



## ARTHROSCOPIC RECONSTRUCTION OF ANTERIOR CRUCIATE LIGAMENT: COMPARISON OF FUNCTIONAL OUTCOME BETWEEN BONE PATELLAR TENDON BONE AND HAMSTRING TENDON GRAFT

### Orthopedics

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### ABSTRACT

**Introduction:** Anterior cruciate ligaments (ACL) Reconstruction have undergone series of evolution over the past 30 years to improve the biomechanics of knee joint. In 1970's surgery was done to repair the torn ends of the ligaments. After that, repair of ACL using auto graft was done in 1980's using arthrotomy (open procedure). **Aims:** To compare between Patellar tendon graft and Hamstring graft in arthroscopic ACL reconstruction on the basis of clinical and functional outcome. **Materials and Methods:** The present study was an Institutional based analytical epidemiological study with longitudinal design study. This Study was conducted from 12 months at Department of Orthopedics, Bankura Sammilani Medical College and Bankura. **Result:** In our study, We have studied 40 cases of ACL tear, amongst the 20 cases operated by Hamstring graft, 3(30%) patients were found to have ACL tear on the right side and 7(70%) were found to have tear on left side. Amongst the 20 cases operated by bone patellar tendon, 6(60%) were found to have right sided tear and 4(40%) were found to have left sided tear. **Conclusion:** We found that, mechanical advantage rests with the bone patellar tendon as in previous studies the bone to bone integration is much better when compared to hamstring grafts. Micheal Hnuesstated in this study that the bone patellar tendon has higher post operative activity levels than hamstring grafts.

### KEYWORDS

Anterior Cruciate Ligament (ACL), Reconstruction, semitendinosus and Outcome.

### INTRODUCTION

Anterior cruciate ligament (ACL) Reconstruction have undergone series of evolution over the past 30 years to improve the biomechanics of knee joint. In 1970's surgery was done to repair the torn ends of the ligaments. After that, repair of ACL using auto graft was done in 1980's using arthrotomy (open procedure). In recent times, ACL reconstruction using autografts using arthroscopic procedure is universally accepted treatment for ACL injuries. ACL injury rate is around 60 per 1,00,000 people per year, with increase in sports activity this number is likely to go up. In recent advances in arthroscopic ACL reconstruction it is noted that 90% of athletes have chance of returning to their pre injury level sports activity.

However there is a new found interest in some centers doing double bundle reconstruction, particularly in sports personnel which is much more technically demanding and with technical advancement in computer-assisted navigation and fluoroscopic placement of tunnels, results have improved in a great way. As J. C. Imbert, suggest it is likely that ligament replacements will take the form of —bio-implants produced with the aid of cell and tissue culture techniques. Perhaps, fresh lesions could be made to heal with gene therapy. Research along these lines is currently being conducted at Pittsburgh, US (F.Fu).

The Anterior Cruciate Ligament (ACL) is regarded as critical to the normal functioning of the knee<sup>1</sup>. Disruption of ACL is a common ligamentous injury of the knee that causes significant disabilities especially among athletes. Strategies exist for patients with this injury are controversial between conservative rehabilitation and reconstruction, and between methods of reconstruction<sup>2</sup>.

Reconstruction of the ACL allows the patient to resume sporting activities and delays the onset of osteoarthritis, which is associated with loss of meniscal function<sup>3,4,5</sup>. Currently, ACL reconstruction is most often performed using an arthroscopically assisted technique<sup>6</sup>.

For the past three decades, the gold standard in ACL reconstruction has been the patellar tendon graft from the middle third of the patella tendon<sup>7</sup>, but increasingly the combined semitendinosus and gracilis tendons (ST) graft has been used. This shift in popularity has occurred for several reasons including, concerns about damaging the knee

extensor apparatus, the potential for subsequent patellofemoral joint pain, patella fracture, patella tendon rupture, and infra patella contraction<sup>8</sup>.

- To find out functional and clinical improvement between bone patellar tendon graft and hamstring tendon graft in arthroscopic ACL reconstruction.
- To evaluate intra operative and post operative complications between bone patellar tendon graft and hamstring tendon graft in arthroscopic ACL reconstruction.

