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# ORIGINAL ARTICLE

# COMPARATIVE STUDY OF CLINICAL OUTCOME OF ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION BONE PATELLAR TENDON BONE GRAFT V/S HAMSTRING GRAFT

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**ABSTRACT: BACKGROUND:** Anterior cruciate ligament is an intra-articular, extra synovial structure present in the central complex of knee joint. It functions in concert with all other anatomical structures in the knee joint to control and limit motion and to maintain both static and dynamic equilibrium. It is commonly injured in athletic activities specially contact sports and motor vehicle accidents. Ligament disruption occurs without a fall or direct contact where deceleration along with valgus external rotation or hyper extension force comes into play. The aim of surgical treatment is to restore knee stability, thereby allowing the patient to return to his original physical activity levels. The choice of graft and its fixation plays a key role in ACL reconstruction. An ideal graft would be one that provides as much strength as native anterior cruciate ligament, allows for secure fixation, has minimal harvest site morbidity, enables unrestricted rehabilitation and restores normal knee biomechanics and kinematics. **AIM:** To assess the effectiveness of the bone-patellar tendon-bone graft compared to hamstring tendon graft as used in the treatment of anterior cruciate ligament injuries of the knee. **DESIGN:** This is a prospective study. **MATERIALS AND METHODS:** This prospective study was conducted at a tertiary hospital for a period of twelve months from June 2013 to July 2014. Patients presenting with unilateral knee injury in Outpatient department and Casualty of the hospital were evaluated by a thorough general and local clinical examination of the knee. Uninjured knees of same subjects in supine position were taken as reference. Subjects fulfilling the predetermined inclusion and exclusion criteria were included in the study. **STATISTICAL METHODS:** Intergroup comparison was analysed by K- Independent sample t test. Intragroup comparison was analysed by Paired t - test. **RESULTS:** Patients were divided into two groups and treated with using Bone-patellar tendon-bone graft and Hamstring graft respectively. Mean age group of patients was 29.16 yrs. (range 16-51yrs) and 30.88yrs. (range 19-48yrs) in group A and B respectively we found the incidence of ACL injury in 15-44 years age group to be greater than twice the general population. A mean delay in surgery of 4.66 months (range 2-12 months) since the time of injury in group A and 4.46 months (range 2-7 months) in group B was observed. Subjective IKDC evaluation was done at the end of 12 months. There was no difference in both the groups in the terms of effusion, passive motion, knee compartment findings, ligament examination, X-ray findings. Functional test and IKDC grade of both the groups showed statistically very highly significant improvement. However, there was statistically very high Harvest site pathology in group A. **CONCLUSION:** We found that there is statistically no significant difference in the overall clinical outcome between hamstring autograft with transfix and bone-patellar tendon-

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bone autograft with interference screw except that the patellar tendon group had a greater tendency of having donor site morbidity compared to the hamstring tendon group.

**KEYWORDS:** Anterior cruciate ligament, bone-patellar tendon-bone graft, hamstrings tendon graft.

**INTRODUCTION:** Anterior cruciate ligament is an intra-articular, extra synovial structure present in the central complex of knee joint. It functions in concert with all other anatomical structures in the knee joint to control and limit motion and to maintain both static and dynamic equilibrium. It is commonly injured in athletic activities specially contact sports and motor vehicle accidents. Ligament disruption occurs without a fall or direct contact where deceleration along with valgus external rotation or hyper extension force comes into play.

The aim of surgical treatment is to restore knee stability, thereby allowing the patient to return to his original physical activity levels. Selection of appropriate graft in ACL reconstruction is important as allogenic tissue and prosthetic ligaments have shown discouraging results due to short half-life and decreased mechanical strength in contrast to autologous grafts which include bone patellar tendon bone, hamstrings (semitendinosus-gracilis), quadriceps bone, Achilles tendon and iliotibial band.

The choice of graft and its fixation plays a key role in ACL reconstruction. An ideal graft would be one that provides as much strength as native anterior cruciate ligament, allows for secure fixation, has minimal harvest site morbidity, enables unrestricted rehabilitation and restores normal knee biomechanics and kinematics.

