

# IAS NEWSLETTER



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## ARTICLES IN THIS ISSUE

### IAS Academic Corner:

Moderators: Dr Deepti Nandan, Dr Sunit Hazra

Co-ordinators: Dr Sandeep Biraris, Dr Ramakanth R, Dr Terence

### Expert Talk: Keynotes

Tensionable suture anchor technique-philosophy and utility  
Dr J Maheshwari(Pg 2)

### Interesting cases:

Arthroscopic fixation of comminuted bony bankart lesion with repair of massive retracted rotator cuff tear-A technical note  
(Pg 3-7)

Implantless press fit graft fixation technique at Patella for MPFL reconstruction(Pg 8-12 )

# EXPERT TALK

## TENSIONABLE SUTURE ANCHOR TECHNOLOGY

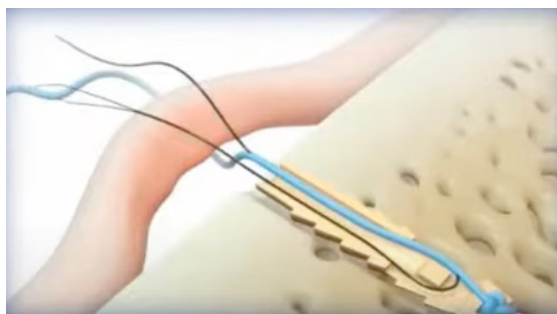
### PHILOSOPHY & UTILITY



Dr J MAHESHWARI

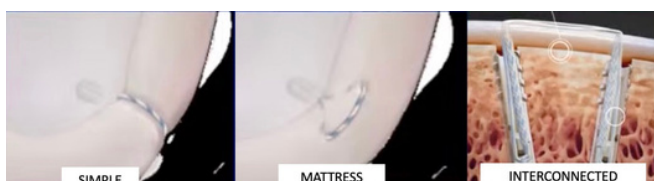
JMVM SPORTS INJURY CENTER  
IN COLLABORATION ABHINAV BHINDRA INITIATIVE  
(ABTP)  
SITARAM BARTIA HOSPITAL, SOUTH DELHI

## HIGHLIGHTS



Tensionable Suture Anchors

- Second-generation knotless PEEK/All Suture Anchor.
- Advantages:  
No knotting skills required saves time, good loop security, knot security-no concerns, no chondral abrasions due to knot migration.
- Overcomes problems of first-generation knotless(Suture first technique):  
Fine-tuning between tissue bite and anchor placement,  
difficulty in finding the pilot hole & Controlling tension was not possible.
- Suture configurations: Simple(Bankart repair), Interconnected( Remplissage & Bony Bankart repair).
- Knotless tensionable technology(KTT) has made labral repair quick & predictable with versatile applications for remplissage & bony bankart repair



Suture configurations for Tensionable Sutures

# ARTHROSCOPIC FIXATION OF COMMINUTED BONY BANKART LESION WITH REPAIR OF MASSIVE RETRACTED ROTATOR CUFF TEAR-A TECHNICAL NOTE



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## Abstract:

Managing concomitant cuff tear with comminuted bony bankart is a challenging scenario. Appropriate management of bony pathology and the rotator cuff tear is necessary in cases associated with both. Bony Bankart with considerable glenoid involvement

results in recurrent instability if not treated accordingly. We describe our preferred technique of bony bankart repair with rotator cuff repair in a seventy years old male diagnosed with large comminuted bony bankart lesion along with massive cuff tear.

## Introduction:

The association of comminuted bony Bankart with massive rotator cuff tears is rare(1). Various techniques are described for bony bankart fixation which include labrum alone, transosseous, and double-row repair(2,3,4). However, arthroscopic management of a comminuted bony Bankart lesion is less reported in the literature(5). In this Technical Note, we describe our preferred arthroscopic bony bankart repair technique using the transosseous method, incorporating a comminuted bony Bankart fragment and rotator cuff repair.

## Case:

Seventy years old male presented with complaints of pain and difficulty in moving the right shoulder for the last 3 weeks following a trivial fall, which was associated with dislocation of the right shoulder, which was reduced and immobilized. The patient could do routine activities using the right shoulder without any symptoms before the fall. On examination glenohumeral joint was tender, and movements were painful, with no neurovascular deficits.

