

## A Description of a Four-Fold Hamstring Tendon Autograft for an ACL tear

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### ABSTRACT:-

The autograft of the hamstring tendon continues to be a common procedure in modern medicine. In comparison to a patellar tendon transplant, the pain in the knee has improved significantly more following this operation, and the patient is also recovering considerably more quickly and with less difficulty. In terms of biomechanics, it is also more robust when compared to patellar tendon graft. We conducted in-depth searches of the articles available on PUBMED and Google scholar, in addition to examining the references. Based on the results of the IKDC rating, we came to the conclusion that a quadrupled hamstring tendon graft provides a good outcome.

**Keywords:** Narrative, quadrupled, hamstring, ACL.

### INTRODUCTION: -

The anterior cruciate ligament (also known as the ACL) is located in the knee and is the ligament that is most frequently torn in sports. Because it is performed more frequently, it is intensively researched with a concentrated focus, and post-operative reports are readily available. Reconstruction of the anterior cruciate ligament (also known as the ACL) is routinely performed across the country using tried-and-true surgical techniques with a manageable number of complications. When the ACL is torn, it causes alterations in the role that the muscles play and the patterns they follow. The pre-injury strength of the muscles is restored when the anterior cruciate ligament (ACL) is reconstructed surgically [1, 2]. Due to the prevalence of the injury, numerous strategies for reconstructing the graft and developing methods for mending it have been developed and are currently the subject of research [3].

### METHODS :-

For the purposes of this review, a collection of literature written in the English language was produced. PubMed and Google scholar were searched, and articles that were relevant to this subject were found there. ACL restoration, hamstring tendon autograft, and IKDC score were some of the keywords that were utilized for this research.

In the year 2000, a scoring system known as the IKDC [4] was developed and implemented for the evaluation of patients. This scoring system was documented by the international knee committee. The calculation was performed by first adding up the scores for each individual component, and then mapping those totals onto a scale that ranges from zero to one hundred. The scores of 90 to 100 are considered to be normal, 80 to 89 are considered to be near normal, 70 to 79 are considered to be abnormal, and any number lower than 70 is considered to be highly abnormal.

## **DISCUSSION & RESULT :-**

Riley et al. evaluated the clinical outcomes in patients with at least 2 years of follow-up following ACL reconstruction with quadrupled hamstring tendon autograft in the year 2004 [5]. Clinically, improvements of up to 89% were noted. Ten months after surgery, seven percent of patients experienced graft tearing issues. In the post-op X-ray, no degenerative changes were found. In order to determine whether there is any difference between the two grafts, HT and BPTB, seven years after the treatment, Roe et al. [6] conducted an analysis in 2005. In 2007 [7], Keays SL et al. compared HT tendon transplant to BPTB autograft in patients who had undergone a 6-year follow-up. ACL reconstruction with HT tendons resulted in enhanced performance and a very low incidence of degenerative alterations. In 2011 Mohtadi NG et al. [8] reviewed the effectiveness of adult patellar tendon bone autograft and HT graft treatments for ACL tears. After 19 trials using the Cochrane, Medline, and Embase databases, it was determined that there was no difference between the two grafts. In contrast, a forward knee problem was observed in BPTB. Cirstiou et al. [9] evaluated the effectiveness of HT or a Patellar tendon graft in treating injured anterior cruciate ligaments in 2011. Rehabilitating patients with semitendinous grafts was simpler and more effective. Mariscalco et al. examined the impact of graft size on the patient's outcome in 2013 [10]. A mm larger graft was found to result in a 3.3 point increase in pain, a 2 point rise in the ADL subscale, a 5.2 point increase in the sport or recreational function subscale, and a 3.4 point increase in the subjective scale. 14 out of 199 patients required additional surgery after revision.

