3-D MRI helps kids with ACL tears -- surgery without harming the growth plate

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Surgery has not been an option in the past for children with ACL tears because of the possible damage to the growth plate that can cause serious problems later in life.

With this new technology, surgeons can actually see from one point to the other on either side of the knee, and can safely position the tunnels where they will place the new ligament.

John Xerogeanes, MD, chief of the Emory Sports Medicine Center, and colleagues in the laboratory of Allen R. Tannenbaum, PhD, professor in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, have developed 3-D MRI technology that allows surgeons to pre-operatively plan and perform anatomic anterior cruciate ligament (ACL) surgery.

ACL tears are one of the most common injuries in children who participate in sports including football, basketball, soccer and gymnastics. Traditional treatment for ACL injuries in kids has been rehabilitation, wearing a brace and staying out of athletics until the child stops growing - usually in the mid-teens - and ACL reconstruction surgery could then safely be performed.

“The problem with doing surgery on a young child is that if you damage the growth plate, you can cause a growth disturbance,” says Xerogeanes, an associate professor in the Department of Orthopaedics at Emory University School of Medicine.

The ACL is one of the four major ligaments in the knee, somewhat like a rubber band, attached at two points to keep the knee stable. In order to replace the ligament, surgeons create a tunnel in the upper and lower knee bones (femur and tibia), slide the new ACL between those two tunnels and attach it at both ends. (The new ligament is typically taken from either a hamstring tendon or allograft tissue, which is donor material.)

Xerogeanes explains that prior to using the 3-D MRI technology, ACL operationswere conducted with extensive use of X-Rays in the operating room, and left too much to chance when working around growth plates.

With this new technology, surgeons can actually see from one point to the other on either side of the knee, and can correctly position the tunnels where they will place the new ligament. The surgery can be done in less time than the traditional surgery, and with confidence that the growth plates in young patients will not be damaged.

Kids who undergo this type of operation will still have at least one year of recovery time, advises Xerogeanes. The good news is that it does allow them to eventually pursue normal activity.

Xerogeanes and his colleagues at Emory are performing the anatomic ACL reconstruction technique on adult patients as well as pediatric patients. He hopes that another advantage of this new anatomical procedure will be that it helps prevent re-injury in the future for all athletes who have suffered from ACL tears.

Provided by Emory University

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