B0353

Outcomes of anterior cruciate ligament reconstruction in adolescents

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Background: Anterior cruciate ligament (ACL) injury is common in adolescents. However, outcomes of ACL reconstruction in adolescents have not yet been well examined. Therefore, the purpose of the study is to assess outcomes of ACL reconstructions in adolescents.
Methods: In total 102 adolescent patients (age from 13 to 18 years old) who received unilateral ACL reconstruction using hamstring graft with a minimum of 1-year follow-up were examined. Patients who received physeal-sparing ACL reconstructions for a wide open epiphysis were excluded. Seventy-four patients received a double-bundle (DB) ACL reconstruction and 28 patients received a single-bundle (SB) ACL reconstructions. Patients were divided into DB group or SB group and the outcomes were assessed respectively. The outcome assessments included the Lysholm score, side-to-side difference of anterior tibial translation on KT-1000 arthrometer, manual pivot shift grade, re-injury rate, and contralateral lateral ACL-injury rate. Student's t-test and chi-square test were used for statistical analysis.
Results: The mean postoperative Lysholm score was 93.0 ± 8.3 in the DB group and 95.4 ± 7.8 in the SB group. The mean side-to-side difference of anterior tibial translation on KT-1000 was significantly improved from preoperatively 6.0 ± 2.3 mm to postoperatively 1.6 ± 2.5 mm in the DB group, and from 5.4 ± 3.2 mm to 2.2 ± 2.3 mm in the SB group. Postoperatively, grade I-positive pivot-shift test was observed in 8 patients (10.8%) in the DB group and 7 patients (25.0%) in the SB group. Re-injury occurred in 5 patients (6.8%) in the DB group and 1 patient (3.6%) in the SB group. There was no statistically significant difference in the all evaluated items between the two groups, although positive pivot-shift test ratio tended to be higher postoperatively in the SB group. Seven patients in the DB group (9.5%) had contralateral ACL injury at the average of 23.4 ± 8.4 months (ranging from 11 to 32 months) postoperatively. All the patients were female and all the contralateral ACL injury occurred after they returned to the original sports activity level.
Discussion: Overall clinical outcomes of the ACL reconstruction were satisfactory in adolescents. Considering the relatively high ratio of the postoperative positive pivot-shift test in the patients who received SB ACL reconstruction, DB ACL reconstruction may be more reliable to treat adolescent patients with ACL injuries.
Contralateral ACL injury occurred in only female patients in the follow-up of this study. Therefore, more intensive prevention gram may be necessary for female adolescents.
Conclusion: Clinical outcomes of ACL reconstruction in adolescents were favorable. DB ACL reconstruction can be an effective treatment for adolescents with ACL injuries.
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B0355

The discrepancy between clinical signs and subjective symptoms in patients with posterior cruciate ligament injury examined using gait analysis and surface electromyography

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Purpose: Patients with posterior cruciate ligament (PCL) injury often lack subjective symptoms, even though posterior instability of the knee joint can be shown on clinical evaluation. We have previously performed gait analysis of patients with isolated PCL damage, and reported decreased posterior tibial movement and increased external tibial rotation during one gait cycle, but we could only estimate the muscular compensation involved in these mechanisms, and so we were not able to elucidate the difference between clinical results and subjective symptoms. Therefore, in this study, we investigated the influence that PCL damage has to the knee joint and lower limb muscle activity during gait.
Methods: We evaluated six patients with unilateral isolated PCL damage (PCL group) and compared them to 10 physically unimpaired participants. Study participants walked 10 m at an optimum speed while measurements were recorded using a three-dimensional movement analysis device (VICON MX) and surface electromyography (EMG; ME6000). The kinematic data calculated knee joint flexion angles and tibial rotation angles, before and after tibial movement during one gait cycle, quantified using the Point Cluster method. Surface EMG examined the medial and lateral heads of the gastrocnemius muscle (GM, GL), the medial and lateral hamstring muscles (MH, LH), and the vastus medialis and lateralis muscles (VM, VL), and calculated the activity latency before and after the activity of each muscle during one gait cycle.
Results: The PCL group showed a decrease in the knee joint flexion angle and an increase external tibial rotational displacement in comparison to the physically unimpaired group. Additionally, the PCL group showed an increase in the muscle activity of the VM and VL and a shortened activity latency of the VL before heel grounding, while the GM and GL showed a shortened an increase in their active mass after heel grounding.
Discussion: A decrease in knee joint flexion and an increase external tibial rotational displacement during walking were seen in the PCL group, and it is thought that this kinematic change during walking decreases knee joint instability. In addition, this current study proved that the VL and gastrocnemius muscles compensate earlier and to a larger extent during walking to induce stability of the PCL-damaged knee joint.
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B0357

Outcomes of distal femoral varus osteotomy in patients with valgus knee osteoarthritis