The mid third bone-patellar tendon-bone and multiple stranded hamstring tendons (semitendinosus-gracilis) are the most frequently used autografts today.[1] The bone-patellar tendon-bone autograft is considered to be the "gold standard" because of the bone-to-bone healing that allows for an early and accelerated rehabilitation with documented good and excellent long- term results.[2]

The hamstring tendon grafts have increased in popularity as an alternative to the bone-patellar tendon-bone graft. Advantages of hamstring over patellar tendon are reduced donor site morbidity associated with fewer kneeling problem and muscular deficits and less anterior knee pain in the long term follow up.[3] On the contrary, Yunes et al.[4] reported significantly poorer static knee stability after hamstring tendon ACL reconstruction compared with patellar tendon graft.

The present study is designed to compare BPTB and hamstring tendon autografts for arthroscopic ACL reconstruction with interference screw fixation for both grafts on tibial side and transfix screw on femoral side in hamstrings and transference screw in BPTB graft in clinical outcome study with 12months follow-up.

**MATERIALS AND METHODS:** This prospective study was conducted at a tertiary hospital for a period of twelve months from June 2013 to July 2014. Patients presenting with unilateral knee injury in Outpatient department and Casualty of the hospital were evaluated by a thorough general and local clinical examination of the knee.

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Uninjured knees of same subjects in supine position were taken as reference. The following specific tests were performed for diagnosing ACL deficiency:

1. Lachman test.
2. Anterior drawer test.
3. Lateral pivot shift test.

Injuries to the associated structures were assessed by performing the following clinical tests:

1. Valgus/Varus stress test (for collateral ligaments).
2. McMurray's test (for menisci).
3. Posterior drawer test (for posterior cruciate ligament).
4. Reverse pivot shift test (for posterolateral complex).

Routine skiagrams of the affected knee were taken in standing position in antero-posterior and lateral views. MRI of the knee was done in cases with equivocal clinical findings.

**CRITERIA FOR INCLUSION:**

1. Clinical / radiological / arthroscopic evidence of ACL deficiency which is symptomatic even after conservative therapy of adequate duration.
2. Young and middle aged, active, patients who are involved in vigorous activities.
3. A normal contralateral knee.
4. The acute inflammatory phase of the injury has subsided and full range of motion and good quadriceps strength has been regained with no extensor lag (usually after4-6weeks of injury).
5. Patients who Surgery with either BPTB or hamstring grafts.

**CRITERIA FOR EXCLUSION:**

1. Bilateral anterior cruciate ligament deficiency.
2. Elderly patients especially with pre-existing osteo-arthritis.
3. Presence of fractures around the knee( tibial plateau, patella, femoral condyles)
4. Infected knee joints and compound knee injuries.

An informed consent was taken from the selected patients after explaining the procedure, its outcome, complications and the prolonged rehabilitation protocol to be followed subsequently.

- **Intragroup Comparison**: Patients were mainly evaluated within the same group at different time intervals from preoperative to 12 months postoperatively.
- **Intergroup Comparison:** Evaluation done at same time interval between the two different groups of patients who underwent ACL reconstruction with BPTB hamstring graft.

**PROCEDURE:** After giving adequate anaesthesia (spinal/spinal epidural/general), the patient was placed in supine position. The affected knee was correctly identified and a high pneumatic tourniquet applied after exsanguination of the limb with an esmarch bandage.

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**GRAFT HARVEST**

**HAMSTRING GRAFT**

- A longitudinal skin incision of about 4 cm was given, centered approximately 4cm medial and just distal to the tibial tubercle or about three finger width below the medial joint line.
- Semitendinosus tendon and Gracilis were hooked under PesAnserinus fascia.
- Deep fascial bands were dissected.
- Open -end stripper was passed over the tendon one by one and advanced carefully in line with it giving firm, steady but gentle pressure and simultaneously applying counter-traction using the previously placed suture.
- Graft was harvested and was placed on graft master board residual muscles were removed.
- Both tendons were stitched together with a No 5 ethibond suture in running baseball fashion and the tendons were looped and passed through various holes in the graft sizer. Prestressing of the graft was done manually.

**BONE-PATELLAR TENDON- BONE GRAFT**

- A 6cm medial para patellar incision was given with knee in 90 degrees of flexion, starting at the inferior pole of the patella and extending distally medial to the tibial tuberosity.
- Patellar tendon was exposed by subcutaneous dissection.
- A 10mm wide graft or one third of the tendon was harvested from the central portion of the tendon, extending distally from the palpable inferior tip of the patella and contoured with roungers so that it fits through the10mm trial.
- 25mm long tibial graft was freed with curved osteotome.