## Evaluation and Preoperative planning:

The evaluation included radiographs. AP view showed mild haziness in the anteroinferior glenoid rim. A computed tomographic scan(CT) and a 3D reconstructed glenoid after subtraction of the humeral head( En-face view)

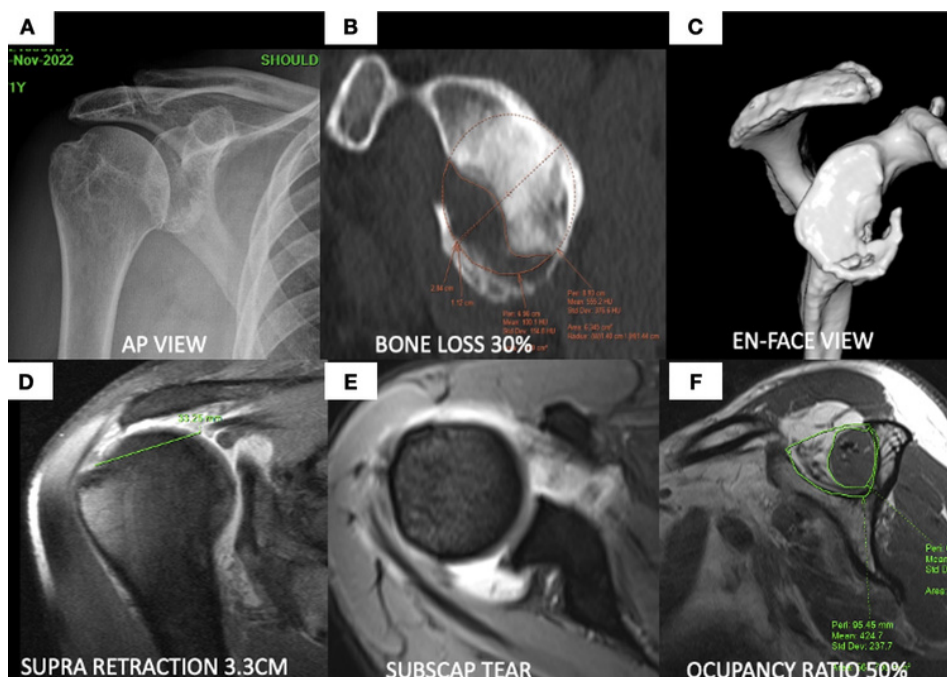


Fig 1 : Pre-operative imaging . A: Plain radiograph, B&C: CT images, D, E, F: Coronal, axial and sagittal MRI cuts.

confirmed comminuted bony anteroinferior glenoid rim fracture, and glenoid bone loss accounted for 30%. Magnetic resonance imaging(MRI) revealed a supraspinatus tear(3.3cm retraction)and an infraspinatus tear (3.2cm retraction)along with an upper third subscapularis tear. An occupancy ratio of 50% and grade1 fatty infiltration were noted(Fig 1).

## The technique of bony Bankart repair:

An interscalene nerve block is administered preoperatively. After the induction of general anaesthesia, the patient is placed in the lateral decubitus position. An axillary roll is placed, and the right shoulder is suspended in a traction arm holder.

A standard posterior portal is established, and the arthroscope is advanced into the glenohumeral joint. Diagnostic arthroscopy is performed. An anterior portal is established using an outside-in technique under spinal needle localization, and an 8-mm cannula is inserted.

An anterosuperior portal is established, and a 6-mm cannula is inserted. The arthroscope is switched to the anterosuperior portal. The labrum and bony Bankart lesions are probed from the anterior portal. Labral injury extended from 2'o clock to 6'o position, and the labrum was detached and separated from its continuity. The glenoid rim is comminuted with three fragments. The main fragment which is attached to the labrum; one small upper fragment is independent, and a lower-middle fragment is interposed between the glenoid and the main fragment. (Fig 2A). The reducibility of the fragments and labrum is checked provisionally by mobilizing them to their appropriate position with an arthroscopic grasper.

The first anchor is inserted at a 4 o'clock position. Through the anterior portal, a pilot hole is made, and a double-loaded anchor (Fig 2B) is inserted. A 6-mm cannula is inserted into the joint through the posterior portal. Alternate Sutures are retrieved and parked in the posterior portal. A long straight large, bore needle(14 gauge needle used in hip arthroscopy) is introduced from the posterior



portal, the main fragment, along with the labrum attached to it, is held with an arthroscopic grasper, and the needle is advanced through the bone (Fig 2C) while counterforce is given by the arthroscopic grasper holding the fragments from the anterior portal.

Nitinol wire is passed through the large bore needle and retrieved anteriorly, sutures that are parked in the posterior portal are fed into the opposite end of the nitinol wire, and the sutures along with nitinol wire are pulled out through the anterior portal. The same steps are repeated again with another set of sutures to complete the horizontal transosseous stitch (Fig 2D). These sutures are tied using sliding knots through the anterior portal with knots positioned on the bone. The gap between the glenoid and the main bone fragment gradually closes, compressing the middle fragment to the glenoid with successive knots.

