

Functional Outcome of Arthroscopic Reconstruction of Anterior Cruciate Ligament Injuries Using Semitendinosis-Gracilis Graft

Dr. Pradeep E¹, Dr. Arun Kumar KV^{1*}, Dr. Hemanth Kumar², Dr. Shah Shaival Kalpesh²

¹Associate Professor, ² Junior Resident, Department Of Orthopaedics, Chettinad Hospital And Research Institute, Tamil Nadu

Corresponding Author: Dr. Arun Kumar KV

Email: arun5684@gmail.com



Abstract

Aim: To determine the functional outcome of arthroscopic ACL reconstruction using semitendinosis-gracilis graft, in patients with anterior cruciate ligament tears. **Materials and Methods:** This is a prospective observational study, of the patients Aged >18 years to <55 years old, who underwent, Arthroscopic reconstruction of anterior cruciate ligament injuries using semitendinosis-gracilis graft, at Chettinad Hospital and Research Institute (CH&RI), during the period, 11/3/2020 to 15/4/2021(13 months). Follow up period till 15/10/2021. Patients satisfying the inclusion criteria, alone were included, in this study. Total 36 patients were included in this study. The patients, were followed up, at the end of the 3rd, 6th month, from the date of surgery. **Results:** The mean age of the patients of the study was 33.03 ± 8.89 years with minimum age of 20 years and maximum age of 55 years. In present study at 3 months, 66.67% of patients had fair lysholm score followed by 22.22% had poor score and 11.11% of cases had good score. The mean lysholm score at 3 months was 74.58 ± 8.12 with minimum score of 58 and maximum score of 86. At 6 months 63.89% of patients had good lysholm score followed by 30.56% of cases had excellent score and 5.56% of cases had fair score with mean lysholm score at 6 months was 91.47 ± 5.78 with minimum score of 78 and maximum score of 100. The mean knee society score of patients at 3 months was 76.83 ± 5.71 with minimum score of 61 and maximum score of 86. The mean knee society score at 6 months was 92.97 ± 5.58 with minimum score of 77 and maximum score of 100. The mean distance in single hop test was 81.39 ± 11.05 cms with minimum distance of 51cms and maximum distance of 103cms. **Conclusion:** ACL reconstruction with semi-tendinosis and gracilis graft gives good functional outcomes which might be due to the advancements in the surgical techniques and fixation device.

Keywords: Arthroscopic reconstruction, ACL injuries, Semitendinosisgracilis graft, knee ligament injuries.

Introduction

Amongst all forms of injuries, knee joint injuries are common that individuals experience. Injury to the anterior cruciate ligament (ACL) are common injuries to knee ligaments, with anterior cruciate ligament (ACL) tears being most common type. Sports and automobile accidents are the most prevalent causes of knee ligament injury.

An ACL injury manifests itself most clearly in the form of knee instability/giving away sensation, discomfort and walking difficulties. Even though conservative management of the ligament injury can be accomplished with the help of physiotherapy, Knee brace, and the modification of one's way of life, operative intervention is necessary in a symptomatic individual with impaired knee function. The majority of ACL tear are associated with meniscus tear, if ACL tear with instability not treated, the

patient may progress early onset of knee joint osteoarthritis.¹

For the prevention of the aggravation of existing lesions as well as the emergence of new lesions, it is important to maintain a stable knee.^{2,3} Arthroscopic reconstruction is gold standard treatment for ACL injuries. Open reconstruction of a torn ACL, which was previously performed, is no longer performed today due to the complications associated with it, which include a high incidence of post operative stiffness, and lengthy period of rehabilitation following the procedure.

However, despite continued investigation, the optimum graft to employ for ACL restoration remains a matter of contention. Both the bone-patellar tendon bone graft and hamstring tendon, peroneus graft, quadriceps tendon graft are most utilized grafts for treatment of injuries to ACL among athletes, with hamstring tendon graft being the most commonly employed. Numerous studies carried out in recent years to determine the functional outcomes of ACL reconstruction using all available grafts in order to demonstrate the effectiveness of ACL reconstruction.^{4,5}

The use of hamstring graft for ACL reconstruction is increasing in recent times due to the following aims:^{6,7,8}

- Advanced techniques used for graft fixation.
- High frequency of anterior knee pain occurred when patellar tendon bone graft is used.