**ARTHROSCOPY:** Standard Arthroscopy was performed in the *'W* sequence, starting from the suprapatellar pouch, then the patellofemoral joint, medial gutter, medial meniscus, intercondylar notch, lateral meniscus and lateral gutter after making high anterolateral portal and pathologies were noted. Through a second anteromedial portal associated pathologies were dealt appropriately like partial menisectomy for meniscal tear, removal of loose bodies.

**NOTCHPLASTY:** It is done only in cases of suspected impingement and not done as a regular procedure. Graft impingement may lead to loss of terminal extension and 'Cyclops lesion' (large lump of scar like material).

**TUNNEL PLACEMENT:**

TIBIAL TUNNEL:

- The tibial guide was introduced into the joint through the anteromedial portal after setting the inclination of the jig at 55 degrees.
- The aimer was placed on the center of the tibial footprint of ACL.
- The sleeve was inserted into the guide upto the tibial cortex (through the incision used for graft harvesting) and a guide pin were drilled into the joint through the sleeve.
- The tunnel was then reamed starting from 8mm size upto the size determined by graft sizer.

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**FEMORAL TUNNEL**

- Femoral off set guide was introduced into the joint through the tibial tunnel and engaged into "over the top" position with the knee in 90° flexion. The guide was aimed at 2o'clock position in the left knee and 10o'clock in the right knee.
- An appropriate sized offset guide was used so as to leave about 2mm of posterior cortical wall after drilling the femoral tunnel (7mm size for10mm reamed tunnel).
- The guide pin was then drilled through the inter condylar region and lateral femoral cortex to emerge out of the anterolateral aspect of the thigh.
- An appropriate sized cannulated calibrated reamer was threaded over the pin and femoral tunnel reamed up to the 30mm mark on the calibrated reamer.

**GRAFT PLACEMENT AND FIXATION**

**HAMSTRING GRAFT**

- The size specific tunnel (marking) hook was mounted onto the femoral guide and inserted through the tibial tunnel into the femoral socket.
- The guide pin sleeve was advanced to mark the skin over the lateral femoral condyle and about 1cm longitudinal incision was given in the skin and iliotibial band.
- The guide pin sleeve was placed against the lateral femoral cortex and a 3 mm guide pin was drilled through it, in a direction slightly posterolateral to anteromedial in the coronal plane coming out through the medial skin.
- The guide pin was then drilled back and forth a few times to loosen it for its easy removal subsequently. The outer cortex of the lateral femoral condyle was drilled over the guide-pin, up to a depth of 7mm using a cortical reamer with a depth stop.
- The fine wire loop of the nitinol wire was then placed into the slot on the lateral end of the guide pin and the guide pin was pulled through the condyles.
- The tunnel hook was then withdrawn out pulling the loop of wire down through the femur and out of the tibial tunnel.
- The hook was then disengaged from the wire loop and the prepared tendon graft was loaded at its middle onto the wire loop.
- The graft was passed through the tibial tunnel and up into the femoral socket.
- The TransFix implant was placed on its impactor and slided over the guide wire into the lateral femoral condyle and under the grafts at the end of the femoral tunnel, taking care that it is slided easily.
- As the lateral threaded head contacted the femoral cortex, the implant was hammered with the impactor till its head was flush with the cortex.
- The graft was then placed under tension and knee was cycled several times to remove "creep" from the graft construct.
- The knee was then placed in about 20-30 degrees of flexion, an appropriate sized headless Titanium screw (usually same size of the diameter of tibial tunnel) was inserted into the tibial tunnel until it was buried just below the cortex.

