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COMPARATIVE ANALYSIS OF THE FUNCTIONAL OUTCOME OF ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING QUADRUPLED HAMSTRING GRAFT FIXED WITH BIOABSORBABLE INTERFERENCE SCREW AGAINST TITANIUM INTERFERENCE SCREW- A PROSPECTIVE SHORT TERM STUDY

Orthopaedics

Dr. Vinoth K R — Department Of Orthopaedics, Sree Balaji Medical College And Hospital, Biher. Chromepet, Chennai – 600 044, Tamilnadu, India.

Dr. V. Vijay Narasimman Reddy* — Department Of Orthopaedics, Sree Balaji Medical College And Hospital, Biher.Chromepet, Chennai – 600 044,Tamilnadu, India. *Corresponding Author

ABSTRACT

Knee injuries are more common in the modern era due to increase in road traffic accidents and more youth getting involvement in sports related activities. Anterior cruciate ligament is the most commonly injured ligament around the knee joint. Anterior cruciate ligament has a pivotal role in function and stability of the knee joint, being the primary stabilizer preventing the anterior translation of tibia over femur. Arthroscopic anterior cruciate ligament reconstruction has become the gold standard in the management of these injuries. This study is a prospective study of 30 patients treated with arthroscopic anterior cruciate ligament reconstruction with quadrupled hamstring graft with endobutton as the femoral fixation device and titanium interference screw (n=15) and bioabsorbable interference screw (n=15) as tibial fixation device respectively between Jan 2016 and Dec 2018 at Sree Balaji Medical College and Hospital, Chennai. Minimum age of the patient was 21 years and maximum age was 55 years. All patients were evaluated with Lysholm and Gillquist scoring. The clinical results associated with titanium interference screw and bioabsorbable interference screw were found to be statistically similar. The results of this comparative analysis support the hypothesis that there are no significant differences in the outcomes associated with titanium screws compared with bioabsorbable screws for ACL reconstruction.

KEYWORDS

Anterior cruciate ligament, quadrupled hamstring graft, titanium, bioabsorbable, interference screw, endobutton, arthroscopy

INTRODUCTION:

Knee injuries are more common due to exponential increase in road traffic accidents and more involvement in sports related activities by common people. Anterior cruciate ligament injury is one of the most common injuries around knee and poses quiet a lot of management controversy[1]. Anterior cruciate ligament has a pivot role in function and stability of the knee joint along with all other ligaments, being a prime stabilizer and preventing the anterior translation of tibia over femur[2]. Along with this function anterior cruciate ligament also restricts valgus and rotational stress to some extent. Acute anterior cruciate ligament injury causes recurrent episodes of instability, pain and decreased motion. Anterior cruciate ligament injury may be associated with meniscal injury and result in early onset of osteoarthritis[3]. There is also an involuntary decrease in function and activity of anterior cruciate ligament deficient knee. Anterior cruciate ligament reconstruction allows earlier return to pre injury levels even in athletes, delays development of early osteoarthritis[3] and re-establish the stability of the joint[4]. Earlier extra-articular procedures and intra-articular reconstructions by open arthrotomy were done but complications like post-surgical knee stiffness and prolonged duration of rehabilitation has made reconstruction of ACL using Arthoscopic assisted method the treatment of the choice[5]. Decreased post-operative inflammation and possibility of early full range of movements makes arthroscopic reconstruction superior and more preferable than open procedures. Nowadays, usage of soft tissue grafts is increasing in number than bone patellar tendon bone graft. Graft fixation during ACL reconstruction can be achieved with use of either metal screws or bio-absorbable screws. Bio-absorbable screws usages provides better visibility in post-operative MRI and also avoid removal at a later stage. However there are controversies regarding the ideal graft, ideal fixation device, ideal time and technique of reconstruction.

AIM:

To do comparative analysis of the functional outcome of Arthroscopic Anterior Cruciate Ligament Reconstruction using quadrupled hamstring graft with endobutton as femoral fixation device and bioabsorbable interference screw against titanium interference screw as tibial fixation devices respectively.

