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TO STUDY THE MORPHOMETRIC ANALYSIS OF INTERCONDYLAR FOSSA OF DISTAL END OF FEMUR AND IT'S CLINICAL SIGNIFICANCE IN TOTAL KNEE ARTHROPLASTY.

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ABSTRACT

Background: Knee joint is a complex joint which includes both tibiofemoral joint and patellofemoral joint. The bony geometry of the tibia and femur contributes to the static stability of the knee joint and is responsible for the normal knee kinematics.The intercondylar notch/ intercondylar fossa is the area of the posteroinferior aspect of the distal femur between it's condyles. **Objective:** To study the morphometric analysis of intercondylar fossa of distal end of femur and it's clinical significance in total knee arthroplasty. **Material and Methods:** In this Cross-sectional descriptive study, 250 dry human femurs,125 right side and 125 left side, were examined, in the LN Medical College, Bhopal (Madhya Pradesh) region, where the morphology and morphometry of the distal end of femur, including bicondylar width, intercondylar notch – width, depth, height and curvature, Index parameters – notch width index and notch depth index were noted and documented. **Results:** In this study there were no statistically significant parameters between right and left femur As the bicodyler width, intercondylar width, intercondylar height, intercondylar depth intercondylar curvature found 65.82 mm,23.33 mm,28.22 mm, 32.17 mm, 45.39 mm in right femur and 66.21 mm, 23.32 mm , 28.75 mm, 32.22 mm, 44.75 mm in left femur respectively. **Conclusion:** The current study provides the morphometric measurements of intercondylar fossa of distal end of femur by direct method. For clinical relevance, it could serve as important landmark for the proper distal femoral resection during total knee arthroplasty for knees with significant deformities.

Introduction

Knee joint is a complex joint which includes both tibiofemoral joint and patellofemoral joint. The bony geometry of the tibia and femur contributes to the static stability of the knee joint and is responsible for the normal knee kinematics[1]. The intercondylar notch/ intercondylar fossa is the area of the posteroinferior aspect of the distal femur between it's condyles. The intercondylar fossa separates the two condyles distally and behind. In front it is limited by the distal border of the

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patellar surface, and behind by an intercondylar line, separating it from the popliteal surface[2]. Osteoarthritis is a degenerative disease causing deterioration and musculoskeletal disability of the knee joint[3]. Total knee arthroplasty (TKA) is a highly complex and precise procedure that aims to relieve pain and improve function of the knee joint[4]. The ultimate success of the total knee arthroplasty is related critically to knowledge of the anatomy of the distal femur and the predicability of key femoral dimensions. Maintenance of the natural joint line during total knee arthroplasty is important to obtain excellent post surgical outcomes[5].

Material and Methods

In this Cross-sectional descriptive study, 250 dry human femurs,125 right side and 125 left side, were examined, in the Department of Anatomy, LN Medical College, Bhopal (Madhya Pradesh) region, where the morphology and morphometry of distal end of femur, including bicondylar width, intercondylar notch – width, depth, height and curvature, Index parameters – notch width index and notch depth index were noted and documented.

- **Bicondylar width-** Maximum distance between both femoral epicondyles (BCW)
- **Intercondylar Notch Width (ICW) -** the line connecting the articular margins of the medial and lateral femoral condyles.
- **Intercondylar Depth (ICD) –** A distance from the horizontal line connecting the most posterior point of lateral femoral condyle and medial femoral condyle to the apex of the intercondylar notch.
- **Intercondylar Height (ICH) –** It is the maximum distance measured between the superior and inferior margins of the intercondylar notch.
- **Intercondylar Curvature (ICC) –** It is the maximum curvature measured at the level of apex of intercondylar fossa.
- **Notch width index** :The index was calculated for the intercondylar notch width by dividing the intercondylar notch width by the bicondylar width.
- **Notch depth index** : The index was calculated for the intercondylar notch depth by dividing the intercondylar notch depth by the condylar depth.