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**BONE-PATELLAR TENDON- BONE GRAFT**

- Eye let guide wire was used to pass the patellar bone plug guide suture through the femoral tunnel and then out through the lateral thigh.
- With the suture, graft was pulled up into the knee and a probe was used to help guide the graft up into the femoral tunnel with the cancellous portion of the graft pointing anteriorly.
- For graft fixation a cannulated screw with non-cutting threads was passed through the medial portal or central patellar portal. Knee was flexed to about 110 degrees.
- Screw was advanced into the tunnel, placing head even with the bone plug. Tension was held on the graft for approximately 3 minutes while cycling the knee to allow for collagen fiber stress relaxation. Graft was secured with appropriate size screw

**REHABILITATION:** Rehabilitation programme was divided into 4 phases with following goals:

**Immediate phase (0-2 weeks)**

- Control of pain and swelling with rest, cryotherapy, NSAIDs and compression bandage.
- Recovery of full range of motion with active flexion and passive/ self-assisted extension, especially in the last 45°.
- Isometric quadriceps and hamstring exercises with ankle pumps.
- Re-establishment of normal gait by walking with crutches and knee brace.

**Early phase (2-5 weeks)**

- Full range of motion, active extension from 0-45, 60-65% quadriceps strength.
- Begin agility drills and proprioception activities by 5th week.
- Brace-free, normal gait pattern without crutches.

**Middle phase (5-12 weeks)**

- Critical period, as revascularization occurs during this time.
- Full active range of motion, 70-75% isokinetic quadriceps strength, starts athletic activity (swimming, bike).

**Late phase (3-6 months)**

- 80-85% isokinetic quadriceps activity by 4 months when return to non- contact sports is advised.
- 90% isokinetic quadriceps activity by 6-9 months when full return to sports(including contact sports) is allowed.

All knees were examined before surgery, in the operating room immediately after the Procedure, and at two, four, six and twelve months and following things were noted:-

- Ability to bear weight (graded as full, partial, or impossible)
- Difficulty with squatting or flexing the knees greater than or equal to 90 degrees (assessed as no problem, slight difficulty, or unable to squat)
- Presence or absence of anterior knee pain was documented.

Knee Evaluation Form and 2000 IKDC Knee Examination form was recorded preoperatively and at the twelve month follow-up interval.

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Patients were evaluated using International Knee Documentation Committee – 2000 (IKDC) scoring system. It involves subjective evaluation and objective assessment of the ligament and function. The subjective assessment involves a set of 18 questions including a visual analogue scale for pain and current status of the knee.

**OBSERVATION AND RESULTS:** After completing the study, observations were tabulated and were analysed, qualitatively as well as quantitatively, using proper statistical methods.

- Demographic and clinical data between two groups were compared.
- Intergroup comparison was analysed by K- Independent sample t test.
- Intragroup comparison was analysed by Paired t - test.
- In all tests P value:

> 0.05 - Non-significant
< 0.05 - Significant
<0.01 - Highly significant
< 0.001 - Very highly significant (P value 0.000 => P value < 0.001)

| Sl. No | Group | No. of patients | Type of Graft |
|---|---|---|---|
| 1 | A | 18 | Bone-Patellar-Tendon- Bone |
| 2 | B | 18 | Hamstring graft |

Table 1: Distribution of Patients

| RECORDINGTIME | DESCRIPTION |
|---|---|
| T0 | Pre- operative (base line )ooojj)value) |
| T1 | Post- operative 2 months |
| T2 | Post- operative 4 months |
| T3 | Post- operative 6 months |
| T4 | Post- operative 12 months |

Table 2: Recording of the Parameters

| Age(yrs.) | Group A | Group B | Total |
|---|---|---|---|
| 15-25 | 10 | 6 | 16 |
| 26-35 | 4 | 7 | 11 |
| 36-45 | 1 | 4 | 5 |
| 46-55 | 3 | 1 | 4 |
| Total | 18 | 18 | 36 |

Table 3: Age Distribution

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| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | MEAN | ±S.D | MEAN | ±S.D |
| TO | 46.755 | 7.17 | 45.59 | 5.59 |
| T4 | 92.10 | 2.11 | 91.92 | 2.32 |

Table 4: Mean Score of Subjective Ikdc Evaluation in Two Groups

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | P value | Significance | P value | Significance |
| TO-T4 | 0.000 | VHS | 0.000 | VHS |

Table 4.1

| Recording time | Group A Vs. Group B | |
|---|---|---|
| | P value | Significance |
| TO | 0.597 | NS |
| T4 | 0.560 | NS |

Table 4.2: Intergroup Statistical Comparison of Mean Score of Subjective Ikdc Evaluation

