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To study certain lower end of femoral anatomy namely Bicondylar width and inter condylar notch at medical college, Jaipur

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Abstract

Background: The knee joint is one of the major joint of our body and lower end of femur forms important component of it. Knee joint is also commonly operated for replacement surgeries. In such cases, measurements of lower end of femur has great importance in designing of implants. Prosthesis based on accurate morphometric data of components of knee; femur and tibia, plays a crucial role, which will ensure early mobility as well as fewer complications after arthroplasty.

Methods: After applying inclusion and exclusion criteria 41 dried femur of each side (total 82) of unknown age and sex will be selected for present study. The bicondylar width and inter condylar notch width was measured.

Results: In present study mean BCW was 74.1±5.18 mm on right side and 74.53±4.51 mm on left side. No statistical significant difference found between right and left side as the p value was > 0.605. . In present study mean ICW was 22.6±2.44 mm on right side and 22.35±2.92 mm on left side. No statistical significant difference found between right and left side as the p value was > 0.620.

Conclusion: On comparison between right and left side measurements, no significant difference was found between values of parameters of right and left sided femur. This information will be useful to negate the need of side specific measurements for implant

Keywords: Femur, left, Right

Introduction

Total knee arthroplasty is widely acknowledged to be one of the most successful and cost effective procedures in orthopedic practice. Significant improvement in quality of life after TKA procedures have been attested to by several studies. Further improvements have been achieved by recent technological advancements in prosthetic design, instrumentation, surgical techniques, and rehabilitation. These results, when combined with an aging population, explain the dramatic rise in the number of TKA procedures performed all over the world.[1]

Total knee arthroplasty is a precise type of surgery that requires accurate soft tissue balancing and resection of bone thickness equal to the thickness of the prosthetic

component which we have to implant, so that the flexion-extension spacing are equal, allowing joint stability throughout the total range of motion. Prosthetic selection, accurate sizing and proper placement of the components determine the success of this procedure. The anteroposterior prosthesis dimensions is important in maintaining flexion-extension spacing while mediolateral dimension determines adequate coverage of the resected bone surface, tension free wound closure.[2] The maximal implant coverage at the resected bone will reduce the stress applied on the bone implant interface which is main factor contributing to long term survival in total knee arthroplasty.[3]

There are no published studies on the anthropometry of the distal femur in the Indian population. Hence the results obtained from this study would provide valuable data on the average dimensions of the distal femur which can serve as guidelines for designing a suitable femoral component of total knee prostheses for this population.

Material and Methods

Study Place: Department of Anatomy, S.M.S. Medical College, Jaipur

Study Period: From approval of plan till 15 December 2020.

Study Type: Descriptive type of observational study.

Study Design: Cross-sectional study.

Sample Size: Sample size calculated at 95% confidence level and alpha-error of 0.05 expecting standard deviation of 3.17 mm in the mean inter condylar notch with of right and left side of femur as per result of seed article : Hiren S. Chavda[1], Hishita K Jethva[2], Sudarshan Gupta[3] A Study of Morphometric Analysis of Condyles of Adult Dry Femur of Humans in Gujarat Region. DOI: 10.7860/IJARS/2019/ 40703:2474

To detect mean difference of at least 2mm in the mean intercondylar notch at the study power of 80% the required sample size would be 41 adult dry femur bone for each side.

All the measurements was performed by using digital vernier caliper. The femur will be clamped to facilitate the measurements.

The measurement will be taken by me on 3 occasions and the average of the 3 values will be taken as representative measure. The intra observer variation will be minimized by taking the measurement 3 times. The data will be tabulated and analyzed statistically.

Eligibility criteria

Inclusion Criteria –Fully ossified Dried, intact bones of unknown sex and age.

Exclusion Criteria –incomplete bone showing damage, bone deformity and gross pathological changes (like Arthritic changes).

Statistical Analysis

Statistical analysis was performed with the SPSS, version 21 for windows statistical software package (SPSS inc., Chicago, IL, USA). The categorical data was presented as numbers (percent) and were compared among groups using Chi square test. The quantitative data was presented as mean and standard deviation and were compared by student t-test. Probability was considered to be significant if less than 0.05.

Observation and Result

A total of 82 dry human cadaveric tibia used for present study, out of which 41 were from right side and 41 were from left side. Statistical analysis was carried out and obtained results of various parameters have been compared in tables and histograms accordingly. Following results were obtained-

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Table 1: Bicondylar width (BCW) in mm

	Right Side		Left Side	
	Mean	SD	Mean	SD
BCW (in mm)	74.01	5.18	74.53	4.51
Median	74.31		75.38	
P value	0.605 (NS)			

Table 2: Intercondylar Notch Width (ICN W)(in mm)

	Right Side		Left Side	
	Mean	SD	Mean	SD
ICN W(in mm)	22.62	2.44	22.35	2.92
Median	22.54		22.11	
P value	0.620 (NS)			

Discussion

Bicondylar width was measured as the maximum width across both the medial and lateral femoral condyles. A lot of variations are found in anthropometry of this area. In present study mean BCW was 74.1±5.18 mm on right side and 74.53±4.51 mm on left side. No statistical significant difference found between right and left side as the p value was > 0.605

Table 3: Comparison of Bicondylar parameters among various studies

Study	Bicondylar width (BCW)	
	Right	Left
Fatih Yazar et al	1.13±5.24	71.13±5.24
Ioannis Terzidis et al	84.1±6.2	83.7±6.3
Present study	74.1±5.18	74.53±4.51

Intercondylar area on articular surface of distal end of femur is very irregular in shape and size. A lot of variations are found in anthropometry of this area. In present study mean ICW was 22.6±2.44 mm on right side and 22.35±2.92 mm on left side. No statistical significant difference found between right and left side as the p value was > 0.620.

Table: 4 Comparison of intercondylar parameters among various studies

Study	Intercondylar width(ICW)	
	Right	Left
Fatih Yazar et al	20.04±2.7	19.9±2.3
Ioannis Terzidis et al	20.05±2.3	20.05±2.2
Present study	22.6±2.44	22.35±2.92

Conclusion

On comparison between right and left side measurements, no significant difference was found between values of parameters of right and left sided femur. This information will be useful to negate the need of side specific measurements for implant

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