

Peroneus longus: Most promising autograft for arthroscopic ACL reconstruction

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Abstract

The ACL injury is one of the most common serious injury in the knee due to its primary stabilizing role and importance in knee biomechanics. ACL injuries are commonly associated with sports injuries and road traffic accidents. The primary aim of ACL reconstruction is to restore the function of the ACL and native kinematics of the knee.¹ ACL reconstruction restores the stability of the knee joint and protects the menisci and joint surfaces from further damage.² The most preferred graft tissues for ACL reconstruction are hamstrings in view of better cosmesis, satisfactory results and to minimize postoperative morbidity. However use of peroneus tendon graft is increasing in view of simplicity of the technique. Peroneus longus graft harvest is possible due to synergistic action of peroneus longus and peroneus brevis. Even some studies suggest that peroneus brevis is more effective evolver than peroneus longus, justifying harvest of peroneus longus tendon.³ We evaluated results of arthroscopic ACL reconstruction with peroneus longus graft in 10 patients using Lysholm score and donor site morbidity of foot and ankle after tendon harvesting using AOFAS (American orthopaedic foot and ankle score) and FADI (Foot and Ankle Disability Index) score.⁵ Peroneus longus tendon is the most promising autograft for ACL reconstruction with advantage of simplicity of harvesting technique, larger graft diameter and minimal graft complications.

Keywords: ACL injury, Arthroscopic ACL reconstruction, Peroneus longus tendon autograft, Lysholm score, Ankle function, AOFAS, FADI.

Introduction

The knee is a modified hinge joint, a type of synovial joint, which is stabilised by various intracapsular and extracapsular ligaments. Among them, pairs of collateral and cruciate ligaments are crucial. The anterior cruciate ligament (ACL) is critically important as it prevents anterior translation of tibia over femur. ACL reconstruction can be single bundle (anteromedial) or double bundle (both anteromedial and posterolateral) reconstruction. Double bundle ACL reconstruction is required only in patients with high athletic demands. Commonly used graft tissues for ACL reconstruction include hamstrings tendon (semi membranous and gracilis), peroneus tendon, bone-patellar tendon-bone, quadriceps tendon, Achilles tendon, tibialis anterior and tibialis posterior tendon grafts.⁴ Use of hamstring tendon graft is decreasing due to unpredictable graft size and reduction in hamstrings power post harvest.⁵ We have done ten cases of ACL injury treated with arthroscopic single bundle ACL reconstruction using peroneus longus autograft and evaluated the effect on ankle function post harvest using AOFAS and FADI scores.

Materials and Methods

We have done 10 cases of ACL injury treated with arthroscopic ACL reconstruction using peroneus longus autograft at Dhiraj hospital, SBKS Medical Institute and Research Centre from June 2018 to June 2019. After taking consent from the patients, under spinal anaesthesia, in supine position first a diagnostic arthroscopy was performed and diagnosis of ACL injury with/without meniscus and other ligamentous injury was confirmed. After arthroscopic debridement and preparation of femoral footprint for ACL, peroneus longus graft was taken (Fig. 1). A longitudinal skin incision is made over the posterolateral aspect of distal fibula of the affected limb. After hemostasis, peroneus

longus tendon was identified and sutured distally with peroneus brevis tendon. Tendon was then harvested using closed tendon stripper. Graft was prepared and folded into double/quadruple strands for single bundle ACL reconstruction (Fig 2). Thereafter appropriate femur and tibial tunnels (Fig. 3) were created and graft was secured at anatomical sites of femur and tibia using endobutton/titanium screw/PEEK (Polyethylene ether ketone) screw (Fig. 4). After reconstruction, stability of ACL was checked by Lachman's test, which showed no laxity.



Fig. 1: Showing peroneus longus (white shiny tendonous structure) and peroneus brevis (with muscle tissue) tendon



Fig. 2: Peroneus longus tendon (27 cms) graft preparation



Fig. 3: Arthroscopic picture of femoral tunnel for graft



Fig. 4: Graft fixation using PEEK screw



Fig. 5: Showing eversion of ankle post operatively (after peroneus longus harvest)

Post operatively, from first day patient is taught static quadriceps, ankle pump and knee range of motion exercises and partial weight bearing. Each patient was encouraged to stretch the affected ankle gently and actively from first day postoperatively. At 3rd week patients were allowed full weight bearing.

Patients were assessed immediate post operatively and then followed up regularly at 1 month, 3 month and 6 months using lysholm score. Ankle biomechanics was assessed using AOFAS and FADI scores. Eversion power of ankle were noted at every follow-up and found to be normal and comparable to pre-operative power in all the patients thus there was no deterioration in ankle function. (Fig. 5).

Result

In our study, all 10 patients had complete follow up of 1 year. There were 7 (70%) males and 3 (30%) females. At final follow up, anterior drawer test showed normal findings in 80%, while 20% of all examined patients had 1+ anterior laxity.

Table 1

Patient	Pre op Lysholm score	Lysholm score at final follow-up	AOFAS at final follow-up	FADI score at final follow-up
1	68	96	95	95.6%
2	62	95	96	96%
3	58	87	93	94%
4	73	97	95	94.9%
5	70	96	92	93.7%
6	64	95	94	92.5%
7	62	95	97	95%
8	60	84	94	93.9%
9	72	97	93	92.9%
10	68	95	96	94.2%

Discussion

The peroneus longus autograft showed a comparable functional score at the 1-year follow up the peroneus longus autograft showed a comparable functional score at the 1-year follow up the peroneus longus autograft showed a comparable functional score at the 1-year follow up Autograft choice is one of the most important considerations during ACL reconstruction surgery. In our study, we found comparable results with peroneus longus autograft at 1 year of follow-up. It also has advantage of larger graft diameter and simplicity of technique and minimal donor site morbidity.^{8,9} Complications associated with hamstring graft like thigh hypotrophy,⁶ anterior kneeling pain,

hypoesthesia due to injury to infrapatellar branch of saphenous nerve can be prevented. A previous study by Anghong et al mentioned possible donor site morbidity using peroneus longus autograft, such as reduced peak torque eversion and inversion, decreased ankle functions and concerns about ankle stability.³ In our study mean for AOFAS is 94.5 +/- 1.5 and FADI is 94.2 +/- 1.1, which shows minimal donor site morbidity and no significant deterioration in ankle function. Peroneus longus autograft produces a excellent functional score (Lysholm scoring system) in 80% of our patients and remaining 20% patients had good functional score (Fig. 6).



Fig. 6: Clinical picture showing functions/range of motion of knee

Conclusion

Peroneus longus tendon is the most promising autograft for ACL reconstruction with advantage of simplicity of harvesting technique, larger graft diameter and minimal graft complications. Proper harvesting technique does not deteriorate ankle functions, thus helps to avoid complications associated with other autografts.

Modified Cincinnati, Lysholm) comparable to that of hamstring autografts at a 1-year follow-up, with the advantages of larger graft diameter, less thigh hypotrophy and excellent ankle function based on AOFAS and FADI scores.

Source of funding

None.

Conflict of interest

None.

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