

0-4 mm). No patient had undergone or had revision surgery planned at the latest follow-up. We conclude that quadriceps tendon allograft is a suitable graft source for ACL reconstruction.

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Arthroscopic Anterior Cruciate Ligament Reconstruction With Quadriceps Tendon Autograft—Minimal 4-Year Follow-up (SS-14)

Surgical reconstruction of the anterior cruciate ligament (ACL) is indicated in the ACL-deficient knee with symptomatic instability and multiple ligaments injuries. In the present study, we describe the clinical results of quadriceps tendon-patellar bone autograft for ACL reconstruction. From 1996 to 1998, the graft has been used in 38 patients. Thirty-four patients with complete final follow-up for minimal 4 years were analyzed. The average follow-up time was 62 (48 to 84) months. Thirty-two (94%) patients achieved good or excellent results by Lysholm knee rating. Twenty-six (76%) patients could return to moderate or strenuous activity after reconstruction. Twenty-eight (82%) patients had ligament laxity of less than 2 mm. Finally, thirty-one (91%) patients were assessed as normal or nearly normal rating by IKDC guideline. Twenty-five (73%) patients had less than 10 mm difference in thigh girth between their reconstructed and normal limbs. Thirty-two (94%) and Thirty-one (91%) patients could achieve recovery of the extensor and flexor muscle strength in the reconstructed knee to 80% or more of normal knee strength respectively. A statistically significant difference exists in thigh girth difference, extensor strength ratio, and flexor strength ratio before and after reconstruction. Our study revealed satisfactory clinical subjective and objective results at minimal 4 years follow-up. Quadriceps tendon autograft has the advantage of being self-available, relatively easier arthroscopic technique, and having a suitable size, making it an acceptable graft choice for ACL reconstruction. There is little quadriceps muscle strength inhibition after quadriceps harvest. There is quicker return to sports with aggressive rehabilitation. A quadriceps tendon-patellar autograft is a reasonable adequate graft choice to ACL reconstruction.

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Quadriceps Tendon Anterior Cruciate Ligament Reconstruction (SS-15)

From April 1996 to August 2001, 302 patients underwent ACL reconstruction using a central quadriceps tendon autograft with a bone plug and bioabsorbable interfer-

ence screw fixation. Fifty-seven patients were available for long-term follow-up. Associated injuries were 20 medial meniscal tears, 29 lateral meniscal tears, and 8 significant (grad 2 or higher) articular cartilage injuries. At an average follow-up of 44.4 months (range 8 to 101 months), patients were assessed for ROM, stability, swelling and pain. KT values were 0.3 mm/47 patients, 3-5 mm/5 patients, 5-10 mm/5 patients and >10 mm/0 patients. Average KT value was 1.04 mm. Five patients had pain at final follow-up while one patient had an effusion. Fifty-four patients lost 0°-3° of extension and four lost 3°-5° of extension. No patient lost more than 5° of extension. No arthrofibrosis was seen in the 54 patients in the 0°-3° extension loss group, 3 patients in the 3°-5° extension loss group, and no patients in the over 5° extension loss group. IKDC scores at follow-up were 31 normal, 16 nearly normal, 8 abnormal, and 2 severely abnormal. There was no donor site morbidity. Good and excellent results were obtained in 55 or 57 patients. We feel that the central quadriceps tendon graft offers an excellent reconstruction option which yields excellent results and stability equal to bone-patellar tendon-bone graft. Patient satisfaction was very high.

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Residual Pivot Shift After Anterior Cruciate Ligament Reconstruction Using Quadriceps Tendon Autograft (SS-16)

This retrospective study was performed to determine the clinical significance and the causes of residual pivot shift after ACL reconstruction using central quadriceps tendon autograft. Methods: 93 knees of 92 patients who underwent an arthroscopic ACL reconstruction using quadriceps tendon autograft were reviewed with a minimum two years of follow-up. Clinical results were evaluated by Lysholm score and Cybex dynamometer. Anterior laxity was assessed using KT-2000 arthrometer. Patients were classified into three groups by postoperative pivot shift and Lachman test; Group 1 (all negative), Group 2 (negative in Lachman and positive pivot shift), Group 3 (all positive). The radiographic analysis was performed by 1) the angle between tibial and femoral tunnel on plain A-P image, 2) the angle between tibial tunnel and anterior tibial cortex on lateral image, 3) the femoral and tibial tunnel location using Aglietti method. Postoperative knee MRIs were obtained and 1) the angle between joint line and the graft on sagittal and oblique coronal view, 2) the angle between Leo's line and femoral tunnel on axial view were measured. Results: The number of patients in each group was 75, 8, and 10 respectively. Patients in group 1 showed greatest im-

provement in Lysholm score among groups, and patients in group 3 experienced greatest side-to-side difference by KT-2000 arthrometer. Radiological study showed that the angle between Leo's line and femoral tunnel in MRI axial view was greatest in group 1 ($P \leq .05$) and the angle between joint line and the graft on oblique coronal view was greatest in group 3 ($P \leq .05$). Conclusions: This study suggests that the postoperative symptoms are related to Pivot shift rather than the results of Lachman test, and the residual Pivot shift is related to the vertical placement of the reconstructed ligament in coronal plane.

