Outcome Measurement Tools for ACL Reconstruction: We Must Do Better

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Anterior cruciate ligament (ACL) reconstruction is one of the most common elective orthopedic procedures performed in this country. Patients who undergo this surgery are generally younger. Anterior cruciate ligament reconstruction, even in the skeletally immature, is performed at well-established sports medicine centers to which ACL-injured patients gravitate because of word of mouth.

Looking critically at our outcomes in these young patients can be humbling to an ACL surgeon and father of 3 soccer players like myself. Only 50% to 70% of patients return to their previous level of sports intensity/exposure and performance as a high school, collegiate, or professional athlete. In female soccer players who return to their previous sports level, the chance of further surgery on the same knee or rupture of the contralateral ACL can be as high as 20% within the first 2 years. The higher up the food chain (ie, the professional athlete), the more humble pie the ACL surgeon must eat. For the truly elite-level athlete, the ACL-repaired knee may simply never return to the same pre-injury level of performance. It is often the beginning of the end of their athletic career.

When we follow these patients for up to 10 years, it becomes even more concerning: studies have shown that 10 years after ACL surgery, >50% of patients have radiographic evidence of arthritis. This has led some surgeons to state that we will simply “fix” their ACL, which enables them to return to sports in some fashion and also progressively ruins their knee.

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The tools we currently use to measure outcomes after ACL surgery are rudimentary at best. Many were developed long before the concept of anatomic ACL surgery was popularized and recommended in the past 5 years. Recently developed, more specific kinematic analysis tools make it clear that traditional nonanatomic tibial tunnel-based ACL reconstruction techniques do nothing to prevent the irreversible development of osteoarthritis after “successful” ACL surgery. Our current ability to reproduce normal kinematics after “successful” ACL surgery is simply a dream. This should alert all ACL surgeons to the fact that we have much more to learn about the ACL-injured patient and the individual differences between patient injury patterns, treatment variation with respect to technique (single bundle/double bundle, graft selection), rehabilitation, and return to play timing. To make positive changes in our treatment algorithm for each of these variables, we need better outcome measurement tools to help us understand how to improve on our overall results. The appropriate use of these tools is equally important.

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A currently used ACL surgery outcome measurement tool that is often required for publication is the International Knee Documentation Committee knee ligament outcome guide. It suggests that joint laxity—such as the pivot shift, which is examiner- and patient-dependent with great variability—Lachman, and KT-1000 arthrometer tests be reported as normal, nearly normal, abnormal, or severely abnormal in comparison to the contralateral normal knee. However, when results are reported in a peer-reviewed publication, normal and nearly normal outcomes are often combined into a single group. This implies that nearly normal is good enough. But is nearly normal what we as ACL surgeons should be striving for? Most parents of ACL-injured athletes have their sights set on normal when you take their child to surgery. They do not sign a consent for nearly normal. We as surgeons should raise our expectations and never lose sight of the goal of a normal knee after ACL injury and reconstruction. To reach this goal, we need more precise measurement instruments. These may include better and easier-to-use kinematic instrument tools, as well as 3-dimensional magnetic resonance imaging articular cartilage mapping. Once we have these tools at our disposal, we must be willing to change what we are doing based on our objective results.

In the early 1990s, we switched from an open 2-incision ACL reconstruction technique to an all-endoscopic tibial tunnel-based ACL reconstruction technique. Looking critically at native ACL insertion site anatomy, we went from being relatively anatomic to being nonanatomic. Many studies were published in peer-reviewed journals that showed no difference between the 2 techniques, or even showed improved results in the nonanatomic surgery because the patient had smaller incisions. If we had at our disposal better outcome measurement tools to compare these 2 techniques, would we have continued to perform nonanatomic ACL surgery over the past 20 to 30 years with outcomes at their current levels? We must be motivated to improve on our overall outcomes. We must not repeat the mistakes of the early 1990s. The only way we can do this is to develop more objective, precise measurement tools.

More than 4 years ago, after 13 years in practice, I completely changed the way I perform ACL surgery. This was very hard to do and had a learning curve attached to it. Surgery today is more difficult in terms of precision and length of time; however, the switch from nonanatomic to anatomic is required. All surgeons must be willing to change what they have been doing if the outcome measurement tools lead us in that direction.