

revision multi-ligament reconstruction, and (2) assess clinical outcomes of this algorithm at a minimum of two years after surgery.

Methods: We identified patients from our prospective multi-ligament database that underwent revision of multi-ligament reconstruction between 1992-2013 for persistent instability after failed primary reconstruction and/or repair. Patient demographic information (age, gender, BMI), injury description (mechanism of injury, neurovascular status, specific ligaments injured, associated chondral or meniscal injury), surgical technique (repair vs. reconstruction, staged vs. non-staged, concomitant procedures), mechanism of failure, as well as IKDC and Lysholm scores were obtained.

Results: The cohort consisted of 19 patients (6 female, 13 male), with an average age of 31 ± 12 years (range 17-59 years) who underwent revision of multi-ligament knee reconstruction with a mean follow-up of 47 ± 27 months. Thirteen (70%) patients underwent at least one additional procedure (mean 1.2, range 0-4) to correct other underlying pathology in preparation for revision reconstruction. Five (26%) patients underwent staged revisions with bone grafting of the tibial/femoral tunnels. Two (11%) patients underwent staged osteotomies, one distal femoral and one proximal tibial. One (5%) patient underwent concomitant meniscal transplant at time of revision. For revision surgeries, 17 (89%) underwent reconstruction only, and 2 (11%) underwent combined repair/reconstruction. Average IKDC and Lysholm scores were 66 ± 26 and 71 ± 23 respectively. High-energy mechanism of injury ($p=0.04$) and increased age at primary surgery ($p=0.03$) are associated with lower Lysholm scores.

Conclusion: This algorithm offers a systematic approach for treatment of failed multi-ligament knee reconstruction. Revision multi-ligament surgery can achieve modest outcomes in selected patients. Non-modifiable risk factors associated with worse outcome include increased patient age and a high-energy injury.

Preoperative Pain Perceptions Are Predictive of Physical Therapy Performance, Healthcare Resource Utilization, and Post-operative Symptoms After Anterior Cruciate Ligament Reconstruction

SS-20

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Introduction: Certain psychological traits including anxiety or fear of pain, individual differences in pain coping strategies, and severe subjective pain prior to surgery can adversely affect outcomes after elective orthopaedic surgery. This study investigated the predictive effect of preoperative pain perceptions physical therapy performance, healthcare resource utilization, and persistent symptoms after anterior cruciate ligament (ACL) reconstruction.

Methods: A total of 72 patients who underwent ACL reconstruction completed a battery of preoperative self-administered survey instruments related to subjective pain, subjective knee symptoms (IKDC), anxiety related to pain (PCS), fear of reinjury or pain from movement (TSK and FABQ), pain coping methods (brief COPE, and PCM). The association between these preoperative scores and number of post-operative pain scripts, office visits, office telephone encounters, re-injury and return to sport within 12 months as well as physical therapist documented effort were analyzed.

Results: Increased preoperative pain scores were predictive of a higher requested number of post-operative pain scripts (R-square 0.10, $p=0.007$), pain-related telephone encounters in the first month ($p=0.002$) and decreased return to sport ($p=0.04$). High pain catastrophizing scores (PCS) and kinesiophobia scores were associated with poor perceived effort in rehabilitation ($p=0.002$ and $p=0.04$), decreased rates of return to sport ($p=0.001$ and $p=0.03$), and increased re-injury rates ($p=0.04$ and $p=0.02$). High IKDC scores were predictive of post-operative complications ($p=0.01$), total number of pain scripts ($p=0.02$), and number of telephone encounters in the first year ($p=0.005$). Score on the PCM emotion focused items were predictive of total number of pain scripts filled ($p=0.03$) and number of telephone encounters in the first year ($p=0.03$).

Conclusion: Preoperative pain perceptions are significantly associated with effort in physical therapy, and functional outcomes. Maladaptive pain perceptions appear to be predictive of higher healthcare resource utilization post-operatively as well as higher re-injury rates.

Return to Sport after Tibial Tubercle Osteotomy for Patellofemoral Pain and Osteoarthritis



SS-21

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Introduction: Anteromedialization (AMZ) tibial tubercle osteotomy (TTO) is an effective treatment for moderate patellofemoral osteoarthritis, patellofemoral compression syndrome, and coronal malalignment in patellofemoral instability. There is limited literature regarding its capacity to reliably return patients to sports. The objective was to determine the rate of return to sport after AMZ TTO for patellofemoral pain or arthritis.

Methods: This was a retrospective review of consecutive patients who underwent unilateral or bilateral AMZ TTO for patellofemoral pain or arthritis. All patients had minimum 1 year follow up. Final follow up consisted of an additional patient-reported questionnaire with questions regarding physical fitness and sporting activities and Kujala score.

