

## Comparison of Modified Intraosseous Patella Suturing vs Conventional in TKR and its Outcome in Post Operative Patella Tracking

Manju G Pillai<sup>1</sup>, Clint Hugh<sup>2</sup>, Sanjay Nath<sup>3</sup>, Achu S Nair<sup>4</sup>

<sup>1</sup>MBBS, DNB Orthopaedics, Associate Professor, Pushpagiri Medical College and Research Institute, Thiruvalla

<sup>2</sup>MBBS, MS Orthopaedics Assistant Professor Pushpagiri Medical College and Research Institute, Thiruvalla

<sup>3</sup>MBBS, MS Orthopaedics, DNB Ortho Assistant Professor Pushpagiri Medical College and Research Institute, Thiruvalla.

<sup>4</sup>MBBS Post Graduate - Orthopaedics Pushpagiri Medical College and Research Institute, Thiruvalla.

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Corresponding Author: Dr Manju G Pillai

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### Abstract:

**Aim:** To develop a novel technique of modified intraosseous patella suturing and to compare with conventional suturing technique and its effect in post-operative patella tracking.

**Method:** We have described a technique of intraosseous patella suturing technique for the arthrotomy wound. A prospective comparative longitudinal study was done in our tertiary care center over a period of 6 months starting from November 2022 till April 2023 wherein the patients were categorized into two groups - Group A conventional technique while Group B our novel technique was done for suturing of medial arthrotomy wound. Post-operative patella tracking was estimated using patella tilt and lateral displacement in standard radiograph.

**Result:** This is an easily reproducible technique and has several advantages over other methods of closure. In group B nearly 90 percentage of patients had better outcome in-terms of patella tilt and lateral displacement compared to group A.

**Conclusion:** The modified intraosseous patella suturing technique can be used for medial arthrotomy closure and has better outcome in terms of patella tracking post operatively.

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### Introduction

The seventies marked the beginning of the era of Total Knee Replacement (TKR). Over the years the operation has now evolved both in terms of component design and surgical technique. TKR is meant to relieve pain from arthritis and is generally recommended for older people as it has a finite life. However newer designs and materials are available for younger patients with arthritis. The success of a TKR depends on various factors which include appropriate choice of implant and meticulous

surgical technique. It is often said that a knee replacement is a soft tissue operation and balancing the soft tissues gives good outcomes. Mention must also be made of the concept of minimal soft tissue trauma surgery where gentle handling of the tissues during surgery helps in reduced wound complications.

Many standard textbooks of knee arthroplasty do not dwell on the detail of closure. Meticulous wound closure has a bearing on wound healing and also on infection rate. Anatomical and watertight arthrotomy closure reduces the dead space, and provides a

tamponade effect thus reducing the hematoma formation. Patellar maltracking is one of common encountered complication after total knee arthroplasty (TKA) can lead to anterior knee pain, increased component wear, and a higher risk of component loosening, patellar fracture, instability, and poor clinical outcomes. We surgeons usually face a challenge in reducing the incidence of patellar tilt.

We describe a novel technique of intraosseous suturing through patella for medial arthrotomy that prevents patella maltracking thereby preventing secondary surgery rate.

### Materials and Method

#### Subject

This a prospective comparative longitudinal study was performed in a tertiary care hospital with the approval of the institutional review board. The senior author performed and used this technique in 20 total knee arthroplasties done in over a period of 6 months starting from November 2022 till April 2023. The inclusion criteria were patients of all BMI presenting

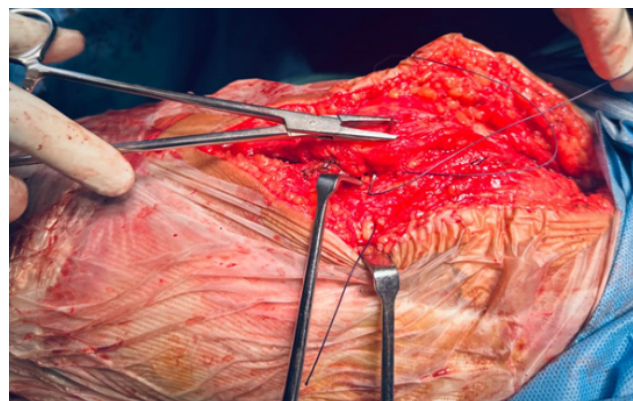
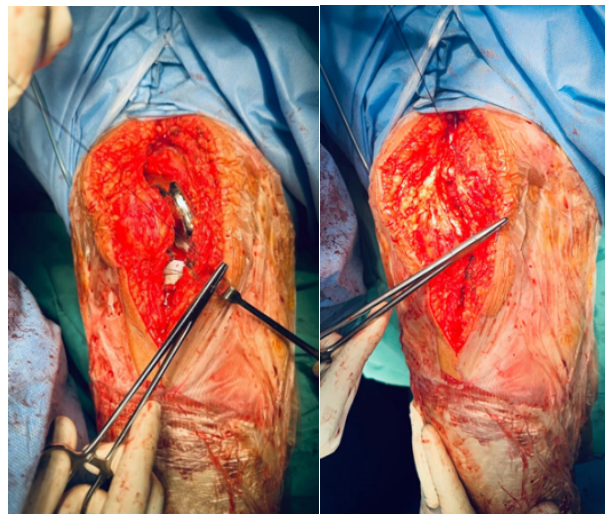
with Kellgren & Lawrence grade 3 and higher. Patients were allocated into two groups randomly, with 10 subjects in each group. In Group A -medial arthrotomy wound was closed by conventional technique while in Group B our novel technique was done.