MATERIALS AND METHODS:

This Prospective study of 30 patients, treated with arthroscopic anterior cruciate ligament reconstruction with quadrupled hamstring graft with endobutton as the femoral fixation device and titanium interference screw (n=15) and bioabsorbable interference screw (n=15) at Sree Balaji Medical and Hospital, Chromepet from Jan 2016 to Dec 2018. Recruitment of cases stopped in Dec 2017, so that the follow up time is for a minimum period of 1 year. Hence the study lasted 3 years, while the recruitment of patients was for 2 years. All the patients had given a written consent for publication of their clinical and radiological data and appropriate clearance was obtained from the institute's research and ethical committee.

INCLUSION CRITERIA:

1. Patients with closed growth plate.
2. Primary ACL surgery.
3. No evidence of multiple ligament injury.
4. No previous knee surgeries.

EXCLUSION CRITERIA:

1. Additional ligamentous laxity in affected knee.
2. Previous ACL surgery of same knee.
3. Chronic muscle disorder.
4. Any co-existing local conditions in the form of- Active articular infection, inflammatory joint disease.
5. Metabolic bone disease.
6. Neoplastic disease.
7. Associated tibial plateau or femoral condylar fracture of the same side.

INSTRUMENTATION:

Many specialized instruments are required for arthroscopic anterior cruciate ligament reconstruction. An arthroscopic system which consist of

1. Television monitor.
2. Camera.
3. Light source and fibre optic light source cable.
4. Arthroscope (30 degree).
5. Shaver system and hand piece.
6. Tourniquet set (Pneumatic).

Equipment needed for surgery are

- 2.4mm drill tip guide pins.
- Trocar, canula, ACL probe.
- Meniscus punch.
- 3.5 and 4.5 shaver blades.
- Tibial aiming guide.
- Cannulated headed reamers (size 5mm to 10mm).
- Transtibial femoral ACL drill guide (usually 7 – mm offset tip).
- Extra-long 2.4 mm guide pin with suture eye (Beath – type guide pin).
- 4.5 mm cannulated reamer for passage of endobutton.
- Depth gauge.

- Sizing block.
- Cannulated interference screws.
- Endobutton.
- 1.5 mm guide wire with screw driver for passage of bio-absorbable interference screw.

METHODS:

PREOPERATIVE WORK UP:

Patients with ACL tear proven clinically and radiologically are admitted. Routine investigations like haemoglobin, total and differential counts, platelet count, ESR, blood sugar, renal parameters, chest X-ray, ECG were taken and anaesthetist assessment for regional and general anesthesia was done. Static and dynamic quadriceps exercise was taught to patients while awaiting surgery.

ANAESTHESIA AND PATIENT POSITIONING:

All patients are operated under spinal anesthesia. In supine position under anesthesia anterior drawer test, posterior drawer test, Lachmans test, pivot shift test are done. With patient supine knees are flexed to 90 degrees and a removable side support is placed in the side of the table to support the ipsi-lateral thigh, a foot stopper is placed beneath the foot after flexing the knee to 90 degrees. In all the cases a pneumatic tourniquet is used which is placed in the upper thigh after soft padding. The limb is shaved around the knee joint and prepared with betadine pre-scrub. Limb is draped exposing the knee joint lower thigh and upper leg after painting the limb with betadine. A pre-operative antibiotic 1 g cefotaxime is given before inflating the tourniquet and limb is held upright for 3 minutes to exsanguinate the limb before inflating the tourniquet.

ARTHROSCOPIC PROCEDURE:

An anterolateral portal is established 1 cm lateral to the patellar tendon midway between the inferior pole of the patella and the upper end of the tibia.(fig 1) Trocar and canula are inserted with knee extended in to the supra-patellar pouch. Inflow of normal saline from a 3 litre saline bottles is maintained through the TURP set. After adequate insufflation of the joint space, scope is introduced and a diagnostic arthroscopy is done visualising suprapatellar pouch, lateral gutter, inter-condylar notch, articular surface of patella, medial gutter and articular surfaces of femur and tibia. An antero-medial portal or the working portal is established 1 cm medial to the patellar tendon midway between the inferior pole of patella and the upper end of the tibia. The menisci are visualised and probed to reveal any meniscal tears. Anterior cruciate ligament is probed to analyse the amount of tear. If unstable meniscal injuries are found they are treated with partial meniscectomy and debridement depending on the site and the type of the tear.

Fig 1: Skin marking for portal incision.

