



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



Original article

Proprioceptive function after isolated single-bundle posterior cruciate ligament reconstruction with remnant preservation for chronic posterior cruciate ligament injuries



A. Eguchi^{a,*}, N. Adachi^a, A. Nakamae^a, M.A. Usman^a, M. Deie^{a,b}, M. Ochi^a

^a Department of Orthopaedic Surgery, Graduate School of Biomedical Sciences, Hiroshima University, 1-2-3 Kasumi, Minami-ku, 734-8551 Hiroshima, Japan

^b Department of Physical Therapy and Occupational Therapy Sciences, Graduate School of Health Sciences, Hiroshima University, Hiroshima, Japan

ARTICLE INFO

Article history:

Received 9 August 2013

Accepted 16 December 2013

Keywords:

Posterior cruciate ligament

Reconstruction

Proprioceptive function

Hamstring

Remnant preservation

ABSTRACT

Introduction: Posterior cruciate ligament (PCL) reconstruction using the remnant preserving technique may contribute to improved postoperative posterior stability, graft healing, and proprioception recovery. Although there have been several reports on remnant preserving PCL reconstruction, no study has yet evaluated the proprioceptive functions before and after PCL reconstruction with remnant preservation. The purpose of this study is to retrospectively evaluate the clinical outcomes and proprioceptive function after isolated single-bundle PCL reconstruction with remnant preservation for chronic PCL injuries.

Hypothesis: Isolated single-bundle PCL reconstruction with remnant preservation surgery for chronic PCL injuries provides satisfactory clinical outcomes and good recovery of the proprioceptive function.

Methods: Nineteen patients who had undergone isolated single-bundle PCL reconstruction with remnant preservation for chronic PCL injuries were followed up for more than 2 years. The posterior laxity was measured by the gravity sag view, stress radiography and the KT-2000 knee arthrometer. The proprioceptive function was defined as the threshold to detect passive motion (TTDPM).

Results: The average Lysholm score significantly improved from 63.7 ± 13.2 preoperatively to 94.4 ± 4.6 at final follow-up. The postoperative posterior laxity significantly improved. Regarding TTDPM, there were no significant differences between the preoperative score and the score at every given time point, regardless of the starting angles and the moving directions of the knees.

Conclusions: The proprioceptive function, defined as TTDPM, is maintained after single-bundle PCL reconstruction with remnant preservation, and the postoperative clinical scores and posterior laxity significantly improve.

Level of evidence: Level IV, therapeutic case series.

© 2014 Elsevier Masson SAS. All rights reserved.

1. Introduction

Reconstruction of the isolated posterior cruciate ligament (PCL) is recommended for patients with severe instability or disability due to PCL insufficiency. Thanks to recent innovations of arthroscopic surgical instruments and improved anatomical and biomechanical understandings of PCL [1], PCL reconstruction has gained in popularity. There are several types of PCL reconstruction, such as “single-bundle” [2], “double-bundle” [3], “transtibial” [4], or “tibial in-lay” [5] procedures.

The torn PCL usually demonstrates thick and abundant remnant fibers of both the PCL and the meniscomfemoral ligament. During PCL

reconstruction surgery, the remnant fibers are generally removed to obtain full visualization of the original ligament attachment site. However, PCL has been shown to include neural elements that may have beneficial effects on proprioceptive function [6]. In addition, the PCL remnants may provide some biomechanical stability to the knee [7]. Since the PCL remnants are likely to provide more rapid vascularization to the grafted tendon, PCL reconstruction with the remnant preserving technique may contribute to postoperative posterior stability, healing of the graft, and recovery of proprioception. No previous study has evaluated the proprioceptive functions before and after PCL reconstruction with remnant preservation [8–11]. The purpose of this study was to retrospectively evaluate the clinical outcomes and proprioceptive function after isolated single-bundle PCL reconstruction with remnant preservation for chronic PCL injuries. We hypothesized that isolated single-bundle PCL reconstruction with remnant preservation surgery for chronic

* Corresponding author. Tel.: +81 82 257 5233.

E-mail address: eguchi-ak@hiroshima-u.ac.jp (A. Eguchi).