Postero lateral portal is established. A suture-passing device curved to the opposite shoulder (in our case, left curved suture passing device) is introduced through the posterolateral portal and passed through the posteroinferior capsule and labrum at 7 o'clock position (Fig 2E). Suture tape is passed through the lasso, and both ends of the tape are retrieved through the anterior portal. A pilot hole is made for a knotless anchor at a 5.30 o'clock position over the glenoid rim (Fig 2F). The suture tape is secured to the glenoid using a knotless anchor. While performing this step, care should be taken to leave an adequate length of suture tape to avoid forceful bunching up of the labrum onto the glenoid. This compresses the lower middle fragment to the glenoid and gives additional support to the construct.

## Rotator cuff repair:

After completing the bony Bankart repair, the arthroscope is shifted to subacromial space through the posterior portal. Supraspinatus and infraspinatus are retracted till the glenoid with a tear involving the upper third of the subscapularis (Fig 3A). Rotator cuffs mobilized by doing subacromial and supra glenoid release. Subscapularis, supraspinatus & infraspinatus is repaired using double row cuff repair technique (Fig 3B). After completing the repair, checked for stability and impingement on rotations. Portals are closed using absorbable sutures.

## Rehabilitation:

The arm is placed in a shoulder abduction brace. Active elbow and wrist movements start from day one postoperatively, and passive range-of-motion exercises after three weeks. The abduction brace is used for six weeks, progressively advancing to an active range of motion to achieve a full range of motion in 3 months. After that, shoulder strengthening exercises are started. Total return to activities is allowed six months after surgery.

## Discussion:

Appropriate management of bony pathology and the rotator cuff tear is necessary in cases associated with both (6). Bony Bankart with considerable glenoid involvement results in recurrent instability if not treated accordingly (7). In our case, though it is associated with instability and rotator cuff tear, our focus is on the technical aspect of repair of bony Bankart.

The technique described above is a straight forward alternative for reducing and stabilizing large bony Bankart fractures associated with comminution. This technique enables the incorporation of the unstable fragments into the repair indirectly without requiring sutures to be passed through small independent fragments.

