

Research Highlights

Highlights from the latest articles in osteoarthritis



Exercise improves long-term outcomes in osteoarthritis

Evaluation of: Pisters MF, Veenhof C, Schellevis FG *et al.*: Exercise adherence improving long-term patient outcome in patients with osteoarthritis of the hip and/or knee. *Arthritis Care Res.* 62(8), 1087–1094 (2010).

It is well known that exercise therapy improves short-term pain and function in osteoarthritis (OA) of the knee and hip; however, the beneficial effects seem to decline over time. This is thought to be due to nonadherence of self-directed exercises after discharge from physical therapy classes. This study was designed to assess the effect of long-term adherence to exercise on outcomes in OA patients.

A total of 150 persons with American College of Rheumatology (ACR) criteria hip or knee OA attended a 3-month physical therapy class, after which they were followed up for 57 months, and advised to perform regular home exercises and maintain a more active lifestyle. Adherence to exercises and level of physical activity was

assessed by patient-recorded questionnaire, and pain and function were recorded using the Western Ontario and McMaster University Arthritis Index (WOMAC) questionnaire. Assessments were performed at 3, 15 and 60 months. At 15 and 60 months of follow-up, 44 and 30% of participants, respectively, were still performing the recommended exercises, and 29 and 30%, respectively, were adhering to the recommended activities.

Adherence to home exercises and being more physically active were associated with improvements in pain, physical performance, self-reported physical function and self-perceived effect. The analyses were not affected after adjustment for age, sex, recruitment method or duration of symptoms. Although self-reported questionnaires tend to overestimate adherence and are open to recall bias, exercise is a very safe and simple treatment option for OA patients. This study should encourage healthcare professionals to educate patients about the effectiveness of both short- and long-term regular exercise for OA of the knee and hip.

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Ultrasound is an effective technique for identifying erosions and inflammation in hand osteoarthritis

Evaluation of: Wittoek R, Carron P, Verbruggen G: Structural and inflammatory sonographic findings in erosive and non-erosive osteoarthritis of the interphalangeal finger joints. *Ann. Rheum. Dis.* (2010) (Epub ahead of print).

Erosive osteoarthritis (OA) is a subgroup of hand OA that has been associated with worse pain and function, which is traditionally

identified from classic radiograph changes. Ultrasound imaging, although having the limitation of being operator dependent, is a safe and rapid technique that is gaining increasing importance in the evaluation and assessment of OA, as it can assess both structural and inflammatory changes.

This study examined the role of ultrasound in detecting erosions in the interphalangeal joints of subjects with hand OA, as well as describing any associated inflammatory features.

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Ultrasound identified 94% of erosions demonstrated on radiographs, as well as identifying numerous other erosive joints not identified on radiographs. Gray-scale synovitis was noted in up to 16% of joints, significantly more commonly in erosive patients, particularly during the active erosive stage. Effusion was noted in just under half of all joints, whether erosive or not.

Although it has a relatively small sample size of 31 subjects, with only seven non-erosive 'control' patients, this study raises

two important points; it further confirms that ultrasound is more sensitive at detecting erosions than conventional radiographs and demonstrates that OA, both erosive and nonerosive, is an inflammatory disease with a high frequency of joint effusions. Although there are currently few treatments for hand OA, and no accepted disease-modifying treatments for hand OA as yet, identifying patients with active inflammation or who are at risk of aggressive erosive disease may allow better targeting of treatment in the future.

Bone marrow lesions may predict future joint replacement

Evaluation of: Tanamas SK, Wluka AE, Pelletier J-P *et al.*: Bone marrow lesions in people with knee osteoarthritis predict progression of disease and joint replacement: a longitudinal study. *Rheumatology (Oxford)* (2010) (Epub ahead of print).

Bone marrow lesions (BMLs) are areas of high signal within the subchondral bone, seen on MRI using fat-suppressed sequences, believed to represent areas of bone marrow fibrosis and necrosis, and trabecular structural remodeling. A recent study has suggested that these high-signal areas may represent more edema than was previously recognized [1]. Although not unique to osteoarthritis (OA), they are of great interest as they have been identified as being associated with both pain and structural progression (cartilage loss)

in OA. However, there is little information as to whether the presence of BMLs could predict a clinically important outcome, such as joint replacement, and how this relates to cartilage loss within the knee joint.

A total of 109 subjects with radiographic OA and knee pain underwent MRI of the knee at baseline and this was repeated in 88 participants approximately 2 years later. BMLs were measured in different sites of the knee and were graded using a semiquantitative scoring system, and cartilage volume was calculated using image-processing software. After 4 years, all participants were contacted to inquire if they had undergone joint replacement of the signal knee.

There was a significant association between the severity of BMLs at baseline and medial tibial, and total cartilage volume loss – confirming previous

findings – even after adjustment for age, gender, BMI and tibial alignment. Of the 109 participants, 16 had undergone knee replacement and this was associated with an increased BML score at baseline (odds ratio: 1.57, 95% CI: 1.04–2.35, $p = 0.03$). This association persisted after adjustment for baseline cartilage volume. Although the number of participants in this study who went on to require joint replacement is small, this paper further supports a role for BMLs in disease progression in OA with an important clinical end point. Larger studies will further confirm this.

Reference

- 1 Leydet-Quilici H, Le Corroller T, Bouvier C *et al.*: Advanced hip osteoarthritis: magnetic resonance imaging aspects and histopathology correlations. *Osteoarthritis Cartilage* (2010) (Epub ahead of print).

Bone marrow 'edema' lesions may represent true edema

Evaluation of: Leydet-Quilici H, Le Corroller T, Bouvier C *et al.*: Advanced hip osteoarthritis: magnetic resonance imaging aspects and histopathology correlations. *Osteoarthritis Cartilage* (2010) (Epub ahead of print).

Bone marrow lesions (BMLs) are an important treatment target in osteoarthritis as they are associated with both pain and progression of osteoarthritis, yet little is understood about their composition. Although they were believed to represent areas of bone marrow edema (due to their high signal on MRI), recent small histology studies have suggested

that the areas of BML correspond more closely to bone marrow necrosis, fibrosis and trabecular remodeling than to edema. This paper suggests that BMLs do indeed represent more edematous areas than was previously recognized. A total of 23 femoral heads were analyzed after surgery for total hip replacement. Coronal magnetic resonance (MR) images within 1 month

of surgery were used to identify the areas for histological examination. MR images were evaluated for areas of edematous or necrotic changes within the bone marrow, sclerosis, trabecular fractures or subchondral cysts. Histological evaluation assessed similar features within the areas of interest identified from the coronal MR images. The results demonstrated that areas on MR images suggestive of bone marrow

edema correlated well with histological findings of edema and, to a lesser degree, of vascular fibrosis. MR changes more suggestive of bone marrow necrosis were represented histologically by marrow necrosis and fibrosis. It is suggested that edema lesions may be 'early' BMLs that could then progress to necrosis and fibrosis. Further work incorporating micro-computerized tomography imaging would



improve the knowledge of the trabecular bone changes within and around BMLs – another potential structural target. It is crucial to fully understand the composition of BMLs so that future treatment options may be developed.