Robindro et al. calculated the results of arthroscopic ACL repair with HT tendon autograft in the year 2016 in [11]. In this procedure, an endo button was utilized to secure the femur portion, and a bioabsorbable screw, such as an IF, was used to fix the tibia portion. According to the International Knee documentation committee score, eighty percent achieved normal, sixteen percent nearly normal, and three percent abnormal outcomes. A study was conducted in 2017 [12] by Veeragandham et al. Endo button-CL was utilized to fix the HT graft to the femur, and bioabsorbable screws were used to fix the HT graft to the tibia, in order to track the results of the procedure. The postoperative result was evaluated, and it showed good improvement.

In the year 2017 [13], Jagadeesh evaluated the variables every six months using the scoring methods IKDC 2000, Lysholm scoring, and Tegner Action Scale. Results were satisfactory

up to a 95% threshold. Functional range (IKDC, modified Cincinnati, and Lysholm scores) was recorded prior to surgery in 2017 by Sholahudin et al. [14]. One year after surgery, functional range was noted. There were no difficulties at all. They came to the conclusion that, given its effectiveness, functional score, and great ankle function with minimal thigh hypotrophy, the peroneus longus tendon can be a promising transplant for repairing the ACL.

In 2018, Mishra et al's [15] assessment of the outcome was based on the performance of a quadrupled HT tendon graft that was performed using implants by inserting endo buttons on the femur, and a bioabsorbable IF (Interference) screw that was performed by arthroscopy for the tibia component. Tegner Lysholm scoring technique was used to assess the functional final product. It demonstrates that injuries happen more frequently in younger age groups and that athletes are more vulnerable. By stabilizing the knee, this technique also lowers post-operative morbidity.

Using quadrupled HT and femoral side graft fixation with ACL Tight Rope, Rai et al. [6] performed this ACL (anterior cruciate ligament) reconstruction technique in 2018. They assessed any potential issues as well. Prior to surgery, a clinical test yielded positive results for each patient. 83% of lachmann tests after surgery were negative, and none were pivot positive. Infection and graft failure were identified as complications in 5% of patients. Results for the surgery, HT tendon autograft fixed with implants for repairing ACL injury by arthroscopy, were estimated in 2019 by Girish Kumar et al. [16]. There were a total of 30 participants, 24 of whom fell within the normal range, 5 fell within the nearly normal range, and 1 fell inside the abnormal range.

## **CONCLUSION :-**

Studies reviewed indicate that hamstring tendon autografts produce excellent functional results. According to the review [17,18], employing hamstring tendon autograft has solved the issues caused by patellar tendon graft, including patellar tendon rupture, tibia bone fracture, failure of complete extension, and anterior knee soreness. IKDC score measurements taken six months after surgery show more improvement. A superior outcome was seen in quadrupled hamstring tendon autograft compared to patellar tendon bone graft in studies done to examine the effectiveness of hamstring tendon transplant and patellar tendon bone graft as measured by IKDC score [19].

## **REFERENCE:-**

1. Ajuied A, Smith C, Wong F, Hoskinson S, Back D, Davies AA. Survey of Rehabilitation Regimens Following Isolated ACL Reconstruction. JMED Res 2014, P1-9.
2. Patras K, Ziogas G, Ristanis S, Tsepis E, Stergiou N, Georgoulis AD. ACL reconstructed patients with a BPTB graft present an impaired vastus Lateralis