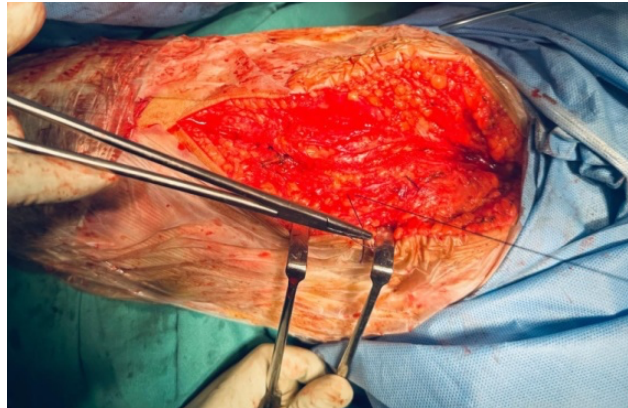
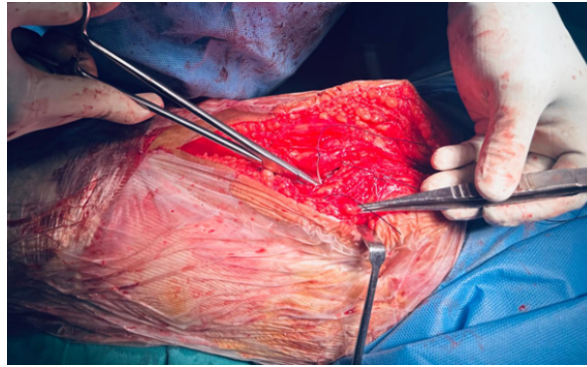
### Surgical Technique

The operations were performed by the senior author using a uniform approach and Posterior stabilized (PS) -type Knee system. Suitable anesthesia is administered and the surgeon performed an anterior midline skin incision and medial parapatellar arthrotomy. Adequate soft tissue balancing was done,

bone cuts were made and cemented tibio-femoral components were inserted.

The arthrotomy wound closure is done in knee in slight flexion in the following sequence, initially a box suture is taken at the inferior pole of patella using an OS -vicrylsuture material, followed by another box suture at the superior pole of patella and later the intraosseous suture is taken through the mid- substance of patella. Once this step is done knee is kept at flexion and closure is carried out till the distal and proximal limit of arthrotomy. Subcutaneous and skin closure carried out followed by dressing of wound.