Results: 48 patients participated in sports within the 3 years prior to surgery. Average age at surgery was 29.6 years with an average follow-up of 4.6 years. Kujala pain score improved from 51.2 preoperatively to 82.6 postoperatively ($p < 0.0001$). 83.3% were able to return to at least 1 sport postoperatively, 62.5% were able to resume more than 1 sport, and 60.4% were able to return to 100% of the sports they participated in preoperatively. The average time to return to sport was 7.8 months (range, 3-19 months). Patients most commonly returned to weightlifting (16/17), cycling (11/12), soccer (7/8), elliptical (13/16), running (24/33), and yoga (6/8) (Figure). 77.5% who returned to sports felt that they returned at the same or a higher level compared to preoperatively. 77% felt that their physical fitness stayed the same or improved. 78.9% were satisfied to very satisfied with their surgical results.

Conclusion: Patients undergoing AMZ TTO for patellofemoral pain or arthritis had an 83.3% rate of return to 1 or more sports at an average of 7.8 months after surgery, with many patients returning at the same or higher level of intensity compared to their preoperative state.

Allograft versus Autograft for Medial Patellofemoral Ligament Reconstruction

SS-22

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Introduction: Isolated medial patellofemoral ligament (MPFL) reconstruction has emerged as an effective treatment of recurrent patellar dislocations that occur in the absence significant patellofemoral malalignment or osseous abnormalities. Both allografts and autografts have been successful used for MPFL reconstruction. We hypothesize that MPFL reconstruction with allograft or autograft tissue yields similar low rates of recurrent dislocation and subjective patellar instability.

Methods: Chart review identified 117 MPFL reconstructions (80 allograft and 37 autograft) without concurrent bony procedures (such as tibial tubercle osteotomy) performed between 2008 and 2014 by four sports medicine fellowship trained orthopedic surgeons at our center. Patient demographics (age and sex) and surgical data (graft type) were identified by chart review. Chart review and patient interviews were undertaken to identify recurrent patellar dislocations as well as recurrent subjective patellofemoral instability. Recurrent dislocation and subjective instability risk were compared between the allograft and autograft groups.

Results: 53 patients (45%) with complete baseline data and minimum 1 year follow-up were contacted at a mean of 4.5 years following isolated MPFL reconstruction, including 37 patient with allograft reconstructions and 16 with autograft reconstructions. No significant differences

in patient sex, age at reconstruction, body mass index, or time to follow-up were noted between groups. Recurrent dislocation occurred in 1 patient in the allograft group (2.7%) and 0 patients in the autograft group (0%), ($p = 0.51$). Recurrent subjective instability occurred in 9 patients in the allograft group (24.3%) and 5 patients in the autograft group (31.2%), ($p = 0.74$).

Conclusion: The use of either allograft or autograft tissue for MPFL reconstruction results in a very low (<3%) risk of repeat dislocation. Recurrent subjective instability occurs more frequently (1/4 to 1/3 of patients) at a similar rate for both graft types.

The Anterior-Posterior Distance Between the Tibial Tuberosity and Trochlear Groove in Patients with Patellar Instability

SS-23

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Introduction: Tibial tuberosity osteotomy is often performed to correct excessive lateralization of the tuberosity in patients with patellar instability. An anteriorizing component has been recommended in the setting of chondral pathology, yet the ideal anterior-posterior relationship of the tibial tuberosity to the trochlear groove is unknown.

Methods: Knees with symptomatic patellar instability underwent static CT imaging, and were compared to age- and gender-matched controls. All knees were imaged in full extension. Tibial-tuberosity-trochlear-groove (TTTG) distance was measured to quantify lateralization of the tuberosity, and APTTTG distance represented the anterior-posterior distance between these two points. Lateral trochlear inclination (LTI), sulcus angle (SA) and trochlear depth (TD) were measured as indicators of trochlear dysplasia. Measurements were compared between the symptomatic and control groups using paired t-tests. Correlations between APTTTG with LTI, SA and TD were assessed using linear regression analyses.

Results: 22 knees in 18 patients with symptomatic patellar instability were included in the study group, with 22 control knees. TTTG and APTTTG distances were 19.9 mm and 8.3 mm in the symptomatic group, versus 16.8 mm and -0.5 mm in the control group, with a difference of 3.1 mm ($p=0.002$) and 8.8 mm ($p<0.0001$) respectively. The symptomatic group displayed greater trochlear dysplasia with lower LTI (13.0° vs 21.9° , $p<0.0001$), higher SA (152.7° vs 137.7° , $p<0.0001$) and lower TD (1.3mm vs 6.0mm , $p<0.0001$). There was strong correlation between APTTTG and TD ($r=0.62$, $R^2=0.39$, $p<0.0001$).

Conclusion: Our findings demonstrate that the trochlear groove is almost 9mm more anterior to the tibial tuberosity