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | Mean | ±S.D | Mean | ±S.D |
| TO | 1.222 | 0.427 | 1.277 | 0.374 |
| T4 | 1.110 | 0.384 | 1.111 | 0.323 |

Table 5: Mean Score of Evaluation of Effusion in Two Groups

**Graded as:**

Normal (A).....1
Nearly normal (B)..... 2
Abnormal (C).....3
Severely abnormal (D)... .....4

**Mean Score of Passive Motion Deficit Evaluation (Range of Movements) in Two Groups at Relevant Recording Times:**

| Recording time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | Mean | ±S.D | Mean | ±S.D |
| T0 | Δ ext | 1.444 | 0.704 | 1.222 | 0.427 |
| | Δ flex | 1.277 | 0.574 | 1.055 | 0.574 |

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| | | | | | |
|---|---|---|---|---|---|
| T4 | Δ ext | 1.222 | 0.427 | 1.277 | 0.235 |
| | Δ flex | 1.110 | 0.323 | 1.166 | 0.383 |

Table 6

**Graded as:**

Normal (A).....1
Nearly normal (B).....2
Abnormal(C).....3
Severely abnormal (D).....4

**Deficit (Rom) In Two Groups and Their Comparison with the Base Line Value**

| Recording time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | P value | Significance | P value | Significance |
| T0-T4 | ΔExt | 0.064 | NS | 0.093 | NS |
| | ΔFlex | 0.058 | NS | 0.081 | NS |

Table 7.1

**Intergroup Statistical Comparison of Mean Score of Passive Motion Deficit Evaluation**

| Recording time | | Group A Vs. Group B | |
|---|---|---|---|
| | | P value | Significance |
| T0 | ΔExt | 0.260 | NS |
| | ΔHex | 0.106 | NS |
| T4 | ΔExt | 0.156 | NS |
| | ΔFlex | 0.641 | NS |

Table 7.2

**Mean Score of Ligament Examination in Two Groups**

| Recording time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | Mean | ±S.D | Mean | ±S.D |
| T0 | Δ lach | 3.000 | 0.685 | 2.944 | 0.639 |
| | ΔAP25 | 3.000 | 0.685 | 2.944 | 0.639 |
| | ΔAP70 | 3.000 | 0.685 | 2.944 | 0.639 |
| | ΔMJO | 1.166 | 0.383 | 1.166 | 0.383 |
| | ΔLJO | 1.055 | 0.235 | 1.055 | 0.235 |
| | ΔPST | 3.000 | 0.685 | 2.944 | 0.635 |

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| | | | | | |
|---|---|---|---|---|---|
| T4 | Δlach | 1.333 | 0.485 | 1.277 | 0.460 |
| | ΔAP25 | 1.333 | 0.485 | 1.277 | 0.460 |
| | ΔAP70 | 1.333 | 0.485 | 1.277 | 0.460 |
| | ΔMJO | 1.166 | 0.383 | 1.166 | 0.383 |
| | ΔLJO | 1.065 | 0.001 | 1.111 | 0.232 |
| | ΔPST | 1.333 | 0.485 | 1.277 | 0.467 |

Table 8

**Graded as:**

Normal (A)……..1
Nearly normal (B)……2
Abnormal(C)……..…..3
Severely abnormal (D)….4

**Mean of Ligament Examination:**

| Recording time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | P value | Significance | P value | significance |
| T0-T4 | Δlach | 0.000 | VHS | 0.000 | VHS |
| | ΔAP25 | 0.000 | VHS | 0.000 | VHS |
| | ΔAP70 | 0.000 | VHS | 0.000 | VHS |
| | ΔMJO | 0.506 | NS | 0.499 | NS |
| | ΔLJO | 0.165 | NS | 0.165 | NS |
| | ΔPST | 0.000 | VHS | 0.000 | VHS |

Table 9.1

**Intergroup Statistical Comparison of Mean Score of Ligament Examination**

| Recording time | | Group A Vs. Group B | |
|---|---|---|---|
| | | P value | Significance |
| T0 | ΔLach | 0.803 | NS |
| | ΔAP25 | 0.803 | NS |
| | ΔAP70 | 0.803 | NS |
| | ΔMJO | 1.0 | NS |
| | ΔLJO | 1.0 | NS |
| TO | ΔPST | 0.083 | NS |

