

ACL Injuries in Skeletally Immature Athletes

In both the medical and lay press, much has been written about athletic knee injuries in adults. Most of us have at least some familiarity with tears of the anterior cruciate ligament (ACL) and how they affect the season, and sometimes the career of professional, collegiate or local high school athletes. Newspapers often quote team physicians and include reports of MRI results after a professional or other high-profile athlete suffers a knee injury. Many ski vacations have been cut short by a bad fall and subsequent visit to an orthopedic surgeon back home, resulting in a diagnosis of ACL tear. Fortunately, the orthopedic community has extensive collective experience in treating this problem - patterns of injury are understood, the natural history is well defined and surgical techniques continue to be perfected. Despite some ongoing controversy regarding the technical aspects of the surgical reconstruction, most patients who suffer an ACL injury have a predictable outcome from surgery or learn to maximize their function without surgery.

Only recently, however, have surgeons begun to fully understand the nature of ACL injuries in skeletally immature athletes. Specialized study of ligament injuries in children is necessary because of the unique biology of growing bones and ligaments. Longitudinal growth in the child takes place at the ends of the long bones, with particularly rapid growth occurring around the knee at the end of the femur (thigh bone) and top of the tibia (shin bone). Growth plates (where growth occurs) are comprised of a sliver of specialized cartilage through a cross section of these bones near each joint. The bones literally increase in length and grow away from these areas. ACL surgery presents unique issues in adolescent or skeletally immature athletes because the reconstructive surgery involves drilling tunnels across the growth plates and placing a graft (replacement ligament) into the knee joint through these tunnels.

In adults, who have completed skeletal growth, the passage of the graft does not affect the growth plates adversely as they have already closed and growth has ended. In children, however, this part of the surgery can theoretically injure the growth plates, resulting in a shortened or angulated leg compared to the opposite limb that continues to grow normally. The degree of the deformity depends upon the extent of injury

to the growth plate and the amount of growth remaining. In other words, if damage to the growth plate occurs, younger patients are at risk for greater degrees of growth disturbance.

Your child's orthopedic surgeon will take all of these biologic issues into consideration when counseling him or her on treatment options for an injured knee. Several variations on traditional surgical techniques have been devised in an attempt to minimize disruption of the growth plates during surgery. While no surgery is risk-free, choosing the proper technique to reconstruct the ligament at the appropriate time in the child's growth curve should lead to predictable results in treating ACL injuries.

A history of a twisting injury associated with an audible "pop" followed by swelling of the knee raises suspicion for a ligament tear. When visiting an orthopedic surgeon for a knee injury, your young athlete should expect a thorough examination of the knee followed by x-rays and, if there is suspicion of an ACL tear, a referral for an MRI study to verify the diagnosis.

Once the diagnosis is confirmed, then the process of decision-making begins. It is very important that the treating physician have significant experience in treating ACL injuries in immature athletes. As outlined above, your physician will help you to assess the risks and benefits of the various treatment options for a torn ACL. The major decision point revolves around conservative treatment, including supportive exercise and activity modification, versus surgical reconstruction. This is a decision that must be made by the patient, parents and physician together as the treatment depends very much on the young athlete's age, biology, goals, motivation and education.

Source: SCOI