GRAFT HARVEST AND PREPARATION:

A 2 to 3 cm oblique incision is placed over the antero-medial aspect of tibia exactly over the pes anserinus which is identified by palpating the semi-tendinosus and gracilis tendon by running the fingers from above downwards in the antero-medial aspect of the upper tibia. The tendons slip under the finger during this gentle palpation. Skin subcutaneous tissue is incised along the incision and blunt dissection is done to expose the sartorius fascia which is lifted up with a forceps and cut with a number 11 scalpel. After incising the sartorius fascia the gracilis and semi-tendinosus tendons are identified and localised using a right angle forceps. The tendons are freed from all soft tissue attachments in the antero-medial tibia and around their insertions. Then the tendons are secured with 1 vicryl near their insertions and the tendons are detached from their insertions one by one as long as possible. Holding the vicryl tied to the tendon a closed tendon stripper is inserted encircling the tendon and the tendon stripper is advanced with a minimal counter tration. The stripper is carefully advanced towards the ipsilateral ischial tuberosity with knee in 70 degree flexion and undue care is taken to prevent the amputation of the graft. The stripper is advanced until the tendon muscle junction is cut and the tendon comes out through the incision. The tendons are cleared of the muscle attachments and free ends of the tendons are stitched together with a running whip stitch 4 to 5 cm from the free ends with polybraided non-absorbable number 2 suture materials (Ethibond). Mannual tensioning of the tendon is done and the tendons are passed through the loop made in the endobutton with number 5 non-absorbable suture material (Ethibond) or through the loop of the endobutton CL ultra so that the tendons are quadrupled for reconstruction. The free ends of the combined gracilis semi-tendinosus tendons are again whip stitched with a number 2 non-absorbable suture material. Then the graft size is measured with a sizer by pulling the graft through the sizer and the graft is kept aside rolled in a moist cotton gauze pad.

INTRAARTICULAR PREPARATION:

The arthroscope is introduced through the antero-lateral portal and the 4.5 or 3.5 shaver blade is inserted through the antero-medial portal and the joint is debrided of the ligamentum plicae, some pad of fat and some synovial reflections which hinder a through visualization of the medial surface of lateral femoral condyle, the over the top position and the tibial foot print of the anterior cruciate ligament. The medial surface of the lateral femoral condyle is shaved of the native ACL remnants and the over the top position is identified without misinterpreting the students ridge. Then the ACL foot print in the tibia is prepared. Throughout this joint debridement undue care is taken to avoid injury to the native posterior cruciate ligament.

TIBIAL TUNNEL:

The tibial guide or the guide pin targeting tibial jig is used to create the tibial tunnel. The guide is set at 55 degrees or by N+7 rule where N is the effective length of the tendon. With the guide set in 55 degrees the tip of the guide pin is positioned in the ACL foot print in the posterior half. The guide can also be placed using various land marks like posterior rim of the anterior horn of the lateral meniscus, antero-lateral part of the medial tibial inter-condylar eminence, 8 mm anterior to the posterior cruciate ligament. After establishing the proper position of the guide tip the guide pin sleeve is inserted and advanced to the antero-medial part of the tibia. The guide pin sleeve is flushed with the antero-medial cortex of the upper tibia midway between the tibial tuberosity and the posterior border of the proximal tibia. The guide pin sleeve is inserted and advanced through the incision made for harvesting the graft by retracting the skin edges. Before drilling the tibial tunnel the arm of the tibial guide is ensured to be parallel with the tibial plateau. Then the 2.4 mm drill tip guide wire is drilled through the tibial cortex to exit intra-articularly which is visualized with the arthroscope. When the 2.4 mm drill tip guide wire had been exactly placed intra-articularly the tibial guide and the guide sleeve is removed. Serial reaming of the tibial tunnel over the guide pin is done with cannulated calibrated reamers up to the desired size of the graft. During all these drilling a small curved curette is placed intra-articularly to prevent the tip of the guide pin or the reamers from damaging the articular surface of the joint. Once the tibial tunnel has been created the posterior end or the intra-articular exit of the tibial tunnel is shaved of the soft tissues and bone particles from obstructing the graft passage. Even a sharp dissection can be used for this purpose and a rasp is used to smoothen the tunnel walls for easy graft passage and to avoid graft damage.