- neuromuscular response during high intensity running. *J Sci Med Sport* 2010;13(6):573-7.
3. International Knee Documentation Committee (IKDC) | PRO Measure 2020. <https://www.codetechnology.com/international-knee-documentationcommittee-ikdc/>
  4. Hefti F, Müller W, Jakob RP, Stäubli HU. Evaluation of knee ligament injuries with the IKDC form. *Knee Surg Sports Traumatol Arthrosc* 1993;1:226-234.
  5. Williams RJ, Hyman J, Petrigliano F, Rozental T, Wickiewicz TL. Anterior Cruciate Ligament Reconstruction with a Four-Strand Hamstring Tendon Autograft. *J Bone Jt Surg - Ser A* 2004;86(2):225-32.
  6. Roe J, Pinczewski LA, Russell VJ, Salmon LJ, Kawamata T, Chew M. A 7-year follow-up of patellar tendon and hamstring tendon grafts for arthroscopic anterior cruciate ligament reconstruction: Differences and similarities. *Am J Sports Med* 2005;33(9):1337-45.
  7. Keays SL, Bullock-Saxton JE, Keays AC, Newcombe PA, Bullock MI. A 6-year follow-up of the effect of graft site on strength, stability, range of motion, function, and joint degeneration after anterior cruciate ligament reconstruction: Patellar tendon versus semitendinosus and gracilis tendon graft. *Am J Sports Med* 2007;35(5):729-39.
  8. Mohtadi NG, Chan DS, Dainty KN, Whelan DB. Patellar tendon versus hamstring tendon autograft for anterior cruciate ligament rupture in adults. *Cochrane Database Syst Rev* 2011.
  9. Catalin Cirstoiu. 1 GCCPRN. The advantage of arthroscopic anterior cruciate ligament reconstruction with autograft from the tendons of the semitendinosus - gracilis muscles for the recovery of the stability of the knee - PubMed. *Maedica (Buchar)* 2011;6(2):109-13.
  10. Mariscalco MW, Flanigan DC, Mitchell J, Pedroza AD, Jones MH, Andrish JT et al. The influence of hamstring autograft size on patient reported outcomes and risk of revision after anterior cruciate ligament reconstruction: A multicenter orthopaedic outcomes network (MOON) cohort study. *Arthrosc - J Arthrosc Relat Surg* 2013;29(12):1948-53.
  11. Nvk L. To study the functional outcome of arthroscopic ACL reconstruction using hamstring graft fixed with endobutton for femur and interference screw and suture post for tibia bone fixation. *Int J Med Dent Sci* 2016;5(1):978-83.
  12. Pheiroijam Robindro, Narayanan Vijaykumar Latchumi, B. Kanthimathi To Study the Functional Outcome of Arthroscopic ACL Reconstruction Using Hamstring Graft

Fixed with Endobutton for Femur and Interference Screw and Suture Post for Tibial Fixation. DOI:10.19056/ijmdsjssmes/2016/v5i1/83539

13. Veeragandham P, Raghavan V, Chattopadhyay A, Banerjee U, Kothari S. Functional outcome following arthroscopic ACL reconstruction using semitendinosus graft: a prospective observational study. *Int J Res Orthop* 2017;3(3):423.
14. Kumar Mishra A, Girish CS. A prospective study of functional outcome of ACL reconstruction with quadrupled semitendinosus tendon autograft using Endobutton and bioabsorbable interference screw. ~ 47 ~ *Int J Orthop Sci* 2018;4(3):47–55.
15. Kolluri R, Padya S. Functional outcome of arthroscopic anterior cruciate ligament reconstruction using semitendinosus autograft-A prospective study ~ 353 ~ *Int J Orthop Sci* 2017;3(3):353–8.
16. Shaikh SR PCJ. A study on functional outcome of arthroscopic anatomical reconstruction of anterior cruciate ligament using quadrupled hamstring graft. *Int J Res Orthop* 2017;3(4):854.
17. Steiner ME, Hecker AT, Brown CH. Jr. Anterior cruciate ligament graft fixation: Comparison of hamstring and patellar tendon grafts. *Am J Sports Med* 1994;22:240-247.
18. Gobbi A., Mahajan S, Zanazzo M, Tuy B. Patellar tendon versus quadrupled bone–semitendinosus anterior cruciate ligament reconstruction: A prospective clinical investigation in athletes. *Arthroscopy* 2003;19:592-601.
19. Aglietti P, Zaccherotti G, Buzzi R et al. A comparison between patellar tendon and doubled semitendinosus/gracilis tendon for anterior cruciate ligament reconstruction. A minimum five-year follow-up. *J Sports Traumatol Rel Res* 1997;19:57-68.