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Background: Treatments of valgus knee osteoarthritis (OA) in young patients are challenging. Distal femoral varus osteotomy (DFVO) is a surgical method to reduce the mechanical load on the lateral compartment of the knee shifting the laterally-shifted weight bearing line medially. The purpose of this study was to investigate the outcome of DFVO in young and middle-aged patients with valgus knee OA.
Material and Methods: Seven knees in 7 patients (4 males and 3 females) who underwent DFVO (distal femoral varus closing-wedge osteotomy) in our hospital for valgus knee OA were retrospectively examined. Abrasion arthroplasty was performed in 5 patients and osteochondral autograft transplantation was performed in 1 patients as a combined surgery. The mean age at the time of surgery was 40.6 ± 4.5 years old (ranging: 28–55). The mean follow-up was 22.4 ± 5.2 months. Radiographically, hip-knee-ankle (HKA) angle, weight bearing line (set the most medial point of the proximal tibia as 0% and most lateral point as 100%), mechanical latelal distal femoral angle (mLDFA), the lateral joint space distance in the Rosenberg view were assessed preoperatively and at final follow-up. Clinical outcome were evaluated with the Knee Injury and Osteoarthritis Outcome Score (KOOS) preoperatively and at final follow-up. Second-look arthroscopy was performed at the time of the plate removal in 5 patients.
Results: The mean HKA angle was changed from 4.9 ± 1.3° valgus preoperatively to 7 ± 1.0° varus postoperatively. The mean mechanical axis was from shifted 76.3 ± 6.6 % to 22.3 ± 3.8 % and the mean mLDFA was changed from 83.7 ± 1.5° to 94.3 ± 0.6°. The mean lateral joint space distance in the Rosenberg view was significantly increased from 0.1 ± 0.2 mm to 2.4 ± 2.0 mm. ($p < 0.05$). The preoperative mean KOOS subscale scores were: pain 42.1 ± 22.5; symptoms 42.9 ± 27.9; activities of daily living (ADL) 62.4 ± 21.0; sport and recreation function (Sport/Rec) 30.7 ± 24.5 and knee-related quality of life (QOL) 34.8 ± 16.5. The mean subscale scores at final follow-up were: pain 75.4 ± 16.2; symptoms 65.3 ± 18.7; ADL 84.7 ± 12.0; Sport/Rec 47.1 ± 27.1 and knee-related QOL 52.7 ± 23.6. The pain and ADL scores were significantly improved postoperatively ($p < 0.05$). A well-coverage with fibrous cartilage over the lateral femoral and tibial condyle was observed in the all 5 patients at second-look arthroscopy. In 1 patient who received osteochondral autograft transplantation combined with DFVO, manipulation was required.
Discussion: Overall favorable clinical outcomes were obtained in most of the patients after DFVO in the short-term follow-up. In addition, an improvement of the lateral compartment of the knee with regenerated fibrous cartilage was observed.
Conclusions: The present study suggests that DFVO can be a treatment option for young and middle aged patients with valgus knee OA.
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Delaminated rotator cuff tear: Chracteristics and anatomical healing after arthroscopic rotator cuff repair

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Background: Limited information is available regarding the characteristics of delaminated rotator cuff tear comparing to non-delaminated tear. Furthermore, the effect of delamination on the anatomical healing of repaired cuff is conflicting.
Aim: To evaluate the characteristics of delaminated rotator cuff tear comparing with non-delaminated tear, and to find out anatomical outcomes of delaminated and non-delaminated rotator cuff tear after arthroscopic repair.
Material and Methods: Among 1061 patients who underwent primary arthroscopic rotator cuff repair between February 2010 and August 2013, 447 patients (42.1%) were confirmed delaminated tear (DL) during arthroscopic surgery while 614 patients (57.9%) were confirmed non-delaminated (N-DL). Among them, 475 patients (DL : N-DL = 226 : 249) were analyzed whose postoperative integrity was verified by CT arthrography (CTA) or MRI at least 1 year after surgery. The mean follow-up was 18.1 (12-47) months and 18.8 (12-52.6) respectively. Structural and clinical features were analyzed between DL and N-DL, and the correlation was assessed with anatomical healing.
Results: The mean age at the time of operation was 62.8 (43-80) years in DL and 59.4 (39-79) in N-DL ($P < .001$). The failure rate of rotator cuff healing was 25.7% (58/226) in DL and 14.9% (37/249) in N-DL (P=.005). Patients in DL suffered longer period (average 33.7 months : 23.63, $P = .035$); had larger tear size (retraction 2.14 cm : 1.41, AP 2.14 cm : 1.62, both $P < .001$); and higher grade of fatty infiltration of the supraspinatus, intraspinatus and subscapularis (all $P < .005$) than those in N-DL. No significant difference between articular and bursal tear size (retraction and AP) of delaminated rotator cuff tear was found.
Discussion and Conclusions: The incidence of delamination was 42.1%. The healing failure rate was higher than non-delaminated tear due to characteristics of delaminated tear – older age with longer duration of symptom, larger tear size and higher grade of fatty infiltration.
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