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| | | | |
|---|---|---|---|
| T4 | ΔLach | 0.726 | NS |
| | ΔAP25 | 0.726 | NS |
| | ΔAP70 | 0.726 | NS |
| | ΔMJO | 1.0 | NS |
| | ΔLJO | 1.0 | NS |
| | ΔPST | 0.083 | NS |

Table 9.2

**Mean Score of Compartment Findings in Two Groups**

| Recording time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | Mean | ±S.D | Mean | ±S.D |
| TO | Ant | 1.111 | 0.323 | 1.333 | 0.351 |
| | Med | 1.222 | 0.427 | 1.12 | 0.323 |
| | Lat | 1.000 | 0.000 | 1.000 | 0.001 |
| T4 | Ant | 1.111 | 0.325 | 1.333 | 0.351 |
| | Med | 1.222 | 0.427 | 1.120 | 0.323 |
| | Lat | 1.000 | 0.000 | 1.000 | 0.351 |

Table 10

**Mean Score of X-Ray Findings in Two Groups**

| Recording Time | | Group A | | Group B | |
|---|---|---|---|---|---|
| | | Mean | ±S.D | Mean | ±S.D |
| T0 | MJS | 1.133 | 0.351 | 1.266 | 0.457 |
| | LJS | 1.000 | 0.000 | 1.000 | 0.000 |
| | PF | 1.200 | 0.414 | 1.266 | 0.457 |
| | AJS | 1.000 | 0.000 | 1.000 | 0.000 |
| | PJS | 1.000 | 0.000 | 1.000 | 0.000 |
| T4 | MJS | 1.133 | 0.351 | 1.266 | 0.457 |
| | LJS | 1.000 | 0.000 | 1.000 | 0.000 |
| | PF | 1.200 | 0.414 | 1.266 | 0.457 |
| | AJS | 1.000 | 0.000 | 1.000 | 0.000 |
| | PJS | 1.000 | 0.000 | 1.000 | 0.000 |

Table 11

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**Mean Score of Harvest Site Pathology in Two Groups**

| Recording Time | Group A | | Group B | |
|---|---|---|---|---|
| | Mean | ±S.D | Mean | ±S.D |
| T0 | 1.000 | 0.00 | 1.000 | 0.00 |
| T4 | 1.388 | 0.501 | 1.000 | 0.00 |

Table 12

**Graded as:**

Normal (A)..... 1
Nearly normal (B)..... 2
Abnormal(C)..... 3
Severely abnormal (D).. 4

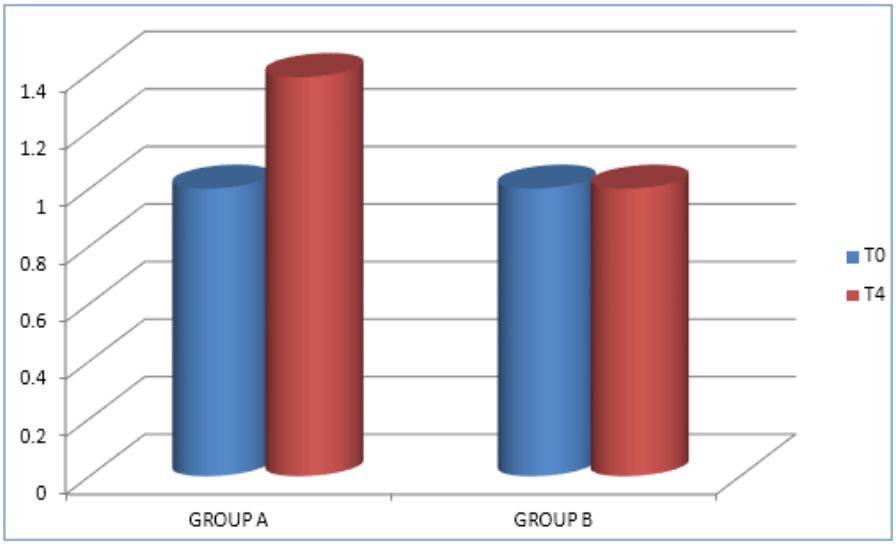


**Figure 1**

**Comparison of mean values of harvest site pathology**

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | P value | Significance | P value | Significance |
| TO-T4 | 0.008 | HS | NS | NS |