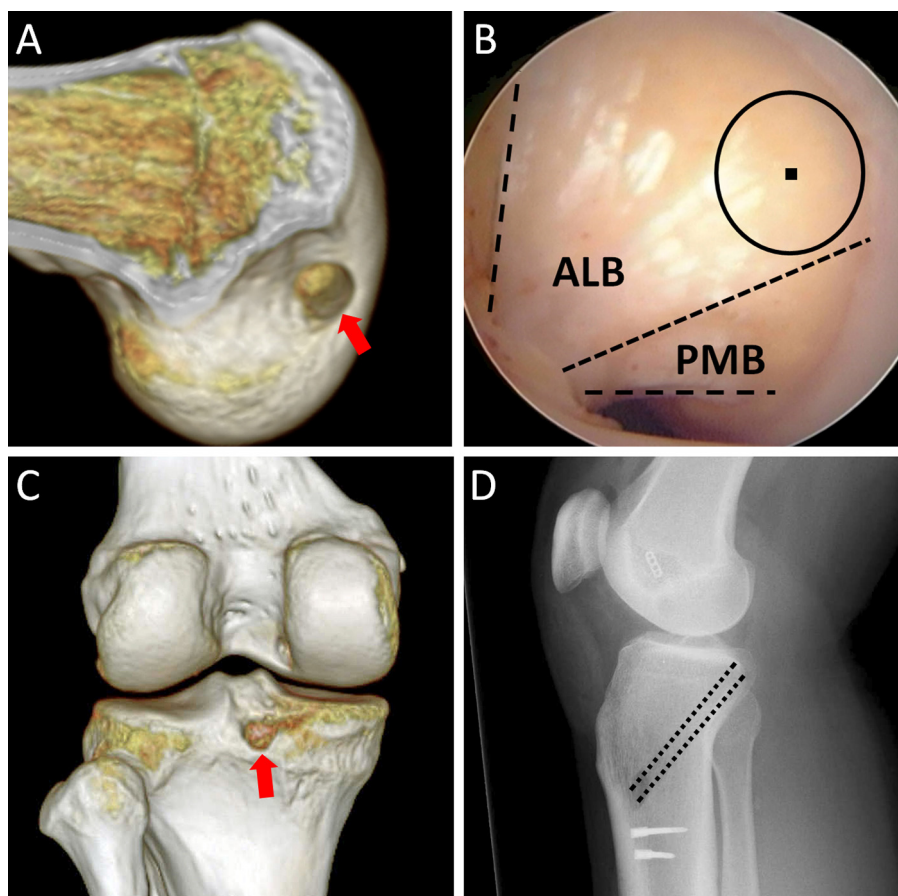


Fig. 1. A. Lateral view of a right medial femoral condyle reconstructed from CT image. Femoral bone tunnel is indicated by red arrow. B. Arthroscopic finding of a femoral attachment of PCL. The target point of femoral bone tunnel is the distal portion of the femoral attachment of the anterolateral bundle (ALB) which comes into contact with the anterior articular margin of the medial femoral condyle. C. Posterior view of a right knee reconstructed from CT image. Tibial bone tunnel is indicated by red arrow. D. Lateral radiograph of a right knee after operation. Tibial bone tunnel is indicated by dotted line.

PCL injuries provides sufficient clinical outcomes and good recovery of the proprioceptive function.

2. Methods

The study was reviewed and approved by the ethics committee of Hiroshima University. Written and signed informed consent was obtained from all patients.

PCL reconstruction at our institute was recommended for patients who, despite conservative treatment for at least 3 months, had severe posterior laxity of more than 8 mm of side-to-side difference in posterior displacement, as measured by a posterior stress radiograph. Fifty-three patients who underwent PCL reconstruction with remnant preservation using autogenous semitendinosus and gracilis tendons, performed between June 2004 and June 2010, were retrospectively enrolled in this study. Of these, 31 were excluded due to the fact that they met one of the following exclusion criteria:

- concomitant ACL injury (15 knees);
- other concomitant ligament injury (MCL 6 knees, LCL 7 knees);
- no sufficient PCL remnant (2 knees);
- severe associated fracture in the lower extremity (1 knee).

In addition, three patients were lost to follow-up, which left 19 patients who met the inclusion criteria and could be followed up for a minimum of 24 months. They consisted of 16 males and 3 females with a mean age of 27.9 (17–59) years at the time of

surgery. The average period from the initial injury to surgery was 20.1 (5–72) months. The average postoperative follow-up period was 27.1 (24–57) months. Causes of PCL injury were traffic accidents in 12 patients, sports-related injuries in 6 patients, and a falls in 1 patient. All procedures were performed by a senior specialist. The graft type (semitendinosus and gracilis tendon), methods of tibial and femoral fixation, and postoperative rehabilitation protocols were identical for each patient.

2.1. PCL augmentation procedure

Semitendinosus and gracilis tendons were harvested using an open-tendon stripper. These tendons formed a graft more than 8 mm in diameter and more than 75 mm in length by folding them in thirds or quarters. The proximal ends of the multi-stranded hamstring tendons were connected to an appropriately sized EndoButton CL loop (Acufex, Smith & Nephew, Mansfield, Massachusetts, US). The distal ends were mechanically connected to EndoButton Tape by suturing them several times to lengthen the graft.

Two portals (anterolateral portal and anteromedial portal) were created and an arthroscopic intra-articular examination was performed with a 30° oblique arthroscope. The posteromedial portal was created using a guide system [12].

A femoral bone tunnel was created in the inside-out fashion. Synovial and fat-like tissue on the femoral attachment of the PCL remnant was removed carefully to expose the fibers of the PCL bundles, which were preserved as much as possible. A headed

Download English Version:

<https://daneshyari.com/en/article/4081547>

Download Persian Version:

<https://daneshyari.com/article/4081547>

[Daneshyari.com](https://daneshyari.com)