

## **ACL Injuries in Children and Adolescents**

It has frequently been emphasized that children are not simply "small adults". They are different anatomically and physiologically in many ways. Knee injuries in children and adolescents frequently demonstrate these differences.

The primary difference between the adult knee and the child's knee is the growth center or epiphysis. These are regions in the end of the femur and tibia on both sides of the knee that provide most of the growth of the leg. They are usually the weakest part of the knee. The same injury pattern that would tear a ligament or cartilage in the mature knee is much more likely to fracture the bones through the growth center in the child.

"Adult" type of the knee injuries can, however, occur in the child. Anterior cruciate ligament tears, once thought to be extremely rare in children, are receiving more attention in recent years. It is unknown whether or not the rise in the number of reported tears recently are related to increased awareness by physicians, better diagnostic techniques, such as MRI and arthroscopy, or that possibly more kids are involved in competitive sports. ACL tears have been reported in children as young as two years of age. The true incidence of ACL tears in the pediatric population is unknown, but some studies report a tear in as many as 50% of children with blood in their knees after an injury.

The treatment of ACL tears in the young, athletic, skeletally mature (adult) knee is usually reconstruction. A tendon is usually taken from another part of the body and used to rebuild the torn ligament. Simple repair of the torn ends usually fails. Non-operative treatment with braces and exercise usually fails. These patients frequently have "giving way" episodes with tearing of other structures, usually meniscal cartilages. This may lead to premature arthritis later in life. This reconstructive procedure usually involves placing the tendon graft through drill holes in the femur and tibia.

Unfortunately, the growth centers in the knee are directly in the path of these drill holes, screws, and staples. It has been shown that standard reconstruction in the growing child or adolescent may cause a growth abnormality leading to leg length inequality, or to angulatory deformity at the knee. The younger the child, the greater the chance of deformity, and the more severe the deformity is likely to be.

As a result, non-operative treatment is usually suggested initially. This usually involves bracing and strengthening exercises. The results are generally poor. A temporary change in activity level or sport may also be indicated. Sports that involve sharp cutting and sudden change of direction, such as basketball and soccer, may have to be put on hold

until the injured knee can be properly repaired. There is a high incidence of instability, meniscal tears, and a significant change in activity level.

If conservative management fails, surgical options can be considered. The patient and family must be aware of the complications noted above. If the adolescent is within a year or two of skeletal maturity, most physicians feel the risks are small, and a standard ACL reconstruction is usually performed. In the younger child, alternative techniques have been developed recently to try to lessen the possibilities of growth arrest. These techniques involve placing the graft in a non-anatomic position, or one that does not quite duplicate normal ligament function. This is done by either drilling holes that go around rather than through the growth centers, or by avoiding holes altogether, and wrapping the graft around the bone. Growth abnormalities can still occur, but the incidence is much less than with standard techniques. These procedures are designed to be a temporary measure to control symptoms until maturity, when a traditional reconstruction can be done. The results of these procedures have been surprisingly good, with many children returning to sports and not needing a later procedure.

In summary, the anterior cruciate ligament can be torn in growing children. The incidence is higher than previously believed. Choosing the best treatment is much more difficult than in the adult. While growth abnormalities can be serious after surgical repair, their incidence is fairly low. With newer surgical techniques, good results are possible.

*Consult your primary care physician for more serious injuries that do not respond to basic first aid. As an added resource, the staff at Children's Sports Medicine is available to diagnose and treat sports-related injuries for youth or adolescent athletes. Services are now available in four locations, to make an appointment, call 614-355-6000.*