The goal of revision anterior cruciate ligament reconstruction (ACLR) is to provide a stable anterior cruciate ligament (ACL) that has similar kinematics to the native anatomic knee. Various factors, such as tunnel position, tunnel enlargement, bone graft, graft type, and fixation devices, are considered while choosing the surgical strategy for revision ACLR. Limited studies have investigated tunnel overlapping, a common concern during one-stage revision ACLR.

Purpose

To present clinical results according to tunnel overlaps of one-stage anatomic revision ACLR

Hypothesis

The results of one-stage revision ACLR using soft-tissue allografts differ between patients with overlapped and non-overlapped femoral tunnels.

Material and Methods

Revision ACLR was performed from July 2012 to April 2017 by a single experienced surgeon. The inclusion criteria were as follows:

1. Re-tear after primary ACLR
2. One-stage revision ACLR using the outside-in technique
3. A minimum of 24 months of follow-up
4. Age <55 years.

The exclusion criteria were as follows:

1. Presence of concomitant ligament injury including medial collateral ligament
2. Modified Outerbridge grade >2 cartilage
3. Severe meniscus defect such as subtotal or total meniscectomy state.

Patients meeting the selection criteria were divided into the non-overlapped and overlapped femoral tunnel groups (groups NO and O, respectively).

Group NO included patients in whom new tunnels were drilled to completely avoid preexisting tunnels.

Group O included patients in whom new tunnels were drilled to incompletely avoid existing tunnels (group O1), divergent tunnels were drilled (group O2), or existing tunnels were re-aimed (group O3).

One-stage anatomic revision anterior cruciate ligament reconstruction: Results according to tunnel overlaps

Jin-Hwan Ahn, Dong-Wook Son, Hwa-Jae Jeong, Dae-won Park, In-Gyu Lee, Jin-Hun Park

Department of Orthopaedic Surgery, Saeum Hospital, Sungkyunkwan University School of Medicine.

Introduction

The positions of the previous and new femoral tunnels were evaluated on three-dimensional reconstructed images. Green cylinder, previous tunnel. Red cylinder, new tunnel. (A) group NO, (B) group O1, (C) group O2, (D) group O3.

Material and Methods

Revision ACLR was performed from July 2012 to April 2017 by a single experienced surgeon.

The inclusion criteria were as follows:

1. Re-tear after primary ACLR
2. One-stage revision ACLR using the outside-in technique
3. A minimum of 24 months of follow-up
4. Age <55 years.

The exclusion criteria were as follows:

1. Presence of concomitant ligament injury including medial collateral ligament
2. Modified Outerbridge grade >2 cartilage
3. Severe meniscus defect such as subtotal or total meniscectomy state.

Patients meeting the selection criteria were divided into the non-overlapped and overlapped femoral tunnel groups (groups NO and O, respectively).

Group NO included patients in whom new tunnels were drilled to completely avoid preexisting tunnels.

Group O included patients in whom new tunnels were drilled to incompletely avoid existing tunnels (group O1), divergent tunnels were drilled (group O2), or existing tunnels were re-aimed (group O3).

One-stage anatomic revision ACLR significantly improved clinical results. Most tibial tunnels (94%) and about half (44%) femoral tunnels were overlapped. Overlapped femoral tunnel group did not show inferior outcomes or stability.

Results

- The positions of the previous and new femoral tunnels were evaluated on three-dimensional reconstructed images. Green cylinder, previous tunnel. Red cylinder, new tunnel. (A) group NO, (B) group O1, (C) group O2, (D) group O3.
- Tunnel overlap was measured on three-dimensional (3D) reconstructed CT images.
- Of the 93 patients, 41 (44%) and 83 (94%) had femoral and tibial overlapped tunnels, respectively.
- There were 52 and 41 patients in groups NO and O, respectively.
- At the last follow-up, did not differ between groups NO and O, respectively.
- Subjective IKDC (73.6 ± 15.3 vs 74.9 ± 12.1, P = 0.799)
- Lysholm scores (80.0 ± 19.2 vs 81.44 ± 13.5, P = 0.505)
- Objective pivot shift IKDC grade of Lachman’s test (P = 0.183 and P = 0.450)
- Using the quadrant method, the new femoral tunnel was positioned shallower and higher than the previous femoral tunnel.

Conclusions

One-stage anatomic revision ACLR significantly improved clinical results. Most tibial tunnels (94%) and about half (44%) femoral tunnels were overlapped. Overlapped femoral tunnel group did not show inferior outcomes or stability.