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Original Research Article

A STUDY ON COMPARING HAMSTRING AND BONE PATELLA TENDON AUTOGRAFTS: AN ARTHROSCOPIC REPAIR OF THE ACL

Sri Aditya B.[1], *Umesh Sunkari*[2], *Sandeep Sriram*[3], *P Prem Kumar*[4], *Sadhan Palakuri*[5]

[1]*Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.*
[2]*Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.*
[3]*Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.*
[4]*Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.*
[5]*Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India.*

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Corresponding Author:
Dr. Sri Aditya B.
Assistant Professor, Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India..
Email: dr.sriaditya.b@gmail.com

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ABSTRACT

Background: The stability of the knee joint is greatly enhanced by the ligaments that surround it. Beginning on the medial aspect of the lateral femoral condyle, the anterior cruciate ligament travels distally and anteriorly until it inserts on the intercondylar eminence. The purpose of this research was to compare the functional results of arthroscopic ACL reconstruction using hamstring versus bone patella tendon autograft.

Materials and Methods: The 30 patients included in this study. This was the observational based comparative study conducted at the Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India. This study was conducted between the December 2022 to November 2023.

Results: Bone patellar tendon and hamstring grafts are the most popular choices for ACL restoration. In this study, we assess the functional outcome of ACL restoration using the Hamstring graft, both of which have their advantages and disadvantages. Participants in this study tended to be middle-aged or older. The hamstring group's management is at 31.5 and the bone patellar tendon group at 30.1. A total of approximately 30.8 is the mean. This points to the fact that the majority of participants were youthful and energetic. However, in investigation conducted by Munro. The risk of anterior cruciate ligament tears is eight times higher in female athletes compared to male athletes. Patients in this study suffered injuries in two main ways: road traffic accidents and athletic activities. Here, injuries sustained in motor vehicle accidents make up around 70% of all injuries, whereas injuries sustained in athletic events make up around 30%. Most athletic endeavours do not involve physical contact. RTAs can happen as a result of a direct hit to the knee, an injury sustained while falling from a height, or even a dashboard accident.

Conclusion: The results showed that patients younger than 40 years old had superior outcomes after ACL restoration. All of the participants were men; we did not include any females in our study.

Keywords: Hamstring, bone patella tendon, autografts, arthroscopic repair.

INTRODUCTION

From its medial surface on the lateral femoral condyle, the anterior cruciate ligament (ACL) runs distally and anteriorly until it inserts on the intercondylar eminence. Preventing the anterior translation of the tibia is the primary function of the ACL.[1,2] An ACL tear is one of the most prevalent and devastating knee injuries. Because the ACL helps activate the muscles around the joint, a change in muscle function could result after a torn ACL. Such instances require reconstruction. Various approaches have been investigated for this process. Over the last three decades, there has been a steady

stream of improvements to the biomechanics of the knee joint through anterior cruciate ligament reconstruction. The ligaments were surgically repaired in the 1970s.[3,4]

Later on, in the 1980s, arthrotomy was used to repair ACLs using autografts. The use of autografts in conjunction with an arthroscopic operation for ACL restoration has recently gained widespread acceptance as a standard of care for ACL injuries. Arthroscopic ACL restoration has come a long way in the past several years, and now 90% of injured athletes have a good chance of being as active as they were before the injury.[5,6]

Thus, it is concluded that the occurrence of osteoarthritis knee will grow prematurely in the absence of ACL restoration. According to recent research, meniscal injuries are linked to 15-40% of ACL injuries.3. Restoring the ACL helps reduce the risk of meniscal injury, which in turn reduces the likelihood of chondral damage and, ultimately, the development of knee arthritis. However, donor site morbidity is a drawback of these procedures. But autografts are usually the way to go for ACL restoration because to all the benefits they provide. The present state of the art in ACL repair is known as transportal anatomic ACL repair.[7,8]

