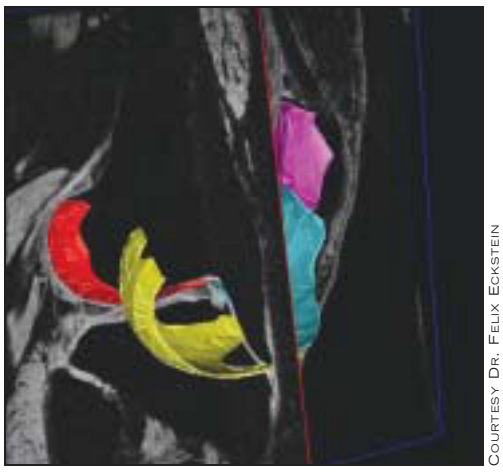
Joint Space Narrowing Predicts Cartilage Loss

BY HEIDI SPLETE
Senior Writer

Knees with joint space narrowing lost more cartilage over a year than did knees without joint space narrowing, based on imaging results from a study of 80 adults with knee osteoarthritis.

Previous research has shown that radiography can identify structural osteoarthritis changes in the knee. But whether knees with joint space narrowing (JSN) lose more cartilage than those without JSN over the long term remains unclear.

To evaluate the impact of JSN on cartilage loss, Dr. Felix Eckstein of Paracelsus Medical University in Salzburg, Austria, and colleagues reviewed imaging data from 32 men and 48 women with pain in both knees, medial JSN in one knee, and no (or less) JSN in the other knee (the "less-affected knee"). The patients were selected from the Osteoarthritis Initiative cohort; their average age was 61 years, and their average body mass index was 31 kg/m^2. JSN was defined using the OARSI (Osteoarthritis Research Society International) scale of grades 1-3. The patients' knees were evaluated using sagittal MRI when they enrolled in the study, and they were evaluated again after 1 year. Cartilage morphology was measured using quantitative image analysis tools.



COURTESY DR. FELIX ECKSTEIN

MRI shows full-thickness lesion in cartilage of the medial femoral condyle (yellow).

The results of the study were presented in September at OARSI's 2008 World Congress on Osteoarthritis in Rome.

Overall, the less-affected knees (with little or no JSN) showed little progression. In the medial tibia, there was little change for knees with no JSN (–1.0%) and a –3.9% change in the less-affected knees with JSN grade 1.

The average change in the tibia in the more-affected knees was –1.6% for the knees with a JSN grade of 1, –2.9% for the knees with a JSN grade of 2, and –6.9% for the knees with a JSN of 3.

When the medial femoral condyle measurements were separated into two parts—weight bearing and posterior—the rate of cartilage loss was greater in the weight bearing than in the posterior part; the tibia increased significantly with worse grades of JSN in the more severely affected knee. The standardized response mean (a measure of change) was significantly greater for JSN grades 3 and 2, compared with 1 for the weight-bearing femoral condyles.

Dr. Eckstein said that he was surprised by the results. "It was thought that subjects with no JSN or small grades of JSN have 'more' cartilage to lose than those at later stages, and would thus progress more rapidly," he said in an interview. "However, the results showed that the more JSN is present, the faster the cartilage loss occurs."

The take-home message for physicians is that the cartilage loss is very small in osteoarthritic knees without JSN. "When JSN starts, a vicious cycle of increasing cartilage loss is initiated," Dr. Eckstein said. The results also suggest that MRI-based measures of cartilage morphometry are particularly responsive at the later disease stages.

The findings should be confirmed in larger cohort studies, which will be possible in the future because the National Institutes of Health–sponsored Osteoarthritis Initiative has recruited almost 5,000 patients, Dr. Eckstein noted.

Dr. Eckstein is co-owner and CEO of Chondrometrics GmbH, a company that provides MR imaging analysis to the pharmaceutical industry and to other researchers.

He also provides consulting services to Merck Serono, Novo Nordisk, Wyeth, and Pfizer Inc., and has received funding from Eli Lilly & Co., Merck Serono, GlaxoSmithKline, Wyeth, and Pfizer.

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MINDFUL PRACTICE

Foot Orthotics for Patellofemoral Pain

BY JON O. EBBERT, M.D., AND ERIC G. TANGALOS, M.D.

