



Original article

Medial patella-femoral ligament reconstruction using the anterior half of the peroneus longus tendon as a combined procedure for recurrent patellar instability

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Abstract

Background: Medial patella-femoral ligament reconstruction (MPFLR) using hamstring tendon is the main procedure for recurrent patellar instability. The anterior half of the peroneus longus tendon (AHPLT) has been proven to be a useful alternate to the hamstring tendon in knee ligament reconstruction. The purpose of this study was to evaluate the clinical outcome of MPFLR using the new graft.

Methods: Forty-five patients with recurrent patellar instability received MPFLR using the AHPLT. Tibial tubercle transfer and lateral release were also performed. Follow-ups were performed at 12 months and 24 months postoperatively, and computed tomography was performed immediately following the operation and at follow-up. The passive patella glide test was performed prior to surgery, during the operation, and at each follow-up point. Knee function was evaluated preoperatively and postoperatively using the International Knee Documentation Committee, Lysholm, Kujala, and Tegner rating scales.

Results: Forty patients were followed for 2 years and received complete serial computed tomography examinations and functional evaluations. The correction of the static patellar position remained through the follow-ups. Functional evaluations at 2 years revealed statistical significant improvement over preoperative status, with International Knee Documentation Committee subjective score, Lysholm score, Kujala score, and Tegner score.

Conclusion: AHPLT is a promising alternative graft for MPFLR, together with lateral release and tibial tubercle transfer, satisfactory static patellar position, and functional outcomes have been achieved in the treatment of recurrent patellar dislocation in adults.

Level of evidence: Level IV, case series.

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Keywords: anterior half of the peroneus longus tendon; functional outcomes; medial patello-femoral ligament reconstruction; recurrent patellar instability

Introduction

The optimal surgical treatment for patellar dislocation or instability is still controversial. The medial patella-femoral ligament (MPFL) provides approximately 60% of the total medial restraining force against lateral patellar displacement¹

and is often damaged or deficient during patellar dislocation.^{2–4} MPFL reconstruction (MPFLR), which directly addresses the deficiencies of the medial restraining structure, is one of the primary methods in the treatment of patellar instability. Many different methods of MPFLR have been reported in literature. Among these techniques, MPFLR with a hamstring tendon graft is the treatment of choice.⁵ However, harvesting the hamstring tendon is sometimes technically demanding^{6,7} and incision near the knee causes cosmetic concern in most of the patients. Thus, attention has been transferred to the anterior half of the peroneus longus tendon

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(AHPLT), which is superficial in the distal leg and can be easily harvested, and results in an incision that causes little cosmetic concern. When the feasibility of using the AHPLT as a graft had been proven in a previous study,⁸ it became the mainstream graft choice for MPFLR in our clinical practice.

This study was conducted to evaluate the clinical outcomes of MPFLR as a combined procedure using the AHPLT in treating recurrent patellar instability. Our hypothesis was that MPFLR using the AHPLT would yield satisfactory clinical results.

Materials and methods

This is a prospective study. From 2010 to 2012, 45 adult patients with recurrent patellar instability underwent MPFLR using the AHPLT. Tibial tubercle (TT) anteromedialisation and lateral release were performed in all patients. All the procedures were operated by the senior author.

The indications for MPFLR with the AHPLT in this study were recurrent patellar dislocation or instability in a patient. All patients had more than two episodes of dislocation or one episode of dislocation plus multiple episodes of instability (lateral excursion of the patella without dislocation). All patients with a previous surgery for patellar instability, those with patellar or lateral femoral condyle fractures, patella alta, or patella baja were excluded for this study.

Prior to the surgery, patellar apprehension, lateral translation (translation of up to more than one-half of the patella width considered abnormal), and soft versus firm endpoint to lateral patellar translation at a 30°-knee flexion were evaluated. Congruence angle, lateral patella angle, patella tilt angle, lateral translation, and the TT-trochlea groove (TT-TG) distance^{9–11} were evaluated on the computed tomography (CT) scan. MPFL sprains or tears and patellofemoral joint chondromalacia were evaluated using magnetic resonance imaging. The International Knee Documentation Committee (IKDC) subjective score, Kujala score, Lysholm score, and Tegner score were also documented.

