Peroneus Longus Tendon Autograft: A Promising Graft for ACL Reconstruction

Nicolaas C. Budhiparama,*†‡§‖ MD, PhD, Sholahuddin Rhatomy,§¶ MD, Krisna Yuarno Phatama,# MD, William Chandra,** MD, Asep Santoso,††‡‡ MD, and Imelda Lumban-Gaol,† MD

Investigation Performed at Dr Soeradji Tirtonegoro General Hospital, Klaten, Indonesia

Background: With the increasing use of hamstring tendon as an autograft in anterior cruciate ligament (ACL) reconstruction, some shortcomings have been found on the donor site. Therefore, an alternative autograft option with adequate strength and less donor site morbidity will be very valuable. Peroneus longus tendon has been found to be a promising option.

Indication: Primary ACL reconstruction.

Technique Description: Peroneus longus tendon graft is harvested with a longitudinal skin incision at 2 to 3 cm (2 finger-breadths) above and 1 cm (1 finger-breadth) behind the lateral malleolus, followed by superficial fascia incision in line with skin incision. The peroneus longus and peroneus brevis tendons were then identified. The tendon division location was marked at 2 to 3 cm above the level of the lateral malleolus. After that, an end-to-side suture was performed between the distal part of the peroneus longus tendon and peroneus brevis tendon. The peroneus longus tendon was stripped proximally with a tendon stripper to at least 5 cm from the fibular head to prevent peroneal nerve injury. Graft preparation was performed with a standard procedure to obtain the suitable graft size. In routine arthroscopic ACL reconstruction, peroneus longus tendon graft fixation can be performed with a cortical suspension device, bioabsorbable screws, or a combined technique.

Results: Recent studies showed that peroneus longus autograft had a comparable outcome with hamstring tendon autograft in primary ACL reconstruction at a 1-year follow-up. The use of peroneus longus tendon autograft resulted in larger graft diameter and less thigh hypotrophy. The mean (±SD) for the AOFAS-Hindfoot Score in the peroneus longus group was 97.3 ± 4.2, while the mean FADI score was 98 ± 3.4, both of which were considered excellent results.

Discussion/Conclusion: The use of peroneus longus autograft in primary ACL reconstruction is a safe procedure with an excellent outcome. Peroneus longus tendon autograft can be recommended as an alternative graft in single-bundle ACL reconstruction. Further study of the functional outcome and knee stability evaluation is recommended.

Keywords: peroneus longus; tendon graft; ACL reconstruction; donor site; hamstring

VIDEO TRANSCRIPT

The following presentation aims to demonstrate the surgical aspect of using peroneus longus tendon as an autograft for anterior cruciate ligament (ACL) reconstruction.

Over the past decade, there has been a large increase in incidents of ACL ruptures due to sports injury and/or other causes. The ACL reconstruction is then performed to restore functional stability to the ACL-deficient knee and prevent further damage.

Graft selection is an important step in preoperative planning as the goal is to achieve an effective biological connection between graft and bone to ensure optimum osteointegration.

There are multiple autograft options that are currently used for ACL reconstruction, such as hamstring, quadricep, and bone–patellar tendon–bone. Each autograft option has its own advantages and disadvantages, as shown here. Another promising alternative is to use the peroneus longus tendon, with initial studies showing favorable findings on its strength and donor site morbidity compared with other autograft options.

Now, the question is: can peroneus longus tendon autograft be a good alternative for ACL reconstruction?

A previous prospective observational study compared the clinical outcome and donor site morbidity of ACL reconstruction with hamstring tendon autografts versus peroneus longus tendon autografts in patients with an isolated ACL injury.

The following procedure shows a 34-year-old male patient who experienced a sports injury 11 months ago. He heard a popping sound, and then his left knee gave out while he was walking. Physical examination showed no swelling and positive anterior drawer test, Lachman test, and pivot shift.

This video describes the surgical technique used in ACL reconstruction using peroneus longus tendon autograft.

Video Journal of Sports Medicine, 1(4), 26350254211009888
DOI: 10.1177/26350254211009888

The patient is in a supine position. First, identify the lateral malleolus. Mark the location of the skin incision 2 to 3 cm above and 1 cm behind the lateral malleolus. Mark 3 cm for skin incision.

Identify the peroneal nerve, which is located just under the fibular head; place a mark 5 cm below the fibular head. Make a 3-cm skin incision until peroneal retinaculum. Identify the peroneus longus tendon with blunt dissection and release from surrounding soft tissue proximally. Tag the distal part of the peroneus longus. Repeat the same procedure for peroneus brevis tendon.

Tenodese both peroneus longus tendon and peroneus brevis tendon at 2 cm distally and suture the distal part of the peroneus longus tendon to the peroneus brevis tendon with end-to-side sutures. Cut the peroneus longus proximal to the tenodesed tendon.

Strip the peroneus longus tendon proximally with a closed tendon stripper up to 5 cm from the fibular head to prevent peroneal nerve injury. Stop the harvest at least 5 cm (or at least 3 finger-breadths) from the fibular head, and cut the graft with the stripper facing anterior. The graft will then be cut easily with this technique.

