

STUDY OF DEPTH OF ACETABULAR CAVITY OF HIP JOINT WITH ARTICULAR CARTILAGE IN DISSECTED CADAVERS IN HYDERABAD REGION

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Abstract

Background: The hip joint was originally referred to as a ball and socket joint is now being described theoretically as a rotational conchoids¹. The work of Menschik² also shows that hip joint is more of a conchoid than a ball and socket type. The articular surface on the femoral head is a spheroidal or slightly ovoid. The femoral head articulates with cup shaped acetabulum, its centre lying a little below the middle third of inguinal ligament. The articular surfaces are reciprocally curved but neither coextensive nor completely congruent. The present study was undertaken to note the average depth of the acetabulum in dissected cadaveric hip joints. This study is done with soft tissues in situ.

Material and Methods: The present study was carried out on 50 cadavers, 40 male and 10 female in the age group 30-70 years human cadavers from the department of Anatomy. With the soft tissue in situ and using Vernier calipers of 1/50 mm accuracy, average depth of the acetabulum was measured.

Results: In the present study the average average depth of acetabulum was found to be 28.29 mm in males and 25.51 mm in females.

Conclusion: There is small difference in average depth the of acetabulum of two sides in the same individual, but this is statistically insignificant. Average depth of acetabulum was greater in males than in females. Availability of such data can help in constructing best possible prostheses for patients of total hip replacement.

KEY WORDS: Hip joint, average depth of acetabulum

Introduction

The hip joint which was originally referred to as a ball and socket joint is now being described theoretically as a rotational conchoids^[1,2]. The closed packed position of hip joint is one of full

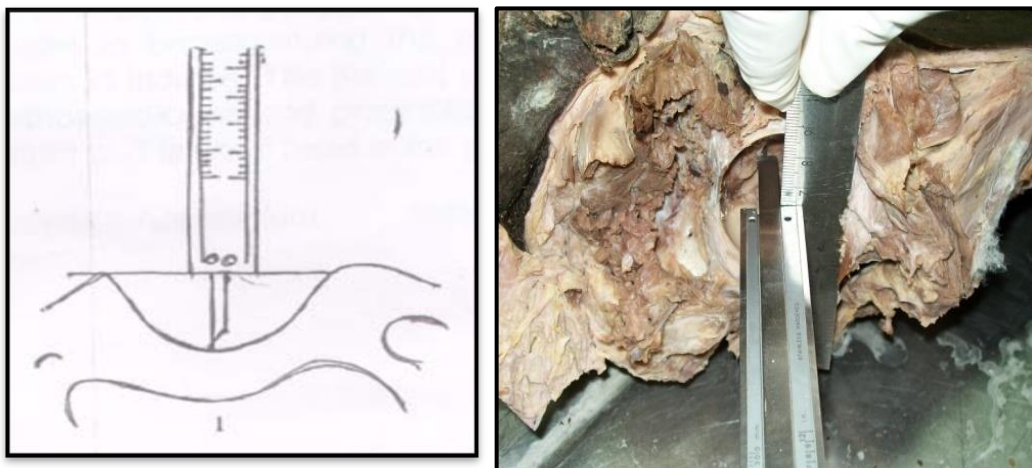
extension, with slight abduction and medial rotation^[3]. The articular surface on the femoral head is a spheroidal or slightly ovoid. The femoral head articulates with cup shaped (cotyloid) acetabulum, its centre lying a little below the middle third of inguinal ligament.

The articular surfaces are reciprocally curved but neither coextensive nor completely congruent. The present study was undertaken to note the average depth of the acetabulum in Indian cadaveric hip joints of Hyderabad region. This study is done with soft tissues in situ. This gives the average values to near normal situations as would be encountered in the patients at operation table. Availability of such data can help in constructing best possible prostheses for patients of total hip replacement. Any deviations of these dimensions from normal have strong correlation with development of various kinds of pathologies of hip joint [4]. Knowledge of the anatomical parameters of the bony components of hip joint is very essential as it will open new horizons into better understanding of etio-pathogenesis of diseases like primary osteoarthritis of hip joint. An incongruous joint is more prone to develop degenerative changes than a joint having normal anatomy [5].

MATERIALS AND METHODS

The present study was carried out on 50 cadavers, 40 male and 10 female in the age group 30-70 years human cadavers from the department of Anatomy in, Kamineni Institute of Medical Sciences, Narketpally and the statistical analysis using SPSS was done in the department of Anatomy, Kamineni Institute of Medical Sciences, Narketpally, Hyderabad, India, After opening of joint cavity during routine dissection, average depth of acetabulum was measured using Vernier calipers. Mean values of parameters were recorded and compared between male and females. Mean values of parameters were compared between right and left for both sexes. With the soft tissue in situ and using Vernier calipers of 1/50 mm accuracy, transverse diameter of acetabulum was calculated as follows:

Thin metallic strip is placed across the diameter of acetabulum. Depth of acetabulum was measured from its center to the metallic strip Maximum depth of acetabulum was measured using vernier calipers.



All observations were taken by the same person to avoid inter-observer error. Data collected was entered in MS excel sheet and analysis was carried out by using SPSS software (10.01 versions). Appropriate statistical test was applied wherever required.

