

Breaking New Ground in Detecting Early Cartilage Degeneration

MR imaging continues to change sports medicine. High-resolution imaging capabilities coupled with advancements in T2 mapping is opening new doors in musculoskeletal imaging and related orthopedic therapy.

At Mercy Hospital Anderson, William Strub, MD, has seen first-hand the benefit of T2 mapping with the GE Healthcare Signa HDx 1.5T MR and the CartiGram application. "I can see things that I couldn't see before, namely the earliest changes in cartilage degeneration." With CartiGram, Dr. Strub can see the breakdown of cartilage even before there is any change to cartilage thickness.

"Normal cartilage is tightly bound together. When cartilage is damaged, it shows its earliest changes by taking on water," he explains. "T2 mapping with Cartigram picks up the change in signal at this early stage, before the cartilage begins to fragment and breakdown."

The implication of this new capability, in Dr. Strub's opinion, is nothing short of groundbreaking. Identifying cartilage degeneration at an early stage opens new possibilities for extending the applications of current therapies used to treat cartilage damage such as:

- Osteochondral grafting;
- Chondrocyte transplantation; and
- "Microfracture" technique.

Early identification may help the patient benefit from these therapies, notes Dr. Strub. Plus, early detection before cartilage breakdown may potentially prevent irreversible osteoarthritis, although more long-term data and clinical studies are needed to support this. "The CartiGram sequence could also be used to help monitor treatment outcomes," adds Dr. Strub.

Since the application is quick and easy to use, Dr. Strub routinely performs the study on all joint and sports-related injury MR scans. "It takes just a couple of extra minutes to get this invaluable information."





Dr. William M. Strub

William M. Strub, MD, is a staff radiologist at Mercy Hospital Anderson. He graduated Summa Cum Laude with a BA in Chemistry from Saint Louis University and received his doctorate in medicine from the University of Cincinnati College of Medicine. Dr. Strub completed a one-year residency in internal medicine at The Christ Hospital (Cincinnati), where he was voted Intern of the Year from 2001-2002, followed by a residency in diagnostic radiology, including Chief Resident Diagnostic Radiology from 2005-2006, and a body imaging fellowship from The University Hospital (Cincinnati). He has received several honors and awards, including Cum Laude Award for a poster presentation at RSNA 2006 and the RSNA Roentgen Resident Research Award in 2005.



About the facility

Mercy Health Partners (MHP) Southwest Ohio is based in Cincinnati, OH and serves the community through five acute care hospitals and six long-term care campuses that offer a range of services, from skilled nursing to independent living. In 2007, Mercy Health Partners – Southwest Ohio Region was named one of the nation’s 100 Most Wired Healthcare Organizations by Hospitals & Health Networks, the journal of the American Hospital Association.

For three consecutive years beginning in 2006, Mercy Hospital Anderson was named to Solucient’s annual list of the nation’s 100 Top Hospitals and received three-year approval with commendation from the American College of Surgeons’ Commission on Cancer, including recipient of its 2005 Commission on Cancer Outstanding Achievement Award.

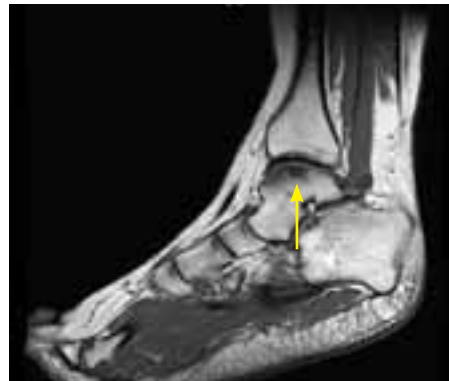
All images courtesy of Mercy Hospital Anderson

Clinical Case

A 30 year-old athletic female was referred for an MRI scan for persistent, chronic ankle pain that was not responsive to conservative treatment. Prior plain (X-ray) films, taken six months earlier, showed no abnormalities or fractures.

MR Acquisition Protocol

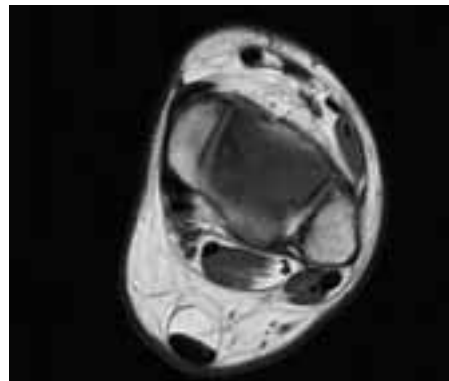
Non-contrast MR was obtained with a Signa HDx 1.5T system using the CartiGram T2 mapping sequence as part of the routine protocol.



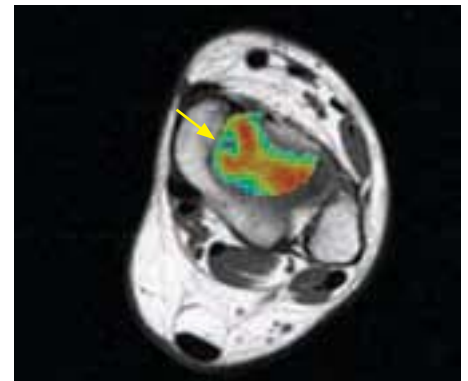
T1 sagittal without CartiGram. Traditional MR sequence showed only a bone bruise (arrow).



Sagittal MR of the ankle obtained using CartiGram. Cartilage damage visible (blue green, small arrow) overlying the bone bruise (large arrow).



T1 axial without CartiGram.



Axial image through the same cartilage injury at the tibial-talar joint. Arrow denotes the focal cartilage injury (blue green) in the normal appearing cartilage (red).

Conclusion

The CartiGram sequence has the ability to provide additional diagnostic information about potential causes of a patient’s pain that may not be readily visible on traditional MRI sequences. When implemented in musculoskeletal imaging protocols, CartiGram can help detect changes in their earliest form, helping physicians provide the most comprehensive treatment plan for the patient. ■