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The Technique of Suprascapular Nerve Block for Shoulder Arthroscopy (SS-17)

The suprascapular nerve originates from the C5 and C6 nerve roots of the upper trunk of the brachial plexus with a contribution from C4 usually present as well. The suprascapular nerve descends posteriorly, passing through the scapular notch and innervating the supraspinatus muscle and more distally the infraspinatus muscle. It also gives off sensory branches to the shoulder joint. Blocking this nerve prior to shoulder arthroscopy provides preemptive anesthesia and can decrease the postoperative pain. The technique for this block is straightforward. Palpate the "soft spot" medial to the junction of the scapular spine and clavicle. This is at the area of the Neviasser portal. Insert the needle at this site and angled toward the coracoid process. At a depth of about 3 to 4 centimeters, the needle will strike the body of the scapula. Probe with the needle anteriorly until the scapula is no longer felt. Then move the needle back posteriorly until the bone is felt again. This is the area at the base of the coracoid where the suprascapular nerve is located. Flood this area with anesthetic to block the nerve. The procedure code used is 64418-59. This simple technique has been used clinically for over one year with consistently good results. Postoperative medication requirements are reduced and patients leave the surgery center in less time. The technique will be demonstrated.

F. Alan Barber, M.D.

Arthroscopic Release of the Long Head of the Biceps Tendon (SS-18)

Treatment of chronic biceps disorders remains controversial as is its biomechanical role. The literature supports the position that the sole function of the biceps is at the elbow with no significant shoulder related activity.

Gowan reported that the biceps acts to control the elbow without a significant effect at the shoulder in *Am J Sports Med* in 1987. It has been demonstrated to be a weak humeral head depressor which increases in importance with rotator cuff tears. Flatow reported the role of the long head of the biceps tendon as a restraint to superior migration of the humeral head particularly with a rotator cuff tear. Gill, Hawkins, et al., reported a study consisting of 30 patients with arthroscopic release of the long head of the biceps tendon with an average follow-up of 1.5 years. Their patients had an average ASES score of 81.8. They reported 13% poor results. In this study we evaluated clinical and functional outcomes in patients who underwent arthroscopic release of the long head of the biceps. Our hypothesis was that in specific cases where all other pathologies have been ruled out, the site specific release of the long head of the biceps may yield relief of pain and symptoms. 54 patients were diagnosed with biceps disorders over two-years. Arthroscopic release of the biceps long head was either isolated or part of another shoulder procedure. 40 patients were available for follow-up at a minimum of two years. Patients were not excluded for concomitant pathology. Nine of the 40 patients had an isolated arthroscopic release of the long head of the biceps tendon. All patients were examined by one surgeon different than the operating surgeon. Outcome evaluation included the ASES, UCLA, and L'Insalata questionnaires. The following disorders of the long head of the biceps were found: mechanical symptoms including incarceration, chondromalacia of the humeral head from the long head of the biceps tendon, biceps tendinitis, instability of the long head of the biceps, partial tears of the long head of the biceps, tearing of the subscapularis with dislocation of the long head of the biceps tendon. The results of the 40 patients were evaluated at 2.7 years postoperatively (range 24-42 months) with an average L'Insalata score of 77.6, UCLA 27.6, and ASES of 77.6. 82.7% of males had a cosmetic deformity (positive Popeye sign) while 36.4% of females demonstrated a positive Popeye sign. Side to side strength difference was checked curling a 5-lb dumbbell counting reps until fatigue. No patients reported arm pain at rest either distally or proximally. Based on our findings arthroscopic release of the long head of the biceps is an appropriate and reliable intervention for patients with chronic, refractory biceps tendinitis. Cosmetic deformity presenting as a positive Popeye sign and fatigue discomfort during biceps curls were the primary complaints. Although this is not a perfect solution it appears to be an acceptable surgical intervention especially in the light of the decrease in the incidence of rest pain when compared to tenodesis (reported between 10% and 30%).