FEMORAL TUNNEL:

The femoral tunnel is created by trans-tibial technique in most of the patients and trans-portal technique in rest of the patients in our study. In trans-tibial technique, femoral tunnel is drilled through the tibial tunnel and in transportal technique, femoral tunnel is drilled through a separate medial portal with the help of femoral offset. The femoral aimer is placed in the inter-condylar notch at 1'O clock position for the left knee and 11'O clock position for the right knee. The 7 mm offset aimer is placed so that it is placed over the posterior edge of the notch to avoid blow out and to leave atleast 2mm of intact posterior cortex. If the graft diameter is greater than 10 mm then the offset guide may need to be placed little more anteriorly to avoid posterior blow out. Having placed the aimer the long drill tip guide wire is drilled through the lateral femoral condyle to exit in the antero-lateral aspect of the lower thigh. The intra-articular length of the graft is measured and the lateral femoral condyle is drilled with 4.5 mm reamer until the antero-lateral cortex is breached to create a passing tunnel for the endobutton. After reaming the lateral condyle the length of the femoral condyle is measured with a depth gauge. Having known the intra-articular length of the graft and the whole length of the graft, the length of the graft to be in the femoral condyle can be desired and marked, which is usually the half the length of the remaining graft after subtracting the intra-articular length from the total length. Having known the length of the femoral condyle and the desired graft length in the femur, the loop length to be adjusted in the endobutton is calculated and the loop is created or an adequate length looped endobutton CL ultra is chosen. The femoral condyle is reamed with an appropriate size reamer as of the graft to a length of around 5 to 6 mm greater than the desired graft length for the turning radius of the endobutton. The tunnel is smoothened with a rasp or the shaver blade and the soft tissue interposition for the graft passage is removed adequately.

GRAFT PASSAGE AND FIXATION:

In the peripheral holes of the endobutton two 5 number suture material is passed and taken through the eyelet of the guide pin so that it can used as a leading suture and as a toggle suture. The guide pin is passed through the tunnel and pulled through the tunnel and extracted along with the suture material in the antero-lateral aspect of the distal thigh. The leading suture is pulled so that the graft is pulled through the tunnel headed by the end of the endobutton to which the leading suture is passed. The graft is pulled until the desired length of the graft is pulled in to the femoral condyle and the trailing suture is pulled to flip the endobutton. Once the endobutton is flipped and confirmed by arthroscope in the antero-lateral aspect of the femur, the distal part of the graft is pulled down to seat the endobutton so that the femoral fixation is done. With manual tension to the distal graft the knee is taken through range of motion to cyclically tension the graft and to look for impingement. If there is impingement of the graft the notch is slightly enlarged to avoid impingement. After tensioning the graft the tibial site is fixed with appropriate size titanium interference screw or bioabsorbable interference screw depending on the allocated study group and ensured endoscopically that the screw has not breached the articular surface.

CLOSURE:

The wound is closed in layers after through wash. The portals are closed with single sutures with non-absorbable suture material after placing a intra-articular suction drain. Sterile dressing applied over the wound and knee brace applied in extension after tourniquet is released.

POST OPERATIVE MANAGEMENT

- Immobilisation in knee brace and limb elevation immediate post-operatively.
- Intravenous antibiotics for 3 days.
- Drain removal on POD 2.
- Wound inspection on POD 2, 5 and 7.
- Suture removal on POD 12.
- Gradual physical rehabilitation.
- Follow up at 4, 8 weeks and there at 3, 6 months.

POST OPERATIVE REHABILITATION:

The general post-operative protocol for anterior cruciate ligament reconstruction is followed and progression of the rehabilitation is individualized for each patient. Emphasis on prevent arthro-fibrosis, joint contracture and joint laxity has been made.

Goals: Full range of motion (ROM), normal gait pattern, stability of the knee joint, pain free movement.

POD 1:

- Rest in extension in long knee brace.
- Static quadriceps exercise.
- Ankle and foot movement and limb elevation.

0 – 2 Weeks:

- Full knee extension ROM.
- 90 degrees knee flexion ROM.
- Strong QS/SLR without extension lag.
- Emphasize normal gait pattern.
- Passive, active, and active – assisted ROM knee flexion.

Partial weight – bearing 50% to 75% with walker or weight bearing to tolerance with knee immobilizer with a walker.

2 – 4 weeks:

- Full extension to 120 degrees flexion.
- Full weight bearing without walker support.
- Progress SLR with weights walking, emphasis on normal gait.

4 – 10 Weeks:

- Progress to full ROM by 6 weeks.
- Progress closed chain exercises.
- Progress all the exercises.