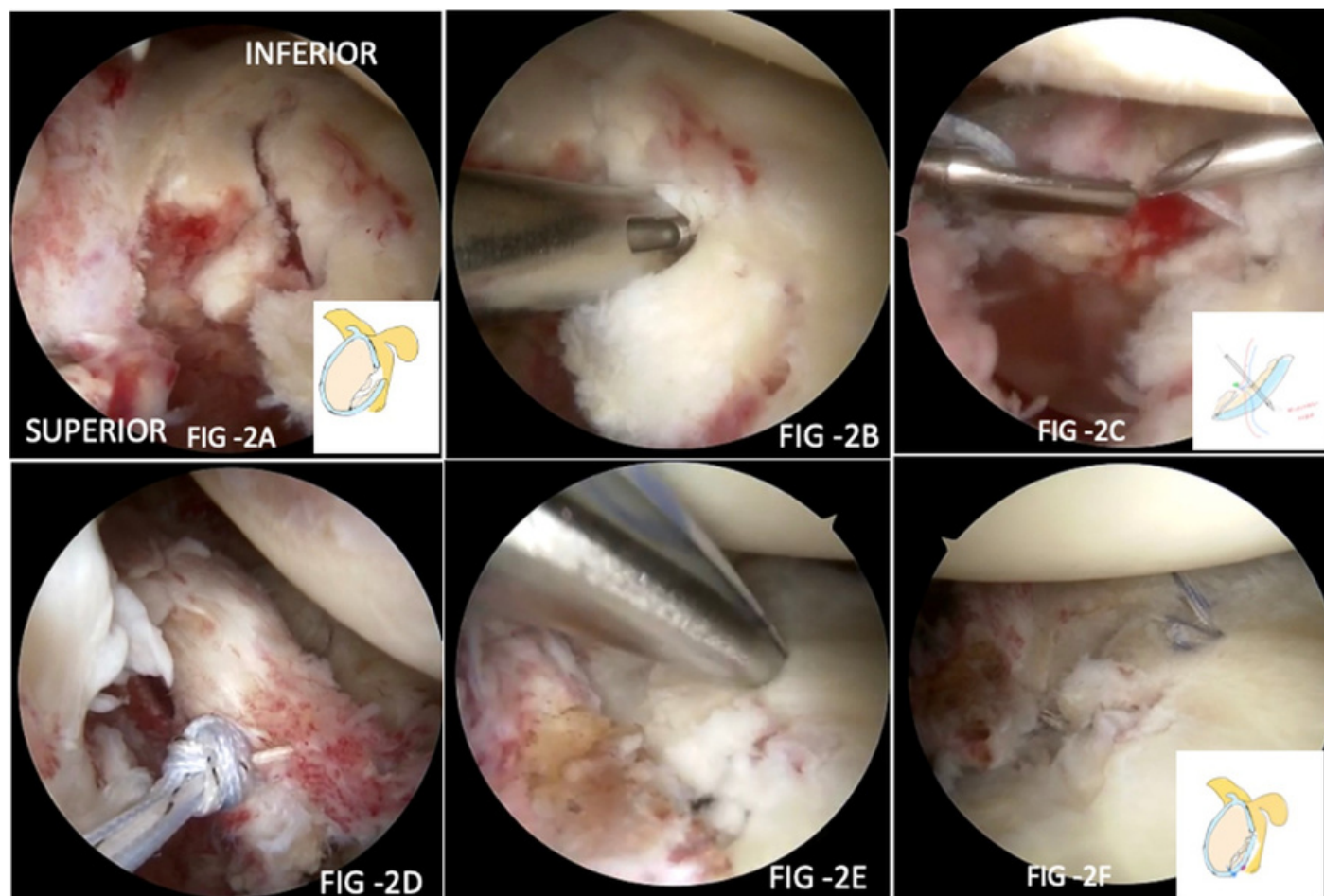


Figure 2: Intra-operative arthroscopy imaging: A: Comminuted bony bankart, B: Inserting double row anchor, C: Inserting a 14 gauge Hip arthroscopy needle through the bony fragment, D: Completed horizontal mattress transosseous stitch, E: Making a pilot hole for the push lock anchor for the inferior labral stitch, F: Completed repair

The advantage of using an arthroscopic technique for cases with concomitant bony Bankart and cuff tears is that it allows close inspection and management of associated intra-articular pathology and confirmation of anatomic reduction. It also avoids the morbidity and complexity of an open surgical approach.

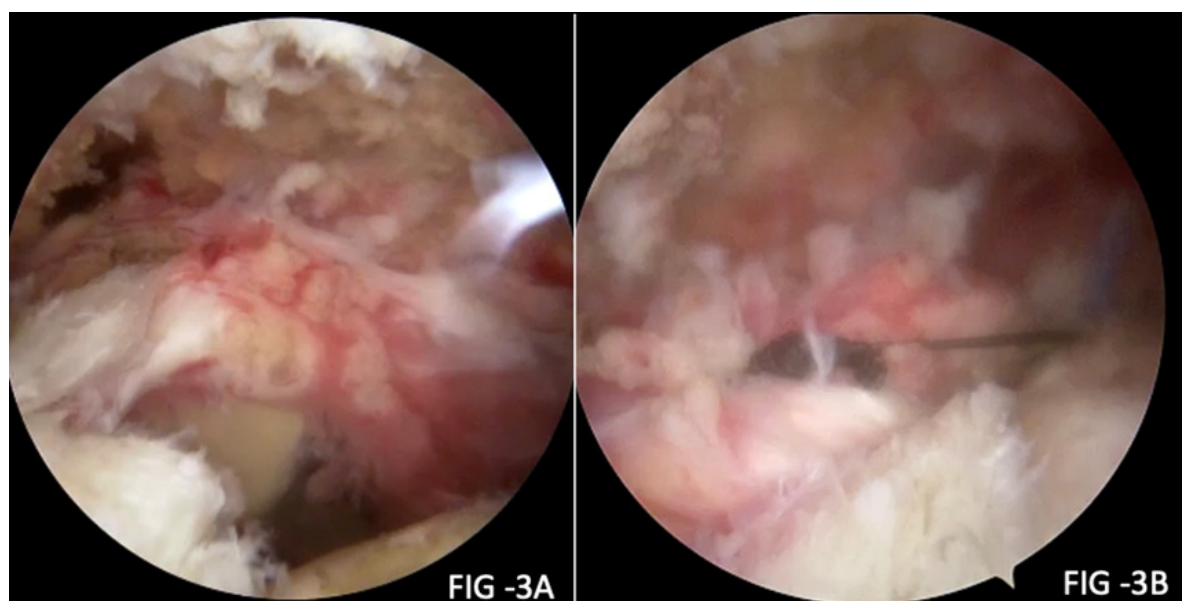


Fig 3: Intraoperative images showing cuff tear. A: Retracted cuff tear, B: Completed Double row cuff repair

## Conclusion:

- Transosseous repair gives robust compression for the comminuted independent glenoid bony fragment.
- Addressing the rotator cuff tear along with bony bankart arthroscopically avoids the morbidities associated with open surgical procedures.