The peroneus longus tendon autograft is successfully harvested. Then, we can proceed with the arthroscopic procedure using standard anterolateral and anteromedial portals.

Perform diagnostic arthroscopy to identify ACL rupture. A shaver is used to remove debris, clearing the area of fibrous tissue to ease visualization during preparation of the tunnels. Remember to preserve some remaining ACL remnants as a reference for tunnel placement. Clean the tendon from the excessive muscular tissue and unstable portions of the tendon.

Stitch each end of the tendon with a nonabsorbable suture. Then whipstitch the tendon with fiber loop to reinforce it. Pass the graft through a sizing device to determine the diameter. Last, measure and draw the flip mark. The graft was then fixated with proper tensioning.

Here are some potential complications that may arise and how to avoid them. Peroneal nerve injury can be avoided by stopping at least 5 cm below the fibular head while stripping the tendon. Infection and hematoma at the donor site are also possible complications. Bumpy harvest site can be prevented by remembering to close the fascia afterward. Tenodesis of the peroneus longus and peroneus brevis tendon is important to avoid reduced eversion and first ray plantarflexion and ankle instability.

Knee extension began immediately after surgery, together with gradual knee flexion from 0° to 90° until 3 weeks after surgery, with subsequent full flexion. The patient was then instructed to do ankle exercises and strengthening of eversion and plantarflexion after 3 weeks. The patient was allowed to jog after 2 months and return to sports after passing a functional outcome test after an average of 6 months. The test consisted of an evaluation of knee stability based on the anterior drawer and Lachman test, as well as a serial leg hop test.

The diameter of the graft was measured and recorded, and the result shows that the mean diameter of the peroneus longus autograft was significantly larger than that of the hamstring tendon autograft, with a mean difference of 0.6 mm.

Based on the result of this study, the use of the peroneus longus as the graft of choice in single-bundle ACL reconstruction can be encouraged in clinical practice, as it shows comparable functional scores compared with the hamstring tendon with less donor site morbidity, especially in groups of patients who frequently kneel in their daily activities.

Single-bundle ACL reconstruction with peroneus longus tendon autografts had an excellent functional outcome and showed comparable results to the 4-strand hamstring tendon, with no donor site morbidity evaluation.

The use of peroneus longus autograft in primary ACL reconstruction is a safe procedure with an excellent outcome. The result of this study suggests that peroneus longus autograft can be a promising alternative autograft for single-bundle ACL reconstruction. The mid-term and long-term follow-up of this study is currently in progress.

This is the end of the presentation. Thank you.

*Address correspondence to Nicolaas C. Budhiparama, Nicolaas Institute of Constructive Orthopaedic Research and Education Foundation for Arthroplasty & Sports Medicine, Medistra Hospital, Jl. Jendral Gatot Subroto Kav. 59, Jakarta 12950, Indonesia (email: n.c.budhiparama@gmail.com).

†Nicolaas Institute of Constructive Orthopaedic Research and Education Foundation for Arthroplasty & Sports Medicine, Medistra Hospital, Jakarta, Indonesia.

‡Department of Orthopaedics, Leiden University Medical Center, Leiden, the Netherlands.

§Department of Orthopaedics and Traumatology, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia.

‖Faculty of Vocational Studies, Universitas Airlangga, Surabaya, Indonesia.

¶Sport and Adult Reconstruction Division, Department of Orthopedics and Traumatology, Dr Soeradji Tirtonegoro General Hospital, Klaten, Indonesia.

#Sport and Adult Reconstruction Division, Department of Orthopaedics and Traumatology, Dr Saiful Anwar General Hospital, Malang, Indonesia.

**Sport and Adult Reconstruction Division, Department of Orthopaedics and Traumatology, Sulianti Saroso Infection Center Hospital, Jakarta, Indonesia.

††Sport and Adult Reconstruction Division, Department of Orthopaedics and Traumatology, Prof. Dr. R. Soeharso Orthopaedic Hospital, Surakarta, Indonesia.

‡‡Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia.

Submitted January 30, 2021; accepted March 22, 2021.

One or more of the authors has declared the following potential conflict of interest or source of funding: N.C.B. is an editorial board member and/or reviewer of *Video Journal of Sports Medicine*; *Clinical Orthopaedics and Related Research*; *Journal of Arthroplasty*; *American Journal of Sports Medicine*; *Knee Surgery Sports, Traumatology, Arthroscopy*; *Journal of ISAKOS*; *Knee*; *Orthopaedic Journal of Sports Medicine*; *Journal of International Medical Research*; *Journal of Sport and Health Science*; *Journal of Orthopaedic Surgery*; *Knee Surgery & Related Research*; *Clinics in Orthopedic Surgery*; *JOINTS*; *Arthroplasty*; *Arthropaedia*; and *Hip & Knee Journal*. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

ORCID iD

Nicolaas C. Budhiparama https://orcid.org/0000-0002-0801-7400

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