12-14 Weeks:

- Initiate full range knee extension exercises, light weight and high repetition.
- Initiate jogging program.

16 –18 weeks:

- Isokinetic strength test for quadriceps and hamstrings Agility training and sport-specific training.

EVALUATION:

All the patients are subjected for post-operative antero-posterior and lateral radiographs to determine the tunnel placement and position of endobutton in femur and interference screw in the tibia. Patients are followed at 4 weeks, 8 weeks, 3months and 6 months and once in 6 months thereafter.

All patients are evaluated with Lysholm & Gillquist scoring.

RESULT:

There were 30 patients with Arthroscopic Anterior Cruciate Ligament Reconstruction using quadrupled hamstring graft with endobutton as femoral fixation device and bioabsorbable interference screw against titanium interference screw as tibial fixation devices in our study. N=15(50%) underwent bioabsorbable screw and n=15(50%) underwent titanium screw. The follow up period was 12 months. There were 22 male patients and 8 female patients.

Table 1: Demographic profile.

Surgery	Bioabsorbable screw ('n' % age)	Titanium screw ('n' % age)	Total ('n' % age)
Male	11(36.6%)	11(36.6%)	22(73.3%)
Female	4(13.3%)	4(13.3%)	8(26.7%)
Total	15(50%)	15(50%)	30(100%)

Table 2: Side of injury.

Side	Bioabsorbable screw ('n' % age)	Titanium screw ('n' % age)	Total ('n' % age)
Right	8(26.7%)	10(33.3%)	18(60%)
Left	7(23.3%)	5(16.7%)	12(40%)
Total	15(50%)	15(50%)	30(100%)

Table 3: Mode of injury.

Mode of injury	Patients ('n' % age)
RTA	23(76.7%)
Sports	2(6.6%)
Fall	5(16.7%)
Total	30(100%)

Table 4: Duration from time of injury.

Duration of injury	Patients ('n' % age)
<2 weeks	24(80%)
<4 weeks	4(13.3%)
<8 weeks	2(6.7%)
Total	30(100%)

Table 5: Associated injury.

Associated injury	Patients ('n' % age)
Associated meniscus tear	15(50%)
Associated PCL	1(3.3%)
Isolated ACL	14(46.7%)
Total	30(100%)

SCORING ANALYSIS:

30 patients of arthroscopic ACL reconstruction with quadrupled hamstring graft was followed for a minimum period of 1 years. All patients are evaluated with Lysholm and Gillquist scoring at the end of 6 months.

Lysholm and Gillquist grading:

Outcome	Points
Good	84 - 100

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Fair 65 - 84
Poor <65

Outcome	Titanium Screw (15)	Percentage within group	Bioabsorbable screw(15)	Percentage within group
Good	12	80%	13	86.67%
Fair	03	20%	02	13.33%
Poor	0	0%	0	0%

GOOD RESULTS:
In our study 80% (n=12) patients in titanium interference screw group and 86.7% (n=13) patients in bioabsorbable interference group had good results. The patients had no limp, were able to walk without support, there was no locking except for a few with mild instability during athletics or heavy exertion. There was no pain or swelling of the knee joints. There was no difficulty in climbing stairs or squatting.

FAIR RESULTS:
In our study 20% (n=3) patients in titanium interference screw group and 13.3% (n=2) patients in bioabsorbable interference group had fair results with the following clinical findings. There was slight limping, occasional locking, with mild instability during daily activities. There was anterior pain and swelling on exertion. Squatting and stair climbing were not impaired.

POOR RESULTS:
In both the groups, 0 patients had poor results.

Complications:
No complications were noted in our study.

DISCUSSION:
Incidence of anterior cruciate ligament reconstruction had increased significantly in the past decade owing to the increased number of road traffic accidents and more involvement in sports activities[6]. Indications for surgical treatment are repeated symptoms of knee instability. Arthroscopic ACL reconstruction have become gold standard and open reconstruction have become almost obsolete nowadays.

Even though arthroscopic reconstruction have been standardised the controversies regarding graft choice, graft fixation methods and technique of reconstruction like single bundle or double bundle and trans-tibial or trans-portal are still in debate. In the past decade ACL has been widely studied and various scientific articles have been published on ACL reconstruction techniq ues and outcomes. The goal of reconstruction is to provide a normal stable joint with full function and to prevent the complications following ACL tear like meniscal injury and secondary osteoarthritis.