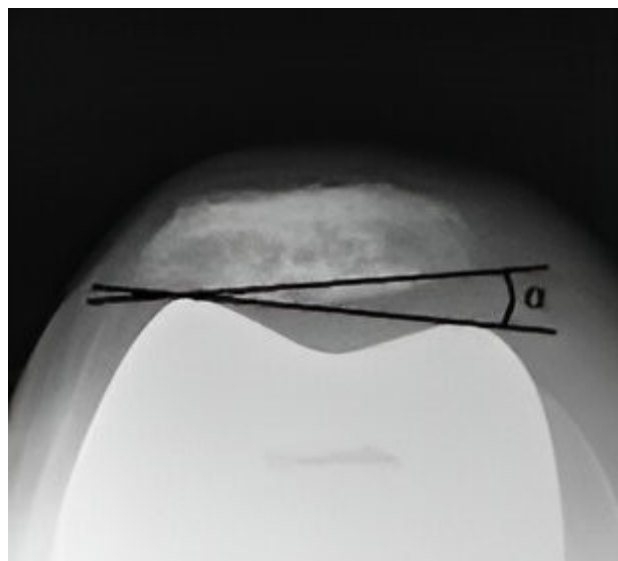


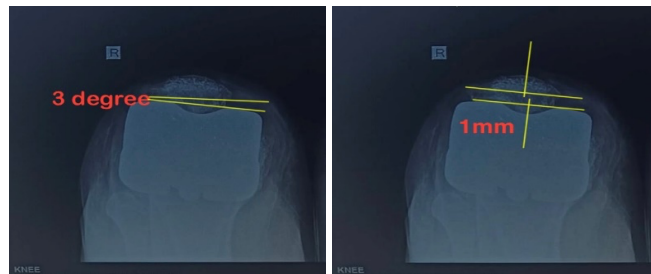
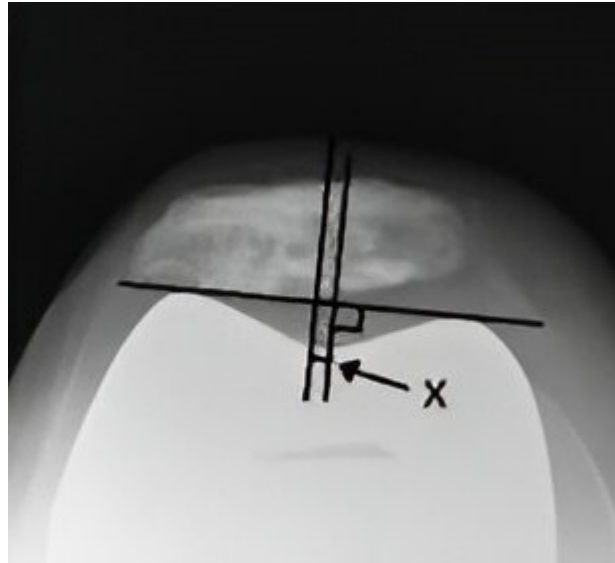
Both groups were discharged uneventfully in post-operative day 3 and were followed up in our out-patient department. Patellar tilt and displacement was assessed radiologically using AP, Lateral and Sky-line view in both groups in post-operative period.

#### Assessment of outcome

Preoperative patellar tilt and displacement were measured using skyline axial-projection radiographs, as described by Kim et al. Patellar tilt was defined as the angle between the equatorial line of

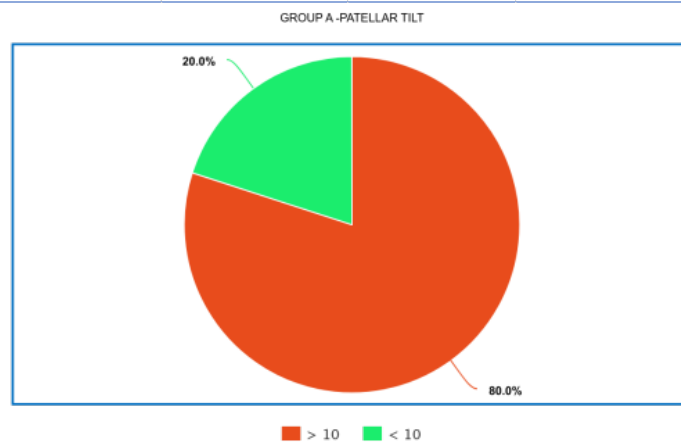
the patella and the anterior intercondylar line. Patellar displacement was defined as the distance from the intercondylar sulcus to the apex of the patella, which is the deepest point of the patella in relation to the equatorial line of the patella. Lateral patellar tilt or displacement was presumed to be positive. Postoperative patellar tilt and patellar displacement were measured as described by Nagai et al. Patellar tilt  $> 10^\circ$  or patellar displacement  $> 3\text{mm}$  was considered positive for patellar maltracking.

