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A narrative review of quadrupled hamstring tendon autograft for ACL tear

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Abstract

Hamstring tendon autograft remains a popular graft choice nowadays. Knee pain after surgery has decreased very much more than patellar tendon graft and recovery was also easier and faster. Biomechanically stronger also compared to patellar tendon graft. Extensive searches of articles were done in PUBMED, Google scholar and reference checking. We concluded that quadrupled hamstring tendon graft gives an excellent outcome by assessing with IKDC scoring.

Keywords: Narrative, quadrupled, hamstring, ACL

Introduction

There is a ligament in the knee called ACL, which is injured commonly in athletes. Since it is more frequent, it is strongly studied with focus, and post-operative reports are noticeable. Anterior Cruciate Ligament (ACL) reconstruction is widely followed throughout the country with practiced surgical procedures with a low number of morbidity. ACL, when its tear results in changes in muscle role and patterns. Surgically reconstructing ACL returns to the pre-injury levels of the muscles [2, 3]. There are various methods of reconstructing the graft and fixing methods evolved, which is being studied throughout as the injury is quite common [4].

Methods

Literature done in the English language for this review was collected. Articles related to this topic were retrieved from PubMed and Google scholar. Keywords used for this research included ACL reconstruction; Hamstring tendon autograft; IKDC score.

In 2000 there evolved a scoring system (IKDC) [5, 6] was used for the assessment of patient, which was documented by international knee committee. Calculation was done by totalling scores individually for each and then changing the score to a scale that exists from number 0 to number 100. The scores as 90 to 100 are normal, 80 to 89 - near normal, 70 to 79 abnormal and less than 70 - which is said to be severely abnormal.

Results

Riley *et al.* in year 2004 [7], assessed the clinical consequences in patients with minimum 2 yrs follow up in ACL reconstructed patients with quadrupled hamstring tendon autograft. Up to 89% improvement was seen clinically. Seven percent had complications of tear of the graft, ten months post surgery. No degenerative changes noted in post op X ray.

In 2005 Roe *et al.* [8] analyzed to find out whether any disparity exists between two grafts HT and BPTB after seven years post procedure. At 7 year evaluation, atypical X-ray change seen in forty five percent BPTB and Fourteen percent of HT group. Splitting of the graft occurred in four in BPTB group and in nine in HT subjects. Outstanding results achieved in both groups at end of 7 years.

Keays SL *et al.* in year 2007 [9, 10] compared BPTB autograft against HT tendon graft at subjects with 6yr follow up. Constructing ACL again with the HT tendons gave an improved performance and very less incidence of degenerative changes. In 2011 Mohtadi NG *et al.* [11], analysed outcomes of Patellar tendon bone autograft and HT graft for an ACL tear in adults with the review.

19 trails were conducted from Cochrane, Medline, Embase databases and finally, no difference was found between these two graft. Whereas in BPTB forward knee Problem was seen. In year 2011 Cirstiou *et al.* [12] assessed torn anterior cruciate ligament with a Patellar tendon graft or with HT. Subjects with semitendinous graft had easier and better rehabilitation.

Mariscalco *et al.* in the year 2013 [13] analysed the consequence of graft size on the outcome of the patient. In the study, graft size is one mm higher, it was noted that it does with 3.3 point increase in pain and 2 point increase in ADL subscale, a 5.2 point increase in sport or recreation function subscale, with a 3.4 point increase in subjective scale. Surgery revision required again in 14 of 199 patients.

In year 2016 Robindro *et al.* in [14, 15], calculated end results of ACL repair with HT tendon autograft using arthroscopy. In this procedure, for fixing femur part endo button was used and for fixing tibia part, bioabsorbable screw such as IF was used. Eighty percent attained normal, sixteen percent nearly normal and three percent abnormal results according to the International Knee documentation committee score.

Veeragandham *et al.* in year 2017 [16, 17] did a study. To monitor the outcomes of HT graft reconstructed by arthroscopy, which use Endo button-CL for fixing with the femur and for fixing tibia, screws that are bio absorbable was used. Post-operative outcome was assessed and it improved well.

In the year 2017 Padya *et al.* [18, 19], study was about analyzing the post-op results using HT.

Autograft for the reconstruction of torn ACL. Only eight percent of subjects had fair range, while ninety two percent attained excellent outcomes.

Jagadeesh in the year 2017 [20], assessed about the variables at 6 months at regular interval with the scoring systems namely, IKDC 2000, Lysholm scoring, tegner action scale. Upto 95%, satisfactory results were achieved.

In 2017 by Sholahudin *et al.* [21, 22] Functional range (IKDC, modified Cincinnati and Lysholm scores) were noted before surgery. Functional range noted one-year post-surgery. All complications were noted. They came with a conclusion stating that the peroneus longus tendon can be a promising graft for reconstructing ACL in terms of its efficacy and functional scoring and excellent ankle function with less thigh hypotrophy.

In the year 2018, Mishra *et al.* [23, 24] outcome was assessed based on the functions of quadrupled HT tendon graft, which was done with implants by inserting endo button on femoral and for tibia part, used Bioabsorbable IF (Interference) screw which was done with arthroscopy. Evaluation of functional end result was made by using using Tegner Lysholm scoring method. It shows that injured occurred more frequently in younger age and Athletes are more prone. This procedure, thereby gives a stable knee, and reduces post-operative morbidity.

Rai *et al.* [25, 26] in 2018, used quadrupled HT and femoral side graft fixation with ACL Tight Rope for this ACL (anterior cruciate ligament) reconstruction procedure. They also evaluated about complications arising from this. Pre-operatively, all patients had positive findings in a clinical test. Post-operatively negative lachmann in 83% and none were pivot positive. Complications were seen in five percent of cases as infection and graft failure.

In year 2019, Girish Kumar *et al.* [27], Results were calculated for the procedure, HT tendon autograft that was fixed with implants for treating ACL tear by arthroscopy. Total number

of subjects is 30, of which twenty four had a normal range and five subjects that had a nearly normal range and one had an abnormal range.

12 subjects got better by one, 18 of them achieved two better grade. That 1 patient who had abnormal range had loss of ROM of upto 50%.

Conclusion

As per the review, studies suggesting that hamstring tendon autograft achieves excellent functional outcome. The problems that arised by patellar tendon graft such as patellar tendon rupture, tibia bone fracture, failure of complete extension and anterior knee pain has been overcome by using hamstring tendon autograft according to the review [28, 29]. There is more improvement in IKDC score measured post operatively after 6 months. Also studies done to compare the efficacy between hamstring tendon graft and patellar tendon bone graft as measured by IKDC score showed a better outcome in quadrupled hamstring tendon autograft in comparison with patellar tendon bone graft [30].

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