In our study road traffic accidents and fall predominated as the cause of injury accounting for 77% and 17% respectively. Sports injuries accounted for only 6% in contrary to all international studies. D W Lewis reported 58% meniscal injury associated ACL tear at presentation. Medial meniscus was involved more than the lateral meniscus in his study and he also proposed meniscal repair or resection did not alter the outcome and chondral lesions are a better predictor of functional outcome. Stephen Lyman reported more than 50 % meniscal procedures with ACL reconstructions in 2009.In our study 50% of patients had meniscal injury at presentation and medial meniscus injury predominated lateral meniscus injury like other studies. None of our patients had significant chondral damage at diagnostic arthroscopy.

The graft choice was of great debate in the recent years. Bone patellar tendon bone graft had been gold standard until a decade ago, as many studies supported patellar tendon graft for its strength and direct bone to bone healing providing early stability. But recent development and advancement in soft tissue fixation devices studies have proven hamstring grafts to be superior in strength and avoiding extensor mechanism disruption. A.Harvey in 2005 published histological analysis of soft tissue graft healing by indirect integration producing sharpey fibres between the graft and bone and achieves adequate pull out strength by 12 weeks in animal studies[7].

Aune et al; compared the outcomes of patellar tendon and hamstring grafts and reported significantly improved outcome and improved quadriceps function at 6 months follow up but the outcomes equalised with time. Though the outcomes equalised the donor site morbidity was less with hamstring graft[8].

Michael Wagner recommended hamstring graft even in high level athletes[9].

David D Greenberg proposed allografts has a good alternative of graft but it carries the risk of disease transmission [10]. In our study we used Quadrupled Hamstring graft in all patients which had greatest ultimate load to failure 4140 N [7] Thomas D Rosenberg reported patellar chondrosis and anterior knee pain with bone patellar tendon bone graft [11].

The fixation of the graft has been proved to be the site of failure rather than the graft itself irrespective of the type of graft especially in the early rehabilitation phase when the graft integration has not taken place and the fixation is of little significance after 8 to 12 weeks when graft has integrated with the bone as proposed by Dawn T Gulick[12]

Various graft fixation devices has been developed in the recent past for soft tissue graft fixation which resulted in the increased reliability on the soft tissue grafts and its use.

Steiner et al proposed strong fixation as the key to success in soft tissue grafts[13].

Petterikousa based on in his bio-mechanical study comparing various fixation devices published that the Bone mulch screw is superior to any other device in providing stiffer fixation of soft tissue grafts and endobutton second only to bone mulch screw [14].

Robert G Marx reported two cases of failure with femoral cross pins [15].

Chae Gwan Kong showed endobutton to be superior than cross pins in femoral fixation [16].

Whereas Young Ho showed that a hybrid fixation with a endobutton and a bio screw in femoral tunnel provided adequate stability and stiffness [17].

Andreas Weiler published his results of bioabsorbable round contoured screw to be better than the regular titanium interference screws. We used endobutton as femoral fixation device and titanium interference screw as tibial fixation device. Though there are concerns about the bungee effect of the graft while using endobutton causing movement of graft in the tunnel, tunnel widening and interference to graft incorporation, a recent study had reported tunnel widening was more with interference screw than the endobutton and attributed tunnel widening to biological factors rather than mechanical factors of the fixation device. In our study there was no pull outs or graft fixation site failures and endobutton was able to withstand the post-operative rehabilitation.

In our study we used transtibial or transportal single bundle reconstruction with quadrupled hamstring graft placing the femoral tunnel between 10:30 and 11'o clock position in the right knee and between 1'o clock and 1:30 position in the left knee.

John Paul proposed that placing graft at 10:30 position and 1:30 position in single bundle reconstruction reconstructs portions of anteromedial and posterolateral bundles[18].

Masayoshi Yagi showed that anatomic reconstruction allowed better rotatory stability than non-anatomic placements of graft[19].

Asheesh Bedi showed that trans-portal placement of tunnel achieved more lateral placement than the trans-tibial drilling and trans-tibial approach to achieve lateral tunnel placements resulted in over reaming of tibia. Though double bundle reconstructions have gained attraction and studies have shown double bundle reconstruction to be superior in providing stability in high demand patients [20].