Double bundle reconstruction, on the other hand, is gaining popularity at some facilities, especially among athletes. This procedure is highly technically complex, but thanks to developments in computer-assisted navigation and fluoroscopic tunnel placement, outcomes have improved dramatically. The use of "bio-implants" made using cell and tissue culture techniques is likely to replace ligaments. Maybe gene therapy could help new wounds heal. Thirty patients involving ACL reconstruction were included in our prospective analysis. Ten of those cases involved hamstring grafts and ten had bone patella tendon grafts.[9,10]

Using the IKDC subjective knee evaluation score, I like to compare the functional outcome of these two grafts. In order to evaluate the functional result of Arthroscopic ACL Reconstruction, the study aimed to compare hamstring versus bone patella tendon autograft.

MATERIAL AND METHODS

The 30 patients included in this study. This was the observational based comparative study conducted at the Department of Orthopedics, Kamineni Institute of Medical Sciences, Narketpally, Telangana, India. This study was conducted between the December 2022 to November 2023.

RESULTS

The 30 patients who were admitted to the Orthopedics' department were the subjects of this investigation. What follows is a display of the findings and observations.

Table 1 presents the distribution of patients by age. The age group of 21-30 had the highest percentage, with 50% (15) of the patients. The age group of 31-40 had 33.33% (10) of the patients, while the age group of 41-50 had the lowest percentage, with 16.66% (5) of the patients. [Table 1]

All patients included in this study were exclusively male. The 30 patients were categorised into two groups, namely HAM and BPT. [as shown in Table 2]

Table 3 shows an equal proportion of patients between the right and left sides, with both groups accounting for 50% each. [Table 3]

The injury's mode was documented in table number 4, with 50% attributed to road traffic accidents (RTA) and the remaining 50% associated with sports. These percentages were calculated based on a total of 30 patients. [Table 4]

Table 5 presents the average time since injury in two groups: the HAM group had a mean time of 8.21 months, whereas the BPT group had a mean time of 14.80 months. [Table 5]

Table 1: Distribution by age group

Sr. No.	Age (Yrs.)	Patients	%
1	21-30	15	50.00
2	31-40	10	33.33
3	41-50	5	16.66

Table 2: Gender distribution

SEX		Distribution		Total
		Group HAM	GroupBPT	
Male	Count	15	15	30
	Percent	50.0%	50.0%	100.0%

Table 3: Allocation by side

		Side	Group		Total
			Group HAM	Group BPT	
	Right	Count	7	8	15
		Percent	23.33	26.66	50.0
	Left	Count	8	7	15
		Percent	26.66	23.33	50.0
Total		Count	15	15	30
		Percent	50.0	50.0	100.0

Table 4: Type of Injury

Mode of injury		Group		
		Group HAM	Group BPT	Total
RTA	Count	7	7	14
	Percent	23.33	23.33	50
Sports	Count	8	8	16
	Percent	26.66	26.66	50
Total	Count	15	15	30
	Percent	50	50	100

Table 5: Duration since the occurrence of the injury

	Group	N	Avg. (Months)
Time SinceInjury	HAM	15	8.21
	BPT	15	14.80

DISCUSSION

In order to prevent additional meniscal damage and restore normal knee function, the goal of an ACL reconstruction treatment is to enable the patient to resume their regular everyday activities. Bone patellar tendon and hamstring grafts are the most popular choices for ACL restoration. In this study, we assess the functional outcome of ACL restoration using the Hamstring graft, both of which have their advantages and disadvantages. Participants in this study tended to be middle-aged or older. The hamstring group's management is at 31.5 and the bone patellar tendon group at 30.1. A total of approximately 30.8 is the mean. This points to the fact that the majority of participants were youthful and energetic.[11-13]

