

Joint Distraction May Delay Knee Replacement

Device demonstrated ‘intrinsic tissue structure repair in OA.’

BY JEFFREY S. EISENBERG

FROM ANNALS OF THE RHEUMATIC DISEASES

Joint distraction can induce tissue structure modification in knee osteoarthritis, possibly reversing structural damage to cartilage tissue and delaying the need for knee replacement surgery

Endoprosthesis currently is the accepted method for treating pain caused by end-stage knee OA. However, the growing number of procedures carries a high price tag, and there is a higher risk of failure in patients aged younger than 65 years.

With that in mind, Dr. Femke Intema of the University Medical Center Utrecht (the Netherlands) and colleagues wanted to determine whether joint distraction could halt and possibly reverse joint degeneration in knee OA (*Ann. Rheum. Dis.* 2011;70:1441-6).

The study included 11 men and 9 women who had knee OA and in whom knee replacement surgery was indicated in 2006-2008. Patients were an average of 48 years old; 18 of them had predominant OA in the medial compartment; the remaining two had OA in the lateral compartment. Patients had a score of 60 mm or higher on the Visual Analogue Scale (VAS) of pain, as well as radiographic signs of joint damage, and primarily tibiofemoral OA.

Joint distraction was applied for 2 months via an external fixation frame. At the 1-year follow-up, researchers evaluated tissue structure modification according to the following:

► **Radiographic analysis.** This showed that the mean joint space width (JSW) of the most affected compartment increased from 2.7 mm to 3.6 mm between baseline and 12 months, whereas the minimum JSW increased from 1 mm to 1.9 mm.

► **Quantitative MRI analysis.** At 1 year, this showed an increase in the mean thickness of cartilage over total area of bone (ThCtAB) from 2.4 mm to 3 mm in the most affected compartment, and a decrease in mean percentage area of denuded bone (dABp) from 22% to 5%. The thickness of cartilage over area of bone covered with cartilage (ThCcAB), a secondary structural outcome parameter, showed a borderline increase from 2.9 mm to 3.1 mm.

► **Biomarker analysis on serum and urine samples.** These showed an 11% decrease of CTXII (a collagen type II breakdown marker), and a 103% increase in PILANP/CTXII (a collagen type II synthesis marker), between 6 and 12 months. These findings suggest a net increase in collagen synthesis, the researchers said.

The primary outcome parameter of this study was the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index questionnaire, which decreased from 55 points at baseline to 23 points at 1 year. In all, 18 of the 20 patients showed a greater-than-10% improvement, and 16 showed a greater-than-25% improvement. There were significant improvements in the individual components of the WOMAC index, namely pain, stiffness, and function.

One secondary measure, the VAS pain score, decreased from 73 mm at baseline to 31 mm at 1 year. Physical examination of the joint, which assessed crepitus, pain on palpation, pain with flexion, and joint effusion, showed improvement from 46% to 75%.



Knee distraction was applied for 2 months via an external fixation frame.

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VITALS

Major Finding: Joint distraction can induce tissue structure modification in knee osteoarthritis, as shown on radiography, MRI, and blood work, possibly delaying the need for endoprosthesis.

Data Source: An open, 1-year pilot study of 20 patients with tibiofemoral osteoarthritis who were treated surgically with joint distraction.

Disclosures: The authors had no relationships to disclose. The Dutch Arthritis Foundation provided financial support for this study.

“This study is the first to demonstrate intrinsic tissue structure repair in OA,” the researchers said. “Historically, the regenerative capacity of cartilage has been questioned owing to the slow turnover rate of cartilage matrix, especially of collagen. However, this study shows that a significant amount of cartilage tissue is formed within 1 year after the distraction, demonstrating that under certain conditions, cartilage has regenerative capacity.”

There is uncertainty as to the underlying mechanism of the structural repair that was seen in this study. One possibility is that temporary distraction prevents mechanical stress on the cartilage, prevents further wear and tear, and allows tissue repair to begin, the researchers said.

For now, the researchers are unsure which patients may benefit from this procedure, as the study included only those patients who were younger than 50 years, had severe OA, and were likely candidates for joint replacement surgery. Referrals from peripheral hospitals may have led to selection bias, the researchers said.

Safety concerns exist as well. Two patients developed lung emboli and required hospitalization and anticoagulative treatment. Also, 17 patients developed single or multiple pin-tract infections, all of which were successfully treated with antibiotics.

Larger and longer trials in a variety of OA populations are needed to optimize treatment, to determine which patients would benefit the most and for the longest period of time, and to pay attention to reducing the number of complications, according to Dr. Intema and associates. ■

MRI Poised to Boost Early Detection of Osteoarthritis

BY MITCHEL L. ZOLER

Magnetic resonance imaging has an increasingly important role in early detection and diagnosis of osteoarthritis, although for now it remains one of several diagnostic tools that also include x-rays, clinical findings, and lab results.

Physicians who treat patients with osteoarthritis (OA) need further research results to better clarify the best use of MRI in early OA detection, said Dr. Philip Conaghan, professor of musculoskeletal medicine at the University of Leeds (England).

In June, Dr. Conaghan and his colleagues on the OA Imaging Working Group for the Osteoarthritis Research Society International (OARSI) issued 11 propositions on using MRI to define OA – propositions that the group said need formal testing “regarding their diagnostic performance before they are more widely used” (*Osteoarthritis Cartilage* 2011;19:963-9).

The working group clearly endorsed

MRI, saying that “MRI may add to the diagnosis of OA and should be incorporated into the [American College of Rheumatology] diagnostic criteria,” but in the same proposition, the working group also reiterated the role of x-ray, clinical, and laboratory parameters. Other propositions caution that “no single MRI finding is diagnostic of MRI,” and that “certain MRI changes in isolation ... are not diagnostic of osteoarthritis.”

The working group’s propositions included two MRI-based definitions of OA, for the tibiofemoral form and for the patellofemoral type.

In a recent talk on MRI and OA, Dr. Conaghan stressed the potential that MRI holds for early OA detection. “We need to develop an early OA culture,” similar to what has emerged for rheumatoid arthritis, he said speaking in May at the annual European Congress of Rheumatology in London. “In OA, we need a culture of early intervention” that would rely on early detection, most likely using MRI.

“Clinical features may suffice at present” for early OA detection, but MRI offers the best individualized option for assessing cartilage, bone features, and possibly the meniscus, he said. Soluble biomarkers may be more feasible” than



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DR. CONAGHAN

MRI, but biomarkers need more development and for early detection are “not there yet.”

The sheer frequency of MRI lesions in OA patients may prove limiting. OA lesions appear more often on MRI than on x-rays. In five different reported series, the prevalence of cartilage defects visible by MRI in OA patients was 85%-98%,

and the prevalence of osteophytes was 70%-100%, Dr. Conaghan noted. Often the MRI changes appear with no radiographic change visible. Other MRI changes that look like promising OA markers are bone marrow lesions and bone shape.

The OARSI Working Group defined tibiofemoral OA by MRI as either both items from group A, or one group A item and at least two from group B. The group A diagnostic features are definite osteophyte formation and full-thickness cartilage loss. The group B items are a subchondral bone marrow lesion or cyst that is not associated with meniscal or ligamentous attachments; meniscal subluxation, maceration, or degenerative tear; partial-thickness cartilage loss; and bone attrition.

The working group’s definition of patellofemoral OA requires both a definitive osteophyte and partial- or full-thickness cartilage loss.

Dr. Conaghan said that he had no relevant disclosures. ■