Hypothesis: To determine the function outcome of reconstruction using hamstring graft.

Materials and Methods

36 patients between the ages of 18 and 55 years, satisfying inclusion and exclusion criteria who presented to the Orthopedics emergency and outpatient departments in Chettinad hospital & research institute with knee joint symptoms and a history of knee trauma were extensively assessed by general and local examination of the knee joint. In a supine posture, the patient's uninjured knee was evaluated first, followed by the affected knee joint. For detecting anterior cruciate ligament injuries, history of trauma, knee effusion, complain of instability, giving away sensation, specialized tests such as the Lachhman test, anterior-drawer test, and pivot shift test were used.

The following particular tests were used to rule-out the other structures of the knee joint: A valgus stress test and a varus stress test are two types of collateral ligament stress testing, McMurray's test for the meniscus tear. The posterior drawer test is performed to determine whether or not the posterior cruciate ligament is damaged. Orthogonal radiographic views of symptomatic knee joints were taken.

In all cases of suspected ACL injury, an MRI of the knee was performed for confirmation of ACL tear.

Study duration: The present study was conducted during the period from 11/3/2020 to 15/10/2021 (Recruitment period 11/3/2020 to 15/4/2021).

Inclusion criteria:

- Isolated complete ACL tear confirmed clinically and radiologically.
- Age should be >18 years and <55 years.

Exclusion criteria:

- Associated with PCL, meniscal, collateral ligament, osteo-chondral injuries.
- Open injuries to knee joint.
- Revision ACL reconstruction.
- ACL avulsion injury.
- Concurrent musculoskeletal condition like polio, cerebral palsy, generalized ligamentous laxity.
- Preexisting osteoarthritis
- Preexisting malalignment of lower limb.

Descriptive analysis was performed on quantitative data using the mean and standard deviation, and on categorical variables using the frequency and proportion.

When doing anatomical single bundle quadrupled anterior cruciate ligament reconstruction, ipsilateral semitendinosus gracilis grafts are harvested using inside out technique using tendon stripper and

prepared into 4 strands (Quadruple hamstring graft). The tibial tunnel is in the centre of the original tibial anterior cruciate ligament foot print, while the femoral tunnel is in the centre of the native femoral anterior cruciate ligament foot print. Transportal technique was used for creating the femoral tunnel. In some cases accessory anteromedial portal was used if the angle of drilling found to be improper. HA-Bio absorbable screw was used for securing the quadrupled graft over the tibial aspect, and an adjustable suspensory fixation was used to secure it over the femoral aspect. Routine Post-operative protocol is followed in each case.

Results

A hospital based prospective study was done among 36 patients admitted under department of orthopaedics, Chettinad hospital & research institute with knee joint injuries after obtaining informed consent during the study period of March 2020 to October, 2021. In present study, majority of patients (41.67%) belong to the age group of 30 – 29 years followed by 36.11% belong to 30 – 39 years, 16.67% belong to 40 – 49 years and 5.56% belong to more than 50 years. The mean age of the patients of the study was 33.03 ± 8.89 years with minimum age of 20 years and maximum age of 55 years.

Table 1: Showing distribution of age (n=36)

| Age (years) | N | % |
|---------------|------------------------|-------|
| 20 – 29 | 15 | 41.67 |
| 30 – 39 | 13 | 36.11 |
| 40 – 49 | 6 | 16.67 |
| >50 | 2 | 5.56 |
| Total | 36 | 100.0 |
| Mean \pm SD | 33.03 \pm 8.89 years | |
| Minimum age | 20 years | |
| Maximum age | 55 years | |

Table 2: Distribution of symptoms (n=36)

| Symptoms | N | % |
|-------------|----|--------|
| Pain | 19 | 52.78 |
| Instability | 36 | 100.00 |
| Clicking | 32 | 88.89 |
| Infection | 0 | 0.00 |

Table 3: Distribution of Lysholm knee score (n=36)

| Lysholm score | N | % |
|---------------|------------------|--------|
| Excellent | 0 | 0.00 |
| Good | 4 | 11.11 |
| Fair | 24 | 66.67 |
| Poor | 8 | 22.22 |
| Total | 36 | 100.00 |
| Mean \pm SD | 74.58 \pm 8.12 | |
| Minimum score | 58 | |
| Maximum score | 86 | |

In present study, the most common symptom among the study patients was instability (100.00%) followed by 88.89% of cases had clicking of knee, 61.11% had swelling of knee joint, 55.56% had locking of knee and 52.78% had knee pain (Table 2).