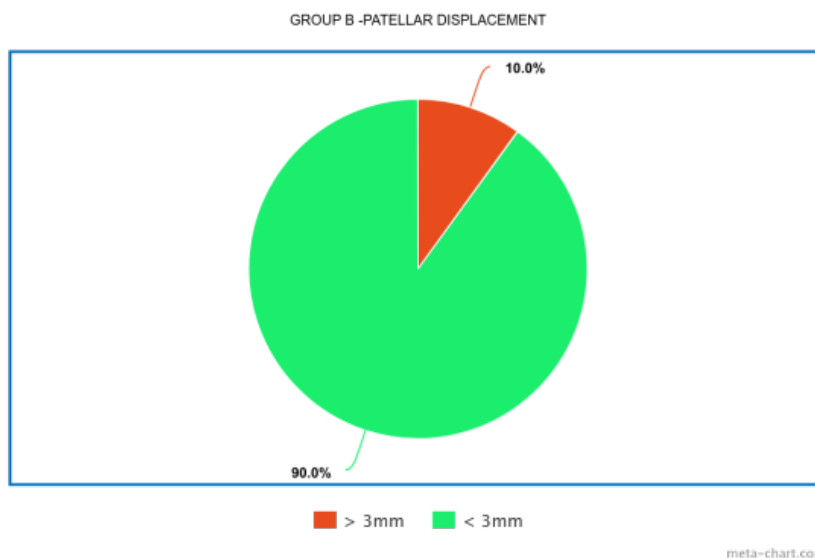
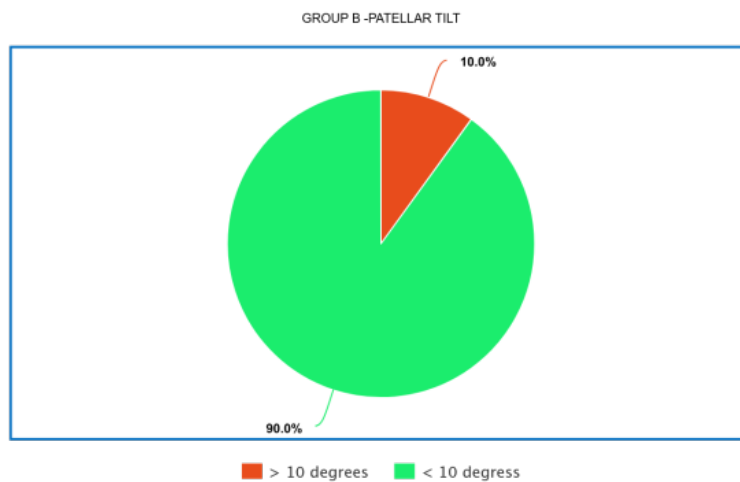
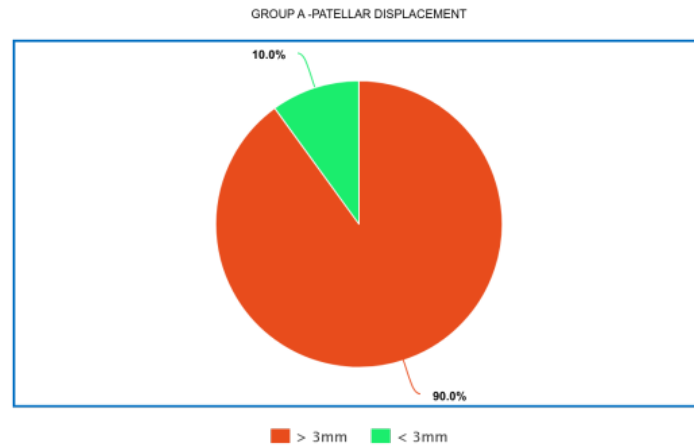




**Statistical Analyses**  
**Result**

GROUP A - PATELLAR TILT	GROUP A - DISPLACEMENT	GROUP B - PATELLAR TILT	GROUP B - DISPLACEMENT
15.4mm		3.1mm	
20.5mm		3.0mm	
13.4mm		5.1mm	
12.3mm		3.2mm	
10.3mm		7.1mm	
8.2mm		4.0mm	
22.5mm		12.4mm	
30.6mm		5.1mm	
18.5mm		5.1mm	
14.4mm		6.2mm	





**Discussion**

Patella maltracking is defined as a displacement of the patella center to a pathological position and features conditions like excessive patellar tilt, subluxation or complete dislocation. It is among the most frequent causes of poor outcomes and early failure after total knee arthroplasty, with an incidence that ranges from 1 to 20%. Patella maltracking after TKA can lead to anterior knee pain

(especially during activities such as stair climbing or chair rising), increased component wear (with higher risk of component loosening), patellar fracture and instability. Therefore proper patellar tracking is necessary for a successful outcome and various techniques have been introduced to prevent patellar maltracking, such as preventing internal rotation of the femoral or tibial component and lateral positioning of the components, modifying the

implant design, and the quadriceps -sparing approach. Over the years, many authors have proposed technical solutions to prevent patella maltracking in TKA, as reported by numerous in vitro and in vivo papers . First of all, it is crucial to identify the cause of the maltracking condition, to select the appropriate surgical procedure. In the absence of components mispositioning, soft-tissue reconstructions of the extensor mechanism should be considered as a first measure to manage patella maltracking. In TKA procedures, the medial structures can be damaged, due to the use of a medial parapatellar approach, hence an inadequate closure, leading to patellar displacement. Therefore, meticulous wound closure prevents post-operative patella maltracking. There are multiple soft tissue techniques like lateral retinaculum release as described by Johnson et al., V-Y quadricepsplasty by Chin et al., partial lateral patella facetectomy by Shen et al however our novel technique is easily reproducible and decreases the post-operative incidence of patella maltracking significantly as substantiated by our statistical analysis .

### Conclusion

Patella maltracking after TKA represents a frequent and challenging problem for orthopaedic surgeons . It is desirable to prevent maltracking conditions at the time of primary arthroplasty using proper surgical techniques . This modified intraosseous patella suturing technique can be used for medial arthrotomy closure and is easily reproducible and reduces the incidence of post-operative patella maltracking.

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