Anterior cruciate ligament (ACL) injury in the skeletally immature individual is being recognized with increasing frequency. Historically, nonoperative treatment of midsubstance ACL injuries in skeletally immature individuals has not been favorable. Despite many reports of successful ACL reconstruction, many orthopaedic surgeons are still reluctant to perform ACL reconstructive procedures in the skeletally immature individual because of clinical reports of subsequent growth abnormalities and a general lack of understanding regarding the physiologic consequences of ACL reconstruction in these patients.

There were no significant differences in femoral longitudinal growth; however, tibial growth was significantly greater on the experimental side relative to controls (P = .001). Angular and rotational deformities were noted on the femoral side but not on the tibial side. The epiphyseal technique resulted in less angular deformity and most closely maintained the anatomic position of the ACL graft with growth; however, this technique exhibited increased femoral rotational deformity. All techniques exhibited a high rate of graft failure. Magnetic resonance imaging revealed chondral and subchondral injuries to the lateral femoral condyle, most frequently in the epiphyseal group.

From the results of our study, we cannot advocate any single femoral reconstructive technique. An epiphyseal femoral technique may reduce the risk of angular deformity and allow a more optimal femoral graft position after growth as opposed to transphyseal and over-the-top techniques. However, the epiphyseal technique may possess an increased risk for rotational deformity, physeal injury, and articular surface injury.