The Problem

A 53-year-old physician presents to you for evaluation of a 1-month history of new-onset knee pain. She reports knee pain when walking up and down stairs on medical rounds and after prolonged sitting ("movie-goers sign"). She denies trauma, swelling, or previous history of knee surgery. On exam, she has no evidence of joint effusion but has tenderness along the patellar facets, a positive patellar apprehension test, and pain on squatting. You suspect patellofemoral pain (PFP) syndrome. Your traditional approach has been to prescribe a neoprene knee sleeve and a handout on exercises, but you are unfamiliar with the most recent evidence of effective treatments for PFP from randomized trials. Since your next patient has canceled, you have a few minutes to investigate what's new.

The Question

In patients with suspected patellofemoral pain syndrome, what interventions have been demonstrated to be more effective than usual care?

The Search

You log on to PubMed (www.pubmed.com) and use "patellofemoral pain syndrome" as your search term. You limit your results to randomized, controlled trials. You find a relevant study. (See box at right.)

Our Critique

This well-conducted study addresses a common complaint in clinical practice. Although excessive foot pronation, which has been implicated as a possible contributing factor to PFP, was not identified, this increases the generalizability of the findings to general practice, in which no reliable and reproducible technique is available to assess excessive foot pronation. Importantly, more than 80% of subjects in this study improved by 52 weeks, in contrast to 50% of patients followed for up to 4 years in a study of the clinical course of PFP. The take-home message from this study is that foot orthotics alone are not inferior to orthotics plus physical therapy, so we can prescribe the orthotics as initial management and make the expensive therapy referral if this approach fails.

Clinical Decision

After reviewing the information, you recommend off-the-shelf foot orthotics, the neoprene knee sleeve, and some stretching and strengthening exercises that you found on the Internet and printed out. You tell her to report back to you if she has not improved in 6 weeks, at which time you will refer her to physical therapy for evaluation and treatment. Four weeks later, she tells you that she has had significant improvement.

DR. EBBERT *and* DR. TANGALOS *are with the Mayo Clinic in Rochester, Minn. They have no conflict of interest to report. To respond to this column or suggest topics for consideration, write to Dr. Ebbert and Dr. Tangalos at our editorial offices or at imnews@elsevier.com.*

N. Collins, et al.
Foot orthoses and physiotherapy in the treatment of patellofemoral pain syndrome: Randomised clinical trial. BMJ 2008;337:a1735 (doi:10.1136/bmj.a1735).

► **Design and Setting:** Randomized, controlled clinical trial performed at a single center in Australia.

► **Subjects:** Subjects were 18-40 years old and had nontraumatic anterior or retropatellar knee pain of more than 6 weeks' duration provoked by common movements and equal to 30 mm on a 100-mm visual analog scale. Potential subjects were excluded if they had injury/pathology of other knee structures, prior treatment with foot orthoses, prior physiotherapy for PFP within 12 months, current use of anti-inflammatories or corticosteroids, or one of several other conditions.

► **Intervention:** Subjects attended six 20- to 60-minute appointments with a physiotherapist over 6 weeks. Subjects were randomized to four groups. The first group received prefabricated foot orthotics from Vasyli International (Orthaheel; www.vasyli.com/brands/orthaheel.html). Subjects in this group were also given a home exercise program of foot arch–forming exercises and weight-bearing calf stretches to be performed twice daily. The second group received flat inserts, a "control" orthotic with no varus wedge or built-in arch. The third underwent a physiotherapy program consisting of patellar mobilization, hamstring/hip stretching, patellar taping, and hip- and leg-muscle exercises. The fourth group received both foot orthotics and physiotherapy.

► **Outcomes:** Primary outcome measures included global improvement, severity of usual and worst pain over the preceding week, and score on an anterior knee pain scale. Secondary outcomes included assessments of function, pain, and physical activity. Outcomes were assessed at 6, 12, and 52 weeks.

► **Results:** A total of 179 subjects were enrolled. Subjects were similar at baseline. At 6 weeks, significant global improvement was observed with foot orthotics, compared with flat inserts, with treatment success rates of 85% for orthotics and 58% for flat inserts. At 6 and 12 weeks, no significant differences were observed between physiotherapy and foot orthotics, or between physiotherapy and combined physiotherapy/orthotics. Notably, over the 52 weeks of the study, all groups had clinically meaningful improvements in the worst pain severity, in anterior knee pain, and on the functional index. Three groups (orthotics, physiotherapy, and orthotics/physiotherapy) had meaningful improvements in usual pain severity. No significant differences were observed between the groups at 52 weeks.