### MATERIALS AND METHODS

- **Study Site:** Department of Orthopedics, Bankura Sammilani Medical College, Bankura.
- **Study Population:** All patients with symptomatic ACL Insufficiency attended and admitted in Bankura Sammilani Medical College during the study period.
- **Study Design:** Institutional based analytical epidemiological study with longitudinal design.
- **Period Of Study:** 12 months

#### Selection Criteria

- **Inclusion Criteria**
  - Patients with clinically Lachman test, anterior drawers test or MRI positive for ACL rupture were included in our study. All cases with only anterior cruciate ligament injuries irrespective of the mode of injury/duration/mechanism of injury/associated injuries of menisci were included in our study.
- **Exclusion Criteria**
  - Patients unfit for surgery,
  - History of hip surgery on the hips, major hip dysplasia, neuromuscular disease, pathological fractures,
  - Associated co morbid conditions -myocardial infarction in less than 1 year, psychiatric illness, head injury, associated major visceral injury, Uncontrolled Diabetes mellitus, Hypertension.
  - Patient with existing pain on another joint of the lower limb like severe osteoarthritis of knees.

### RESULT AND DISCUSSION

The present study was an Institutional based analytical epidemiological study with longitudinal design study. This Study was

conducted from 12 months at Department of Orthopedics, Bankura Sammilani Medical College and Bankura.

In this study, the modes of injury of the patients were RTA and Sports injury. In this RTA accounts for about 70%<sup>9</sup> of total injury, were as Sports injury accounts for about 30%<sup>10</sup> of total injury. ACL torn during sports activity are usually from non-contact sports. RTA is due to direct trauma to the knee or may be due to dashboard injury or fall from height with the twisting force.

We have studied 40 cases of ACL tear, amongst the 20 cases operated by Hamstring graft, 3(30%) patients were found to have ACL tear on the right side and 7(70%) were found to have tear on left side. Amongst the 20 cases operated by bone patellar tendon, 6(60%) were found to have right sided tear and 4(40%) were found to have left sided tear.

In this study, 3(15%) patients have associated medial meniscus tear and the remaining patients have isolated ACL tear. Of the three meniscal injury partial meniscectomy was done along with ACL reconstruction for these patients.

In a study conducted by, the incidence of meniscal tear associated with injury is higher in chronic cases. Early ACL reconstruction is recommended also for prevention of secondary meniscal tear.

In the post-operative functional outcome of bone patellar tendon and hamstring graft is measured by IKDC knee scoring. In this scoring we take various factors like Effusion, Passive motion deficit, Ligament examination which includes, Pivot shift, AP translation and also took considerations on harvest site and X-ray findings.

Functional outcomes were normal in 14 cases of hamstring graft and nearly normal in about 4 cases and abnormal in 2 case. In bone patellar tendon, 14 cases were normal and 6 cases were nearly normal. There were no cases of severely abnormal in our studies and the significance between the two groups was not established.

## CONCLUSION

- 40 patients of ACL injury were studied. There were 20 patients operated with hamstring graft and 20 patients operated by bone patellar tendon graft. In the study we compared the functional outcome of bone patellar tendon graft and hamstring graft.
- The claimed advantage of hamstring graft is that it has less donor site morbidity than bone patellar tendon, it is therefore associated with anterior knee pain and pain on kneeling.
- The mechanical advantage rests with the bone patellar tendon as in previous studies the bone to bone integration is much better when compared to hamstring grafts. Micheal Hnuesstated in this study that the bone patellar tendon has higher post operative activity levels than hamstring grafts.
- In our study there were same post-operative protocol followed for both the sets of patients.
- The p value between the two groups is not significant it is >0.05, and therefore the functional outcome of these groups were similar in this study.
- However a study with larger study group might yield a varying outcome.

**Table: Age Wise Distribution (n=40)**

| Sl. No. | Age group (in years) | No. of cases | Percentage (%) |
|---------|----------------------|--------------|----------------|
| 1       | 21-30                | 22           | 55             |
| 2       | 31-40                | 10           | 25             |
| 3       | 41-50                | 8            | 20             |

**Table: Mode Of Injury**

| MODE OF INJURY |                | GROUP     |           | Total |
|----------------|----------------|-----------|-----------|-------|
|                |                | GROUP HAM | GROUP BPT |       |
| RTA            | Count          | 12        | 16        | 28    |
|                | % within GROUP | 60%       | 80%       | 70%   |
| SPORTS         | Count          | 8         | 4         | 12    |
|                | % within GROUP | 40%       | 20%       | 30%   |
| Total          | Count          | 20        | 20        | 40    |
|                | % within GROUP | 100%      | 100%      | 100%  |

**Table: Time Since Injury**

|                   | Group     | No. Of Case | MEAN (Months) |
|-------------------|-----------|-------------|---------------|
| TIME SINCE INJURY | Group HAM | 20          | 7.40          |
|                   | Group BPT | 20          | 13.70         |

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