Inclusion criteria

Articular surfaces looking smooth, shiny, wet surfaces and non osteoarthritic changes were included in the study.

Exclusion criteria

Articular surfaces showing any pathological changes, dried, rough and osteoarthritic changes were excluded from study.

OBSERVATIONS AND RESULTS

Mean of the values for depth of acetabulum of 80 male and 20 female hip joints were taken. The mean transverse diameter of acetabulum of 40 right and 40 left side hip joints in male and 10 right and 10 left side hip joints in females were taken.

The mean values for both the parameters were calculated for 80 male hip joints and 20 female hip joints, which included hip joints of both sides.

Depth of acetabulum (in mm) is shown in table no 1.

Average values of three parameters (in mm) in table no 2.

Table No.3 shows comparison of left side parameters with right side in males (in mm).

Table No. 4 shows comparison of left side parameters with right side in females (in mm).

Table No.5 shows comparison of Parameters between Males and Females (In mm)

From the observations it was noted that the mean of all the parameters were more on left side than on right side. But there was no statistically significant difference.

In females the mean values of the parameters was more on left side than on the right. But there was no statistically significant difference between right side and left side measurements.

A comparison was done between measurements of male and female. It was noted that the mean of all the parameters were more for males than females, both on right and left side. The difference was statistically significance

Table 1: Depth of acetabulum (in mm)

	Male (n=40)		Female(n=10)	
	Right (40)	Left (40)	Right (10)	Left (10)
Minimum Value	25.26	25.56	24.02	23.96
Maximum Value	30.37	31.04	26.92	27.12
Mean	28.17	28.41	25.38	25.64
Standard deviation	1.13	1.19	1.09	1.14

Table 2: Average values of the parameters (in mm)

Gender		Mean depth of acetabulum
Males	N=40	28.29
Females	N=10	25.51

Table 3: Comparison of left side parameters with right side in males (in mm)

Parameter	Left			Right			P value
	n	Mean	S.D	n	Mean	S.D	
Depth of acetabulum	40	28.41	1.19	40	28.17	1.13	N.S (P>0.05)

Table 4: Comparison of left side parameters with right side in females (in mm)

Parameter	Left			Right			P-VALUE
	n	Mean	S.D	n	Mean	S.D	
Depth of acetabulum	10	25.64	1.14	10	25.34	1.09	N.S (P>0.05)

Table 5: Comparison of Parameters between Males and Females (In mm)

	Males				Females			
	side	n	Mean	S.D	n	Mean	S.D	P value
Depth of acetabulum	Left	40	28.41	1.19	10	25.64	1.14	P<0.05 (significant)
	Right	40	28.17	1.13	10	25.34	1.09	P<0.05 (significant)

DISCUSSION

Study by different workers is presented in table no 7. In the present study the average depth of acetabulum was found to be 28.29mm in males and 25.51mm in females. Lloyd Roberts¹¹ (1955) stated that shallow acetabulum is the most common cause of osteoarthritis among the idiopathic cases. Ian K. Sharp and Hull¹³ (1959) stated that a shallow acetabulum is more prone to develop congenital subluxation. A radiological study by Murray⁵ (1965) showed the average depth of acetabulum to be 13 mm in males and 12 mm in females. According to cadaveric study of Mukhopadhaya and Barooah¹⁶ (1967) the average depth of acetabulum was 24.65 mm on right side and 24.51 mm on left side. John Emmet’s¹⁷ study (1967) on hip bones showed the average depth of acetabulum was 25.4 mm in males and 23.81 mm in females. Chauhan, Paul and Dhaon⁴ (2002) found the average depth of acetabulum to be 27.83 mm in male and 25.19 mm in female cadavers. Varma and Nalini¹⁸ (2010) showed that the average depth of acetabulum was 28.26 mm in male and 26.91 mm in female cadavers studied. Our findings correlated with findings of Varma and Nalini¹⁸ (2010). On comparison it has been observed that the values for the depth of acetabulum is greater in the present study than the values obtained in the study by Chauhan, Paul and Dhaon⁴ (2002) and by Mukhopadhaya and Barooah¹⁶ (1967) with a common factor of measuring the depth of acetabulum with the acetabular labrum in situ. The present study showed deeper acetabulum compared to that proposed by John Emmet¹⁷ (1967) This is because, in the present study the acetabular labrum was intact while measuring the depth of acetabulum. On contrary to this John Emmet¹⁷ (1967) had measured the depth of acetabulum on hip bones

Table 6: Comparative study of depth of acetabulum (in mm)

Authors	Depth of acetabulum	
	Male	Female
Present study	28.29	25.51
John Emmet (1967)	25.4	23.81

Chauhan(2002)	27.83	25.19
Varma & Nalini (2010)	28.26	26.91

CONCLUSION

The depth of acetabulum has been measured in 50 cadavers (40 male and 10 female) in the present study. The depth of acetabulum was found to 28.29 mm in males and 25.51 mm in females. There is small difference in the average depth of acetabulum of two sides in the same individual, but this is statistically insignificant. The depth of acetabulum was found to be greater in males than in females. The depth of acetabulum is of advantage when the complete bone is not available for use in sex determination^{8,9,10,11}. In the present study the mean depth of acetabulum was found to be significantly greater in males than in females.

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