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## IMPLANTLESS PRESS FIT GRAFT FIXATION AT PATELLA FOR MPFL RECONSTRUCTION FOR RECURRENT PATELLOFEMORAL INSTABILITY



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### Abstract:

Patellofemoral instability is one of the most prevalent knee disorder in adolescents. It is often multifactorial and complex. Often accompanied by insufficiency or tear of MPFL ligament. MPFL is primary soft tissue stabiliser of patella and acts as checkrein of lateral patella dislocation. There have been variations in surgical techniques including different choices of surgical techniques, graft material and fixation methods, despite these there is no conclusive evidence that a particular surgical option is superior to another. Recurrent Patella instability requires individualised surgical planning .

In this article we present a surgical technique which is implantless socket type of press-fit fixation at patella .

### Introduction:

Recurrent Patellar Instability is the most common cause of anterior knee pain in skeletally immature and 2nd most frequent cause of traumatic haemarthrosis of the knee after ACL injury (1). This also accounts for 3% of all knee injuries(2) . Incidence of primary dislocation is 29/100000 in children and recurrent dislocation is 15-44% (3) whereas in 60% recurrence is seen in less than 14 yr old age group as compared to 33 % in older than 15 yrs. Incidence increases in 2nd decade and decreases by 4th decade and It is twice more common in females than males in general population where as in athletic population more male prevalence than female in both acute and recurrent patella dislocation (4). H De jour and the school of Lyon (5) classified patients having PatelloFemoral pathology associated with instability in 3 groups such as objective patellar instability, potential patellar instability and painful patella syndrome.



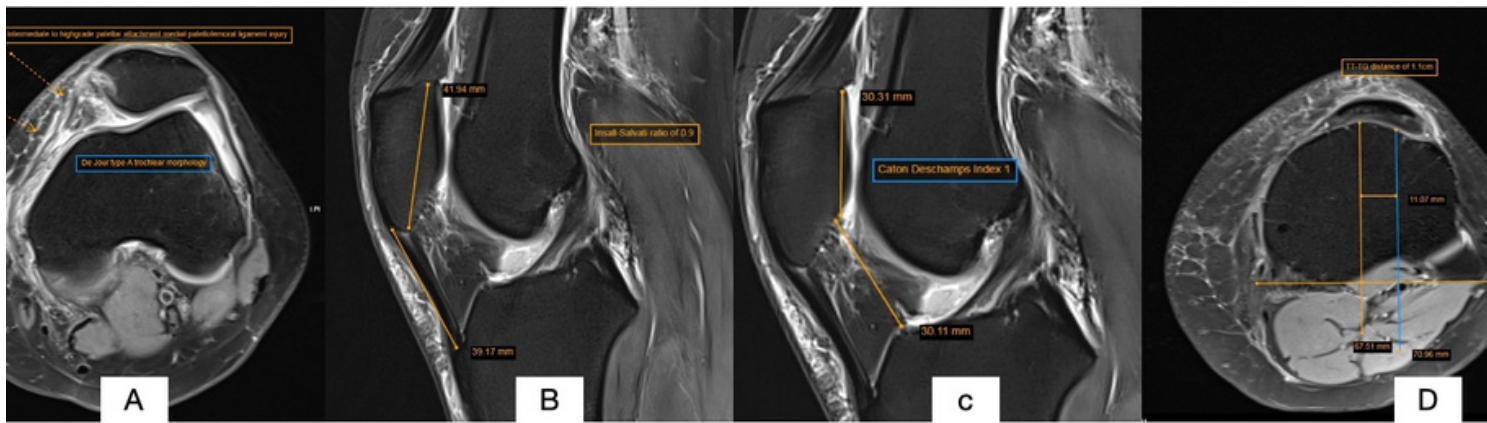


Fig 1 : MRI scan. A: Axial cuts showing high grade MPFL tear at Patella attachment with Dejour type A trochlear dysplasia, B: Sagittal section showing normal Insall Salvati ratio 0.9, C: Caton Deschamps index 1 & D: TT-TG distance 11mm

