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E-MRI – Exquisite Hyaline Cartilage Imaging

By Murray A. Reicher, M.D.

In 1983 when I began working to develop knee MRI as a diagnostic test, the initial main goal was to evaluate the menisci. Since then, MRI has become accepted not only as an accurate, non-invasive test for meniscal evaluation, but has also proven valuable in the assessment of many other conditions, including osteochondral injuries, loose bodies, ligament tears, cysts, masses, bone tumors, arthritis, synovial disorders, and more. Nevertheless, the main weakness of MRI has been the assessment of hyaline articular cartilage until the more recent advent of higher resolution imaging.

High-field E-MRI technology

While numerous techniques have been applied in attempting to visualize the hyaline articular cartilage accurately, the most critical factors remain:

- Maximum spatial resolution
  (thin slices, small pixels)
- Maximum contrast resolution
  (the ability to distinguish hyaline articular cartilage from neighboring structures and synovial fluid)
- Fast scanning
  (the ability to obtain highly detailed images before the patient moves even slightly)
- High signal : noise ratio
  (the ability to obtain a clear image, even while maximizing resolution and while obtaining T2-weighted scans essential for cartilage imaging)

These are precisely the technological strengths of the high-field E-MRI technology provided by RMG. Our E-MRI Scanners, available at our RMG San Clemente, Encinitas and San Diego locations, combine the required high field strength (1.5T) with new fast imaging techniques as well as dedicated surface coils for joint examinations.

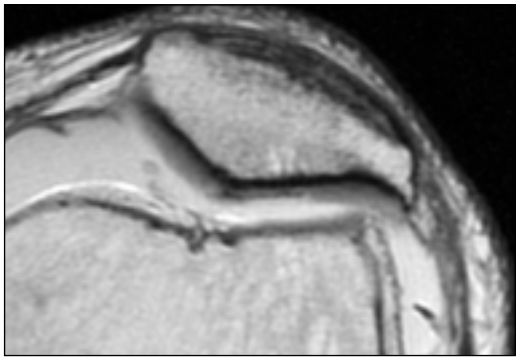
This ability to obtain very high resolution T2-weighted images quickly, comfortably, and with maximum signal : noise is a major advantage of E-MRI over other mid- to low-field strength or Open-type MRI in my view. What, after all, is more important to the patient than an accurate examination?

Common case findings

Let's examine some common findings on the routine images now obtained with E-MRI of the knee.

Patello-femoral chondromalacia:
Axial T2-weighted image with our routine fast technique shows a 4 mm fissure in the patellar hyaline cartilage.

Patellar osteoarthritis:
Cartilage along the lateral patellar facet is narrowed and there is a small osteophyte along the lateral margin of the patella.



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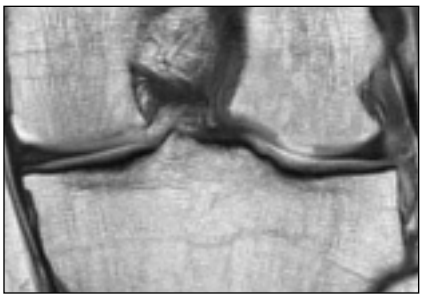
E-MRI – Superior Hyaline Cartilage Imaging:

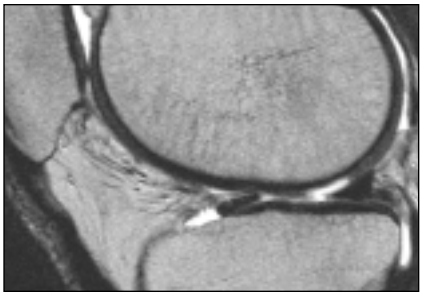
The image on the top is the standard image obtained to view the menisci, but the large erosion of the hyaline cartilage of the medial femoral condyle is only revealed on the image on the bottom, a fast T2-weighted scan performed as part of our routine knee examination.

E-MRI – Cartilage Imaging Made Easy:

Can you spot the defect in the hyaline cartilage of the lateral femoral condyle? With high-field, high resolution E-MRI, it's easy!

A high-field strength scanner is required to maximize the image quality when obtaining the fast T2-weighted images.





Summary

E-MRI enables routine high resolution T2-weighted imaging that is essential to accurately diagnose cartilage abnormalities sometimes missed on other MRI exams. We employ E-MRI at RMG because we strive to provide the most accurate examination possible for all imaging exams.

If you have any questions please call Radiology Medical Group at (619) 849-XRAY (9729) or (949) 493-8799 or visit our website at www.rmgimaging.com.