



PROSPECTIVE STUDY TO DETERMINE RESTORATION OF POSTERIOR CONDYLAR OFFSET AND THE RISK OF ANTERIOR FEMORAL NOTCHING IN TOTAL KNEE ARTHROPLASTY USING POSTERIOR REFERENCING TECHNIQUE

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ABSTRACT

Incidence of knee joint osteoarthritis has increased significantly during recent decades and this tendency will probably continue in near future due to rising age of population. Total knee replacement surgery has been definitive management for severe grade disease. There are two types of referencing techniques used while taking distal femoral cuts they are 1) Anterior referencing and 2) Posterior referencing. Both has their advantages and disadvantages. Literature shows that posterior referencing accurately restores posterior condylar offset relative to anterior referencing but there are chances of anterior femoral notching with posterior referencing technique. And anterior femoral notching in turn may lead to peri-prosthetic fracture. Various studies shows that anterior referencing technique affects the flexion gap tightness. This study is intended to assess the restoration of posterior condylar offset and the chances of anterior femoral notching in total knee replacement using posterior referencing technique by observing pre This is a prospective observational study of 50 consecutive cases of knee operative and post operative knee x-ray true lateral view.

KEYWORDS : Posterior condylar offset(PCO), Total knee replacement(TKR).

INTRODUCTION

Appropriate femoral component positioning and sizing is essential for proper kinematic function in total knee arthroplasty (TKA). Anterior or posterior referencing (AR or PR) are two major techniques for setting center of rotation and for balancing the sagittal plane of the arthroplasty. Both techniques have advantages and disadvantages.[1] With anterior referencing the size of the component is based on the amount of posterior femoral condyle that is removed. Thus, the size of the flexion gap after the posterior condylar resection will differ from anatomic if exact amount of resected condyle does not equals the amount replaced by the femoral implant.[2] Although with posterior referencing, following the posterior condylar resection the flexion gap is constant but variability in sagittal size creates a risk of notching the anterior femoral cortex as per few studies. [2] Anterior femoral notching can increase risk of peri prosthetic fractures.[3,4,5,6] Precision in the posterior condyle cut and restoration of the posterior condylar offset (PCO) is one of the most important concepts in obtaining a high flexion TKA. Both under resection and over-resection of the posterior femoral condyle have significant impact on the amount of flexion that can be achieved in the TKA. For every millimeter of posterior offset lost, flexion is reduced by 6 degrees.[7] Higher posterior condylar offset (PCO) in turn also leads to an increase in the clear space behind the femoral condyle. So during flexion, the posterior edge of the tibia needs to move into this space to allow flexion that leads to early abutment and reduced range of flexion.[7] A very few studies have been done to determine the restoration of PCO and the incidence of anterior notching using posterior referencing system for TKA.

METHOD:

50 consecutive TKA done by single surgeon using posterior referencing system for femoral cuts reviewed and considered for inclusion in our study. Pre- and post-operative perfect true lateral and true size knee X-rays taken. Using picture archiving and communication system(PACS), the posterior condylar offset determined from pre-operative and post-operative X-rays. The difference between the pre and post operative PCO calculated. Also using the Tayside classification the post operative anterior femoral notching determined using PACS system.

Standard method of measuring posterior condylar offset (pc) [8,9



The posterior condylar offset (PCO) was measured pre- and post operatively on true lateral knee radiographs by determining the shortest distance between the line tangent to posterior femoral cortex and the most posterior point of the femoral condyle (pre operatively) or femur prosthesis (postoperatively) respectively as shown above.

PCO alteration was calculated from the respective measurements. PCO alteration was defined as the value obtained by subtracting the amount of Preoperative PCO from the amount of postoperative PCO.

RESULTS AND DISCUSSION:

In our series of 50 knees (45 patients) with grade 4 osteoarthritis knee, there were 19 male patients and 26 female patients. out of which 5 cases have both knee involvement, underwent bilateral total knee replacement and 40 cases are unilateral total knee replacements. In 49 knee replacements posterior condylar offset was restored with in 0 cm to +0.3 cm. In one case pco increase beyond +0.3cm. In none of the cases pco decreased. In none of the cases anterior femoral notching was seen.

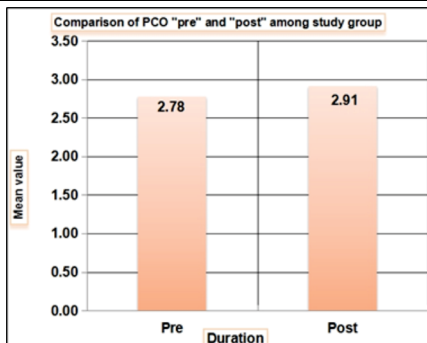
Table no: 1 Posterior condylar offset results:

Result	Frequency	Percent
Increased	50	100.00%
Restored With In 0 Cm And 0.3 Cm	49	98.00%
Increased	01	2.00%
Decreased	0	0.00%

Table No: 2 Comparison of pre op and post op posterior condylar offset in study group:

Study parametr	N	Mean	Std deviation	Unpaired t test	P value

Pre op	50	2.78	0.29	-16.819	0,000
Post op	50	2.91	0.29	Difference is significant	



GRAPH NO 1 Comparison of pre and post op PCO:

In our study of 50 total knee arthroplasties average mean preoperative PCO is 2.78 and average post operative PCO is 2.91. And unpaired t test is -16.819 .The p value is 0.00.

Table no 3 Anterior femoral notching :

Anterior femoral notching	Percent
NONE	100%

CONCLUSION

This study concludes that in total knee replacement using posterior referencing technique, most of the cases posterior condylar offset is restored and chances of anterior femoral notching is negligible. Further studies needed with large number of cases .

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