Patellofemoral instability is multifactorial and complex as it involves several abnormal anatomical factors such as trochlear dysplasia, patella Alta, patella dysplasia, rotational limb deformities, hypoplasia of vastus medialis obliquus, patella femoral and patellotibial ligament issues, extensors muscle dysplasia, generalized laxity (6). MPFL is a Primary static stabiliser of the patella providing 50-60% of restraint to lateral displacement in 0-30 degree flexion and with MPFL, MPML and vastus medialis obliquus confer PF stability. MPFL is damaged in 96% of patients with lateral patella dislocation (7,8). MPFL reconstruction has become the cornerstone among those warranting surgery. Surgery has shown superior results as compared to conservative treatment in RPI. Isolated MPFL reconstruction is indicated in recurrent patella dislocation with a mild degree of pathology. Or as an adjunct with lateral release TTO or Trochleoplasty (9).

## Case:

23yr male student reported with right knee pain and feeling of giving away. With a history of right knee lateral patella dislocation 17 months ago during a football tackle. Last dislocation was 3 months ago. On examination J sign, patella apprehension, quadrant test positive. No restriction in range of motion movement, normal Q angle and no generalized ligament laxity.

On investigation no X-ray abnormality in AP standing, lateral in 30 flexion and skyline views. MRI showing high-grade MPFL tear De Jour Type A Trochlear dysplasia, Insall Salvati was 0.9, Caton Deschamps index was 1 and Tibial Tuberosity - Trochlear Groove (TT-TG) distance 11 mm all within normal (Fig 1). As abnormalities in this case were MPFL tear and mild trochlear dysplasia we went ahead with isolated MPFL reconstruction.

## Surgical technique:

- After Spinal anaesthesia, Patient in supine position and non-sterile tourniquet was used. Marked affected limb is prepared and draping was done as per protocol
- Physical examination was performed to assess for medio-lateral displacement of patella and retinacular tightness and then tourniquet was inflated
- Diagnostic knee arthroscopy is performed to inspect for any intra articular pathology (cartilage / loose bodies/ ligaments).
- Using oblique anteromedial incision, at level of tibial tuberosity, the gracilis tendon is harvested. The two ends of the graft are each sutured with No: 2 FiberWire using a whipstitch technique

- Patella preparation-A longitudinal skin incision is made on the medial aspect of middle-third of patella and deeper dissection done exposing medial margin of patella and retinacular tissue is removed with a nibbler to create a crater for the graft to lie on medial margin of patella.
- 2 parallel tunnels are made with 2.5 mm wire and is drilled from medial to lateral direction. 1st proximal wire which is placed around 5 mm distal to attachment of Vastus Medialis with 15mm between the 2 wires (Fig 2A,2B).
- A cannulated 4.5 mm drill with depth of 15mm is drilled over the 2.5mm wire containing a small eyelet (Fig 2C,2D)
- Ethilon No: 1 suture is looped on its length to form a loop and the free end is kept ready
- 1st proximal beath pin is loaded with loop end and retrieved through the tunnel laterally (PS). A second distal end beath pin loaded with a free end and retrieved laterally(DS) through the skin incision of the previously used anterolateral arthroscopy portal or simply pierced through the skin.
- Next the Ethilon with a free end on the lateral side (DS)is loaded onto the loop end of ethilon on the lateral side (PS) and then the free end of ethilon on the medial (Proximal medial suture) is pulled so that by the end of this step there is a U shape single ethilon with one side loop on the medial distal tunnel and free end on the other medial proximal (Fig 2E).
- Next 2 opposed double different colour fibre wire is passed through the loop of U shaped ethilon which is pulled around the lateral bone bridge medially through the drill holes (Fig 2F,2G)