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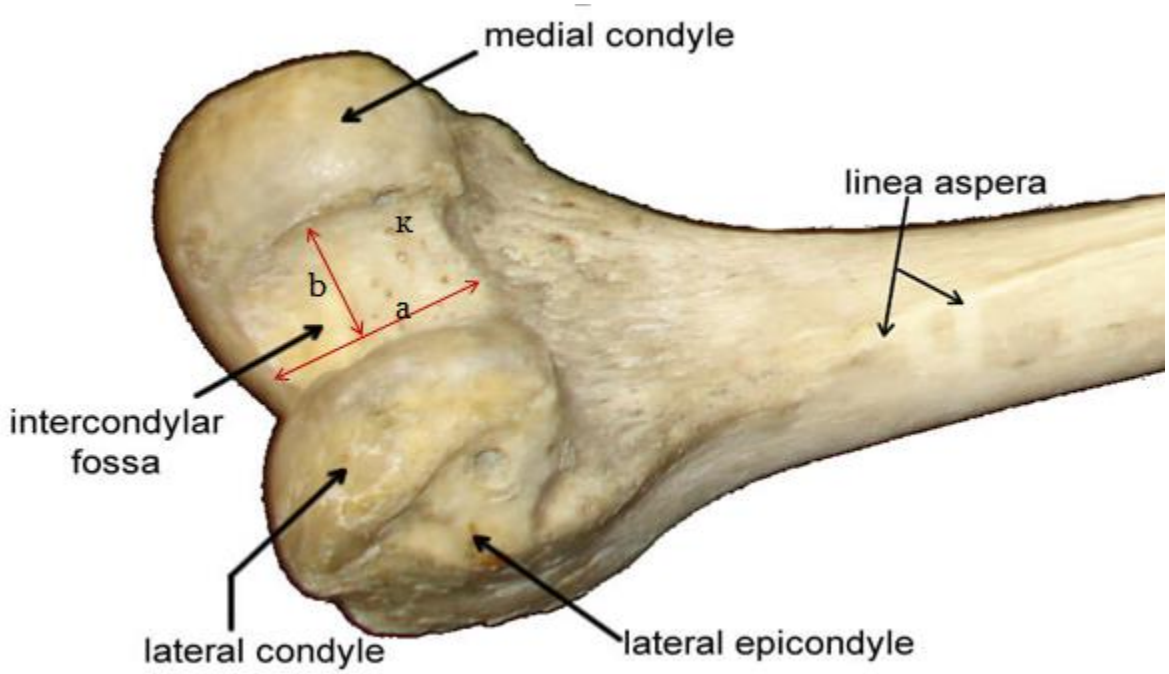

a) **Intercondylar height**

b) **Intercondylar depth**

c) **Intercondylar curvature (κ)**

Result

The observation of various parameters like bicondylar width, intercondylar width, intercondylar height, intercondylar depth, intercondylar curvatureare and the index parameters are as following-

PARAMETERS	**RIGHT FEMUR (in mm)**	**LEFT FEMUR (in mm)**
BICONDYLAR WIDTH	63.52 ± 6.22	66.52 ± 7.37
INTERCONDYLAR WIDTH	24.00 ± 4.93	22.67 ± 4.81
INTERCONDYLAR HEIGHT	24.23 ± 6.87	29.52 ± 3.27
INTERCONDYLAR DEPTH	31.43 ± 4.07	32.48 ± 3.54
INTERCONDYLAR CURVATURE	46.34 ± 6.29	44.15 ± 5.28
NOTCH WIDTH INDEX	.38 ± .085	.34 ± .088
NOTCH DEPTH INDEX	.56 ± .098	.61 ± .099

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Discussion

Distal femoral geometry performs a key role in maintaining the static stability of the knee joint. Subtle alterations in the bone geometry affect the kinematics of the knee. The rise in incidence of ACL injuries reported over the years has made the understanding of the underlying predictive risk factors significant[6]. In our study it can be seen that there is no significant difference in values of intercondylar notch of right and left femur. Measurement of NW and calculation of NWI , the normal values of which range from .18 - .25 have been used to establish the risk of ACl rupture[7]. In the present study it can also be observed that the values of notch width lies in the range whereras the increased range of notch width index value signifies the risk of ACL rupture.

Conclusion

The current study provides the morphometric measurements of intercondylar fossa of distal end of femur by direct method. The notch width index and notch depth index signifies the stenosis of the intercondylar notch and the risk of ACL rupture. For clinical relevance, it could serve as important landmark for the proper distal femoral resection during total knee arthroplasty for knees with significant deformities.

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