Adachi, Ochi and Uchio showed no significant advantage of double bundle reconstruction than anatomic single bundle reconstruction in factors of stability and proprioception in general population [21]. The metallic screws distort the knee MRI wherein bio-absorbable screw avoids impairment of imaging. Apart from this metallic screws have to be removed during surgical revision wherein bio-absorbable screws would have been degraded. The major disadvantages are screw breakage at the time of insertion and post-operative inflammatory reaction causing synovitis. We did not come across such problems in our study.

Fox et al; [22] reported 3 to 17% incidence of anterior knee pain, compared to 13% in our study, Apostolopoulos [23] reported 10% of anterior knee pain. Kurt Spindler [24] stated regular exercise can lead to increased outcomes in 2005.Our patients are put on home based physiotherapy programme insisting on knee flexion and quadriceps strengthening and mean flexion achieved was 135 degree.

J A Grant [25] concluded that home based physiotheraphy is cost effective and not significantly inferior to supervised programmes. As overall conclusion several factors influence the functional outcome in arthroscopic ACL reconstruction. Factors like graft choice, graft fixation, tunnel placement and graft tensioning play a vital role in altering the final outcomes.

CONCLUSION:

The results of our study were comparable with already published reports of comparative study done using bio-absorbable versus metal interference screws. Our study shows that there is no difference in functional outcome whether bioabsorbable or titanium interference screw was used.

The success of ACL reconstruction depend on the correct technique used for the surgery, precise placement of graft and rehabilitation methods than on type of graft fixation device used, neither titanium nor bioabsorbable screws.

The blunt metal or titanium screw has been the de facto standard in graft fixation. Since the alternate bioabsorbable screw overcomes some of the potential drawbacks, it should become the de facto standard in the future.

Clinical pictures:
Case 1:

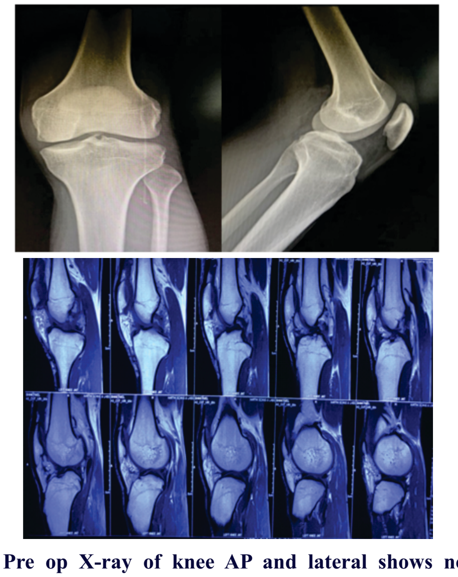


Fig 2: Pre op X-ray of knee AP and lateral shows no bony abnormality and MRI shows Complete ACL tear

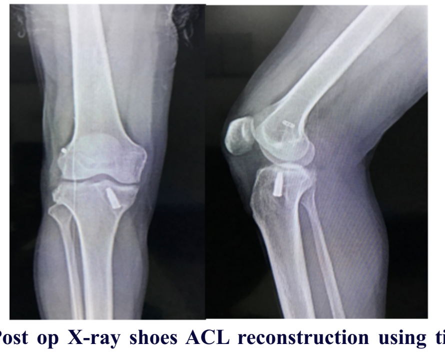
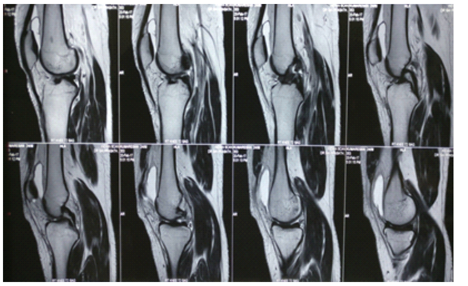


Fig 3: Post op X-ray shoes ACL reconstruction using titanium screws



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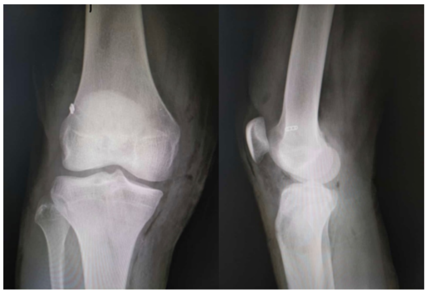

Fig 5: Post op X-ray shows ACL reconstruction done using Bioabsorbable screw.

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