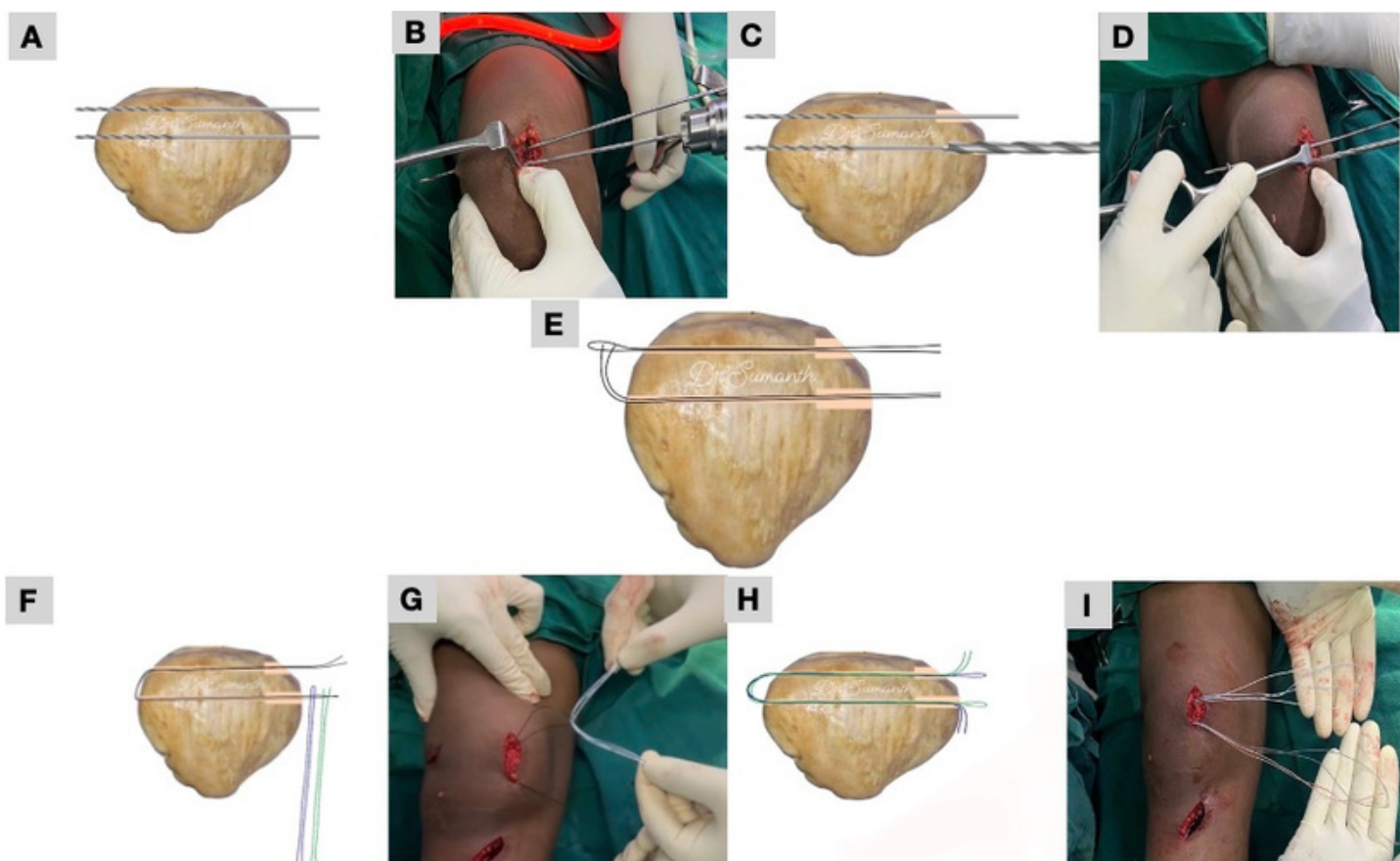


Fig 2 : Surgical Technique. A, B: parallel 2.5 mm wire from medial to lateral 1st proximal wire placed around 5 mm distal to attachment of vastus medialis with 15mm gap between the 2 wires, C, D: A 4.5 mm cannulated drill is drilled both in proximal and distal with depth of 15mm over the 2.5mm wire containing a small eyelet, E: Ethilon no 1 with free end on lateral side in distal tunnel being loaded on to loop end of 2nd ethilon on lateral side in proximal tunnel, F,G: Two different coloured opposed fiber wire is passed the loop, H,I: Two free ends of one Fiber Wire and the loop of other fibre wire at proximal tunnel and 2 free ends of one Fiber Wire and the loop of the other fibre wire at the distal on the medial side