In present study, 66.67% of patients had fair score of 65 – 83 followed by 22.22% had poor score of less than 64 and 11.11% of cases had good score of 84 – 94. There was no excellent score at 3 months among the patients. The mean lysholm score of patients in the study was 74.58 ± 8.12 with minimum score of 58 and maximum score of 86 (Table 3).

In present study, 63.89% of patients had good score of 84 – 94 followed by 30.56% of cases had excellent score of 95 – 100 and 5.56% of cases had fair score of 65 – 83 with mean lysholm score at 6months was 91.47 ± 5.78 with minimum score of 78 and maximum score of 100. There were no patients showing poor score in the study (Table 4).

Table 4: Distribution of Lysholm knee score (n=36) at 6 months

| Lysholm score | N | % |
|---------------|------------------|--------|
| Excellent | 11 | 30.56 |
| Good | 23 | 63.89 |
| Fair | 2 | 5.56 |
| Poor | 0 | 0.00 |
| Total | 36 | 100.00 |
| Mean \pm SD | 91.47 ± 5.78 | |
| Minimum score | 78 | |
| Maximum score | 100 | |

In present study, one patient had surgical site infection

Table 5: Distribution of surgical site infection (n=36)

| Surgical site infections | N | % |
|--------------------------|----|--------|
| Yes | 1 | 2.78 |
| No | 35 | 97.22 |
| Total | 36 | 100.00 |

Discussion

Injuries to knee joint are being increased and are most common because of exponential in road traffic accidents and injuries due to sports by many individuals. Among the knee joint injuries, anterior cruciate ligament is the most common injury of the joint. Because of the reason that ACL injury cannot be healed with repair, reconstruction of the ligament is the only management which is done for enhancement of joint stability, to avoid meniscal tear and postpone the onset of osteoarthritis⁹The selection of graft, placement of graft, techniques of fixation of graft, differences in the protocol during rehabilitation, functional bracing after the surgery and conditions for return to monotonous events still remain debatable.¹⁰⁻¹³

A hospital based prospective study was done among 36 patients admitted under department of orthopedics, Chettinad hospital & research institute with knee joint injuries after obtaining informed consent during the study period of 11/3/2020 to 15/10/2021. To determine the functional outcome of arthroscopic ACL reconstruction using semi-tendinosis gracilis graft.

Lysholm knee score:

In present study, 66.67% of patients had fair score of 65 – 83 followed by 22.22% had poor score of less than 64 and 11.11% of cases had good score of 84 – 94. There was no excellent score at 3 months among the patients. The mean lysholm score of patients in the study was 74.58 ± 8.12 with minimum score of 58 and maximum score of 86. 63.89% of patients had good score of 84 – 94 followed by 30.56% of cases had excellent score of 95 – 100 and 5.56% of cases had fair score of 65 – 83 with mean lysholm score at 6months was 91.47 ± 5.78 with minimum score of 78 and maximum score of 100. There were no patients showing poor score in the study.

Table 6: comparison of Lysholm score of patients in present study with other studies

| No. | Study | Maximum Post-op period | Excellent score | Good score |
|-----|---------------------|------------------------|-----------------|------------|
| 1 | Present study | 6 months | 30.56% | 63.89% |
| 2 | Anil kumar M et al. | 2 years | 45% | 50% |
| 3 | Anil K et al | 1 year | 44% | 52% |
| 4 | Kumar et al | 6 months | 60% | 33.33% |
| 5 | Vikas SN et al | 6 months | 56% | 44% |

Limitation of Study:

- Small scale.
- Outcome of ACL repair of ACL reconstruction
- Outcome may differ in sports Vs nonsports patients.
- Return to sports

Conclusion

It was concluded in present study that among young and active adults, ACL reconstruction with semi-tendinosis and gracilis graft gives good functional outcomes which might be due to the advancements in the surgical techniques and fixation device. The most important criteria for ACL reconstruction is based on the principles of surgical procedure, fixation of graft and rehabilitation during the post-operative period. Hence, reconstruction of ACL by arthroscopy using semi-tendinosis and gracilis tendon graft is an excellent treatment option.

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