The indication for TT medialisation in this study was a TT-TG distance of at least 15 mm. Patients with high-riding patella needing TT distalisation, severe trochlear dysplasia¹² that needed trochlear plasty, and severe femoral anteversion or valgus knee deformity were excluded from this study.

Surgical technique

Graft preparation

Surgery was carried out with the patient under general anaesthesia. The AHPLT was harvested from the same leg with the one-incision tendon-stripping technique or the two-incision tendon-peeling technique as reported by Zhao and Huangfu.⁸ After scraping off the muscle, both ends of the tendon were sutured with a #1 absorbable suture in a whip-stitch style.

MPFLR

At 90° of knee flexion, the superior and inferior poles and the widest point of the patella were palpated. A 1-cm longitudinal incision was made at the medial side of the patella at a

level near its broadest point. A 2.5-mm Kirshner wire was then drilled transversely through the patella, just distal to the maximal width line. The guide wire was then overdrilled with a drill width corresponding to the width of the tendon (Figure 1). A 2-cm-long longitudinal incision was made over the medial epicondyle to expose it. A 6-mm-wide tunnel was created 5 mm posterior and 5 mm proximal to the medial epicondyle. The tunnel was made in the distal medial towards the proximal lateral and exited from the lateral side of the femoral shaft instead of from the lateral femoral condyle to reduce joint disturbance.

The graft, accompanied by one #5 Eithibond (Ethicon, Somerville, NJ, USA) polyester thread, was passed through the patellar tunnel medially to laterally and pulled back over the anterior surface of the patella. The Eithibond polyester thread was used as an augmentation, as reported by Xie et al.¹³ Lateral release was performed with tissue scissors by pulling the patella medially with the graft. Both ends of the graft and the thread limbs were then passed subcutaneously from the medial patella incision to the medial femoral epicondyle incision. With the graft ends adjusted side by side, the absorbable sutures from the two ends were tied together to form a knot about 1 cm from the graft ends. The graft was pulled into the femoral tunnel by pulling the absorbable sutures (Figure 1). The knee was then brought to full flexion several times to accommodate the graft. At 45° of knee flexion, the graft was fixed with an 8-mm nonmetal interference screw.

After graft fixation, lateral patellar glide and end point examination in 30° knee flexion were taken immediately during the operation to ensure a normal lateral patella glide and firm end point in all the patients.

TT transfer

This procedure is a modification of Fulkerson's osteotomy.¹⁴ A 4-cm longitudinal incision was first made along the lateral edge of the TT. Through this movable skin window, an

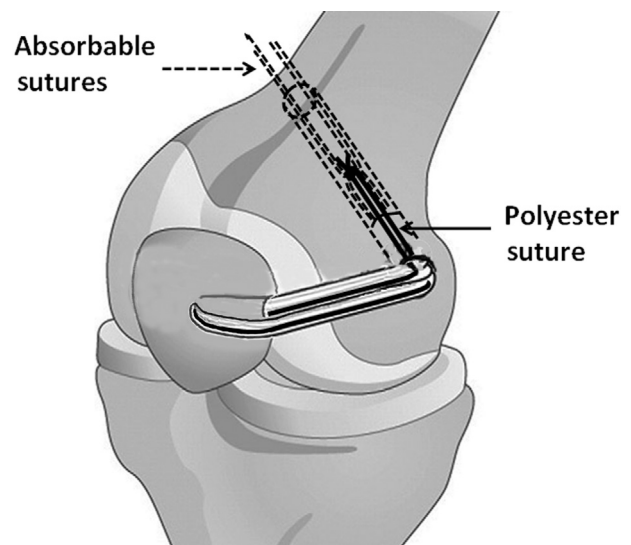


Figure 1. Medial patella-femoral ligament reconstruction with polyester suture augmentation through oblique patellar tunnel.

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