Results were better for patients younger than 40 years old who underwent ACL restoration, according to this research. There were no female patients in our study; all of the patients were male. However in investigation conducted by Munro. The risk of anterior cruciate ligament (ACL) tears is eight times higher in female athletes compared to male athletes. However, according to Ferrari JD's analysis of male and female outcomes following ACL repair, the two groups have identical risk of failure and equivalent results. Patients in this study suffered injuries in two main ways: road traffic accidents and athletic activities. Here, injuries sustained in motor vehicle accidents make up around 70% of all injuries, whereas injuries sustained in athletic events make up around 30%. Most athletic endeavours do not involve physical contact. RTAs can happen as a result of a direct hit to the knee, an injury sustained while falling from a height, or even a dashboard accident.[14-16]

We looked at 30 cases of ACL tears; out of 10 patients who had a Hamstring transplant, 3 had right-sided tears and 7 had left-sided tears. Six of the ten cases that had bone patellar tendon surgery had tears on the right side, whereas four of the cases had tears on the left. Only three individuals in this study had tears to both the medial meniscus and the ACL; the others all suffered from isolated tears. For each of the three patients who suffered meniscal injuries, we performed a partial meniscectomy and ACL restoration. A study found that chronic cases had a greater frequency of meniscal tear related with injury. Another way to avoid a secondary meniscal tear is to repair your ACL as soon as possible.[17-20]

The time it takes for surgery to heal after an injury ranges from two months to three years, according to one study. In the hamstring group, the average duration to repair the tendon is 7.40 months, whereas in the bone patellar tendon group, it is 13.40 months. Overall, the two groups had a mean of 10.4 months.[21,22] According to Hartmann's research, anterior cruciate ligament injuries significantly increase the risk of acquiring secondary knee osteoarthritis. Annually following an ACL injury, the relative chance of developing osteoarthritis is two times higher.[23]

The common difficulties observed in Arthroscopic ACL restoration. One case of bone patellar tendon infection was identified in our investigation; patients were treated with intravenous antibiotics and the infection resolved.[25] An infection in the implant caused a screw to come loose and the patient did not receive follow-up care in one instance of a hamstring graft. To avoid cartilage degradation and Arthrofibrosis, it is crucial to detect infections early and treat them appropriately, according to a study. Anterior knee soreness and slight joint effusion were reported in three occurrences of bone patellar tendon, totaling thirty. There was no difference in the incidence of anterior knee pain between the two transplant types, except when kneeling.[26,27]

An extension lag of approximately 5 degrees has been seen in a single instance of a Hamstring graft. Four athletes out of six who underwent ACL surgery are now back to their regular athletic activities. It is the goal of the IKDC knee grading system to evaluate the functional outcome of bone patellar tendon and hamstring grafts following surgery. Effusion, Passive motion deficit, Ligament examination (including Lachmann), Pivot shift, AP translation, harvest location, and X-ray results are all elements that are taken into account in this grading. Seven hamstring transplant patients had normal functional outcomes, two had almost normal outcomes, and one had aberrant outcomes. There were seven cases of normal and three cases of almost normal bone patellar tendon. No cases of extremely anomalous were found in our tests, and

we were unable to establish a significant relationship between the two groups.[27-29]

CONCLUSION

Study participants included 30 individuals who had suffered an anterior cruciate ligament (ACL) tear. A total of ten patients underwent hamstring transplant and ten bone patellar tendon graft procedures. Bone patellar tendon grafts and hamstring grafts were compared in terms of functional outcomes in the study. Even though hamstring grafts are associated with anterior knee soreness and pain when kneeling, they are supposedly preferable to bone patellar tendon grafts due to the lower donor site morbidity. Bone patellar tendon transplants have a mechanical advantage over hamstring transplants due to superior bone-to-bone integration, as shown in earlier research. Bone patellar tendon grafts are more active after surgery than hamstring grafts, according to Michael Hnues's research. Both groups of patients in our study underwent the identical postoperative care. Since the p-value is greater than 0.05, which indicates that there was no statistically significant difference between the two groups, we can conclude that their functional outcomes were comparable. On the other hand, the results could be different in a study with a bigger sample size.

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Conflict of Interest
None.

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