Table 12.1

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**Inter group statistical comparison of mean score of Harvest site pathology**

| Recording time | Group A Vs. Group B | |
|---|---|---|
| | P value | Significance |
| T0 | NS | NS |
| T4 | 0.003 | HS |

Table 12.2

**Mean Score of Functional Test in Two Groups**

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | Mean | ±S.D | Mean | ±S.D |
| T0 | 3.555 | 0.511 | 3.388 | 0.501 |
| T4 | 1.388 | 0.427 | 1.277 | 0.460 |

Table 13

**Statistical Analysis of the Mean Score of Functional Test in Two Groups**

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | P value | Significance | P value | Significance |
| TO-T4 | 0.000 | VHS | 0.000 | VHS |

Table 13.1

**Intergroup Statistical Comparison of Mean Score of Functional Test**

| Recording time | Group A Vs. Group B | |
|---|---|---|
| | P value | Significance |
| TO | 0.330 | NS |
| T4 | 0.710 | NS |

Table 13.2

**Mean Score of Final Score for Objective Ikdc Evaluation in Two Groups**

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | Mean | ±S.D | Mean | ±S.D |
| TO | 3.555 | 0.5113 | 3.380 | 0.501 |
| T4 | 1.555 | 0.512 | 1.277 | 0.485 |

Table 14

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**Graded as:**

Normal (A) ..... 1
Nearly normal (B)..... 2
Abnormal (C)..... 3
Severely abnormal (D)..... 4

**Statistical Analysis of Mean Score of Final Scores for Objective Ikdc Evaluation in Two Groups and Their Comparison with Base Line Value**

| Recording time | Group A | | Group B | |
|---|---|---|---|---|
| | P value | Significance | P value | Significance |
| TO-T4 | 0.000 | VHS | 0.000 | VHS |

Table 14.1

**DISCUSSION:** ACL injury is a common occurrence these days due to increased participation in sports and a high incidence of accidental trauma. ACL deficiency causes progressive deterioration of knee function and stability in due course of time, especially in active individuals. Surgical reconstruction plays an important role here as it helps to restore normal joint kinematics and function, thereby eliminating knee instability. But the choice of graft (BPTB or Hamstring) still remains a controversial issue. Therefore, we undertook this study to subjectively and objectively compare the results of ACL reconstruction using BPTB and Hamstring Tendon grafts.

Mean age group of patients was 29.16yrs (range 16-51yrs) and 30.88 yrs. (range 19-48yrs) in group A and B respectively, similar to that in the study conducted by Wagner M et al.[5] Daniel et al.[6] found the incidence of ACL injury in 15-44 years age group to be greater than twice the general population. 5 patients in group A and 3 in group B out of a total of 18 patients in each group were females.

Similar variation in sex predisposition was shown in various studies.[7][8]

A mean delay in surgery of 4.66 months (range 2-12 months) since the time of injury in group A and 4.46 months (range 2-7 months) in group B was observed.

**INTRAGROUP COMPARISON**: Group A (Bone-patellar tendon-bone graft)
Group B (hamstring graft)

- Subjective IKDC knee evaluation: At 12 month's postoperative evaluation, statistically very highly significant improvement was seen in subjective knee evaluation score as compared to baseline preoperative assessment in both the groups. Post-operative stable knee produced the apprehension and allowed patients to perform original level of physical activities.[5],[9],[10],[11],[12]
- Subjective IKDC evaluation was done at the end of 12 months. There was no difference in both the groups in the terms of effusion, passive motion, knee compartment findings, ligament examination, x-ray findings. Functional test and IKDC grade of both the groups

showed statistically very highly significant improvement. However, there was statistically very high Harvest site pathology in group A.

**INTERGROUP COMPARISON**

➢ **Subjective IKDC knee evaluation:** In comparing group A with group B, preoperative and month postoperative evaluation showed statistically nonsignificant change, similar to the observations made by Aglietti P et al.[9] Feller JA and Webster KE.[10] and Wagner M et al.[5] in their study reported significantly better results for subjective knee evaluation in hamstring group whereas Eriksson K et al.[11] and Aglietti P et al.[12] reported better results in BPTB group. In our study, we found that the patient satisfaction level was same irrespective of the type of graft used.

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