Classifying GBL by Both Severity and Attrition

Written by Jill Shuman

Although the common location of the glenoid bone defect has been identified [Saito H et al. *Am J Sports Med* 2005], it is a challenge to manage patients with glenoid instability because the degree of glenoid bone loss (GBL) varies. There are many types of GBL, ranging from acute fracture to complete resorption.

Matthew T. Provencher, MD, Massachusetts General Hospital, Boston, Massachusetts, USA, discussed a trial of 140 patients designed to (1) quantify GBL as well as attritional bone loss in recurrent anterior stability, (2) determine how much bone loss is remaining to repair the glenoid, and (3) determine the associations of demographic factors with GBL and attritional mass.

Patients aged 18 to 65 years with Hill-Sachs lesions 5%, GBL > 5%, and skeletal maturity met the inclusion criteria. Patients with posterior instability, multidirectional instability, history of prior anterior shoulder stabilization surgery, and Samilson grade 2 glenohumeral arthritis or higher were excluded from the study. All patients had histories of recurrent anterior instability and underwent preoperative 3-dimensional computed tomography (CT) scanning with reconstruction.

The researchers performed a digital analysis to determine the amount of GBL on the basis of surface area and then evaluated the amount of bone that could be replaced to repair the glenoid defect. The patients were stratified by percentage of attritional bone loss. Type 1 was defined as minimal attritional (< 34% attrition; n = 12 [9% of total]), type 2 as partial attritional (34%–67% attrition; n = 42 [30% of total]), and type 3 as severe attritional (> 67% attrition; n = 86 [61% of total]) bone loss. The researchers then looked at multiple predictors of instability recurrence, such as age, number of instability events prior to the first CT, and time elapsed between the first instability event and CT.

Dr. Provencher then reviewed the results of the study. The mean total GBL was the same for all types of attrition and differed only by the amount of bone remaining to repair the glenoid. There was no significant difference (p for trend = .09) in type of attritional loss by age, although the trend was toward more acute glenoid fractures in younger patients with type 1 defects. More instability events resulted in greater attritional loss of the glenoid bone. The mean total time of instability was notable in that there was greater attritional loss in patients with longer periods from the initial instability event. Attritional loss increased after 1 year, with greater loss up to 2 years after the initial event. Of the 140 patients studied, mean GBL was 16%, with an attritional amount of 72%, meaning that 28% of bone fragment remained. These findings suggest that in the majority of patients in this cohort, there was insufficient bone to reconstruct the native glenoid.

According to Dr. Provencher, these findings support the work of others showing that age at first dislocation and the number of dislocations are the strongest predictors of GBL in anterior shoulder instability [Milano G et al. *Am J Sports Med* 2011].

Tunnel Motion Greater With Bone–Patellar Tendon–Bone Anterior Cruciate Ligament Autografts

Written by Nicola Parry

James N. Irvine, Jr, MD, University of Pittsburgh, Pittsburgh, Pennsylvania, USA, presented data from a study that was conducted to analyze *in vivo* human anterior cruciate ligament (ACL) graft motion during activities of daily living in patients who had received bone–patellar tendon–bone (BTB) or hamstring (HS) autografts. The results showed that BTB autografts have more femoral tunnel motion than HS autografts 6 weeks after ACL reconstruction.

Graft type is one of numerous surgical variables that influences graft-tunnel healing following ACL reconstruction. However, the optimal choice of graft remains controversial because of a lack of evidence-based consensus available to guide surgeons' decision making. According to Dr. Irvine, although clinical and kinematic outcomes of BTB and HS autografts are similar, data from animal studies have suggested that their healing processes may differ.

With this in mind, Dr. Irvine and colleagues conducted a prospective study to compare postoperative BTB and HS graft motion within the femoral and tibial tunnels and the intra-articular graft. They hypothesized that BTB autografts would have less intraosseous tunnel motion, greater midsubstance strain, and less anterior tibial translation than HS autografts at 6 weeks following ACL reconstruction as a result of faster osteointegration.

The study included 12 patients (ages 16 to 37 years; mean age, 24 years) who received BTB (n = 6) or HS (n = 6) autografts. A single surgeon performed anatomic single-bundle ACL reconstruction through a medial portal with the same technique for ACL tunnel placement and used suspensory fixation in all cases. Outcome measurements included graft motion within bone tunnels, midsubstance ACL strain, and knee kinematics at 6 weeks postoperatively.