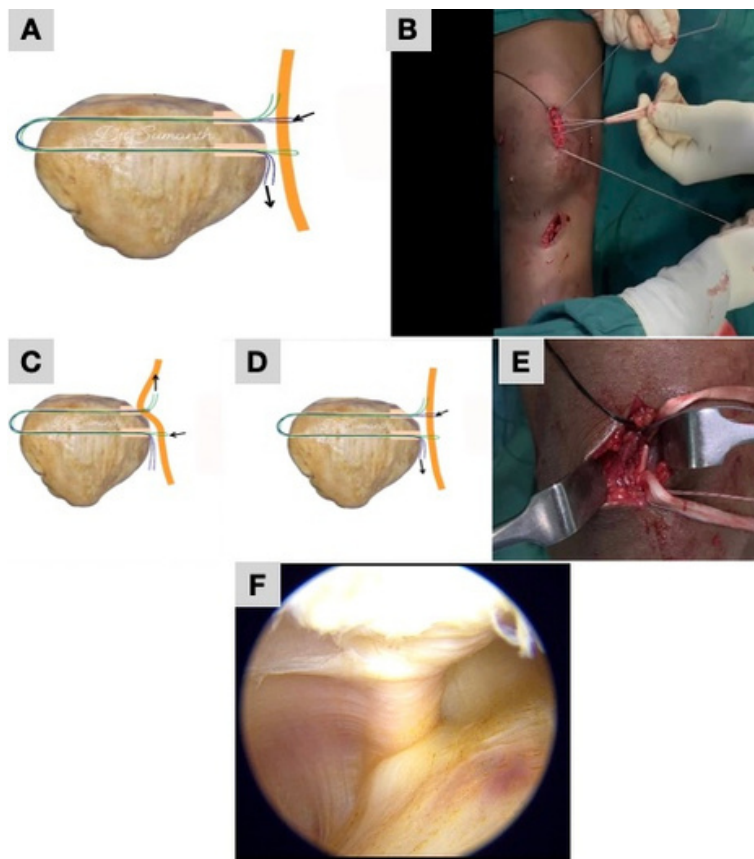


Fig 3. Surgical Technique. A, B: The central part of the graft is loaded into the suture loop of both firewire, C,D, E: Graft is placed within the socket by pulling on the free ends of both sutures. F: Arthroscopic image of reconstructed Medial Patello femoral ligament

- On medial there should be 2 free ends of 1 FiberWire suture and the loop of the other fiberwire should be at the proximal medial drill holes . The 2 free ends of 1 FiberWire and the loop of the other Fiberwire at the distal (Fig 2H,2I)
- The central part of the graft is loaded into the suture loop of both fiber wire and placed on the medial groove ( Fig 3A,3B )
- By pulling on the free ends of both sutures (proximal and distal), the graft is pulled press-fit into the 1-cm bone socket. Simple knots are applied over the free ends of the suture to secure the graft onto the medial patellar facet (Fig 3C, 3D, 3E )
- Femoral preparation palpate the medial epicondyle and adductor tubercle prior to making the incision.
- A 2 cm vertical skin incision is made between the two points.
- The Schottle's point, which is confirmed under fluoroscopic guidance.
- A 2.5 mm beath pin is drilled from the Schottle's point, with the beath pin directed proximally and anteriorly.
- By use of a 6-mm cannulated drill, a bone tunnel is made at the medial tubercle. Another suture is passed through the eyelet at the end of the wire and pulled through the bone. Both free ends of the graft, already armed with sutures, are passed between the second and third capsular layers and through the femoral shuttling suture. Both ends of the graft are pulled into the bone and fixed with a 7-mm interference screw at 30-40 degrees of knee flexion. Attention is paid not to over-tighten the graft.
- Extra-articular graft placement is confirmed under arthroscopy. Arthroscopic intraoperative image post-MPFL reconstruction as illustrated to confirm extra-articular graft placement (Fig 3F). The wounds are thoroughly irrigated and subcutaneous tissue is closed with No: 2 Vicryl and skin with skin staples. The advantages & possible complications of the technique have been summarized in Table 1.



Table 1: Advantages & Possible complications of the technique	
Advantages	Possible complications
<ul style="list-style-type: none"> <li>• Anatomical double bundle fixation</li> <li>• Implant less fixation at patella - avoid related complication</li> <li>• Press fit socket type fixation</li> <li>• Tendon to bone healing over the medial patella border</li> <li>• Decreases chances of patella fracture</li> </ul>	<ul style="list-style-type: none"> <li>• Suture loosening</li> <li>• Irritation on lateral side of the patella</li> <li>• Improper tunneling</li> </ul>

Table 1: Advantages and possible complications of the technique.

## Rehabilitation:

- Extension Long Knee Brace - 3 weeks
- Non-weight bearing for 2 Weeks
- Knee Flexion - 0-30- 2 Weeks, 0-60 3rd Week, Full Range from 4th Week
- Quadriceps Exercise from post-op day 1
- Muscle Strengthening Exercises From 7-8 Weeks
- Return To Sports From 5 Months

## Conclusion:

- Preoperative - Meticulous Clinical And Radiological Assessment for an individualised approach.
- Key to good reconstruction is to restore anatomy , maintain isometry and avoid over tightening of the graft .
- No conclusive evidence of superior of one surgical technique over others .
- Milder degree of associated pathologies can be addressed by Isolated MPFL reconstruction.

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