, favourable psychosocial/organisational work conditions reduced the odds of wrist symptoms due to poor physical work conditions (OR 2.19, 95% CI 1.44-3.34). We conclude that to reduce MSS and its consequences, employers need to adopt a multifaceted approach: concentrate on improving physical conditions as well as the psychosocial/organisational and environmental aspects of the working environment.

Appl Ergon. 2014 Nov;45(6):1610-21. doi: 10.1016/j.apergo.2014.05.018. Epub 2014 Jun 14.

Morphology versus function: the relationship between lumbar multifidus intramuscular adipose tissue and muscle function among patients with low back pain.

Le Cara EC
Marcus RL
Dempsey AR
Hoffman MD
Hebert JJ

ABSTRACT

OBJECTIVE:

To explore the bivariate and multivariate relations between fatty degeneration of the lumbar multifidus muscle (LMM) and LMM function among patients with low back pain (LBP).

DESIGN:

Cross-sectional clinical study.

SETTING:

Hospital

PARTICIPANTS:

Patients with LBP (N=70) referred for lumbar spine magnetic resonance imaging.

INTERVENTIONS:

Not applicable.

MAIN OUTCOME MEASURES:

LMM morphology and function were measured at the L4/L5 and L5/S1 spinal levels bilaterally. Quantitative measures of LMM intramuscular adipose tissue (IMAT) were derived from T1-weighted magnetic resonance images. Function was assessed with ultrasound imaging by measuring change in LMM thickness during a submaximal contraction task. The study participants self-reported their level of LBP-related disability (Modified Oswestry Index), pain intensity (numerical pain rating scale), and physical activity (International Physical Activity Questionnaire). Bivariate and multivariate relations between LMM morphology and function were explored with correlational and hierarchical linear regression analyses, respectively. Additionally, we explored for possible covariates with potential to modify the relation between LMM IMAT and function.

RESULTS:

There were 70 participants (12 women) enrolled in the study (mean age, 45.4±11.9y). A high level of physical activity was reported by 45.5% of participants. Age, sex, and physical activity level demonstrated variable relations with LMM IMAT and LMM function. There were no significant bivariate or multivariate relations between LMM IMAT and LMM function.

CONCLUSIONS:

We observed higher levels of physical activity and LMM function and less LMM IMAT than previous studies involving patients with LBP. There was no relation between LMM morphology and function in this cohort of patients with LBP. Issues specific to LMM measurement and recommendations for future research are discussed

Arch Phys Med Rehabil. 2014 Oct;95(10):1846-52. doi: 10.1016/j.apmr.2014.04.019.
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Relationship between strength, pain, and different measures of functional ability in patients with end-stage hip osteoarthritis.

Zeni J Jr
Abujaber S
Pozzi F
Raisis L

ABSTRACT

OBJECTIVE:

Performance tests and self-reported questionnaires capture different domains of function in patients with lower extremity osteoarthritis, but the impairments related to each of these domains have not been elucidated. The purpose of this study was to determine how strength and joint pain influence performance-based tests and self-reported questionnaires of functional ability of individuals with end-stage hip osteoarthritis.

METHODS:

Fifty-six patients scheduled to undergo unilateral total hip arthroplasty were included in this cross-sectional analysis. Subjects completed the Hip Outcome Survey (HOS) and pain in the affected hip was quantified on a scale from 0-10. Performance-based tests included the Six-Minute Walk Test (6MWT), the Timed Up & Go (TUG), and the Stair Climbing Test (SCT). Isometric strength of the hip abductors and knee extensors was tested and recorded. Hierarchical linear regressions were created to determine the contributions of pain, knee extensor strength, and hip strength for each outcome measure (TUG, 6MWT, SCT, and HOS). Height and body mass index were entered first, followed by pain, then knee extensor strength, and then hip abduction strength.

RESULTS:

Greater pain significantly predicted lower HOS scores, but hip strength did not significantly improve the model. Hip pain was also significantly related to TUG, SCT, and 6MWT values, but hip and knee strength explained additional variance for these performance-based measures.

CONCLUSIONS:

Self-report and performance-based measures capture different aspects of disability and are influenced by different underlying impairments. Both types of outcome measures should be used in studies that evaluate functional changes in patients with hip osteoarthritis.

Arthritis Care Res (Hoboken) 2014 Oct;66(10):1506-12. doi: 10.1002/acr.22329.

Symptom onset, diagnosis and management of osteoarthritis.

MacDonald KV
Sanmartin C
Langlois K
Marshall DA

ABSTRACT

BACKGROUND:

The time between symptom onset and physician diagnosis is a period when people with osteoarthritis can make lifestyle changes to reduce pain, improve function and delay disability.

DATA AND METHODS:

This study analyses data for a nationally representative sample of 4,565 Canadians aged 20 or older who responded to the Arthritis component of the 2009 Survey on Living with Chronic Diseases in Canada. Descriptive statistics are used to report the prevalence of hip and knee osteoarthritis; the mean age of symptom onset and diagnosis; medication use; and contacts with health professionals during the previous year.

RESULTS:

Among people with a physician diagnosis of arthritis, 37% reported osteoarthritis. Of these, 70% experienced pain in the hip(s), knee(s), or hip(s) and knee(s). Close to half (48%) of these people experienced symptoms the same year that they were diagnosed; 42% experienced symptoms at least a year before the diagnosis; and 10% experienced symptoms after the diagnosis. Among those who had symptoms before diagnosis, the average time between symptom onset and diagnosis was 7.7 years.

INTERPRETATIONS:

Individuals with osteoarthritis may experience symptoms for several years before they obtain a physician diagnosis.

Health Rep. 2014 Sep 17;25(9):10-7.