

A study of central edge angle of wiberg of acetabulum radiologically, among Haryanvi population

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Abstract

The present study was conducted in Department of Anatomy, on 200 persons (100 males and 100 females) of all age group of Haryana region. The AP view of radiographs of right and left hip joints were taken after written consent. The central edge angle of wiberg of both hips were measured. The mean CE angle of wiberg in males was 37.52 ± 4.75 degree in right side and 40.25 ± 7.75 in left side. Similarly in females 36.45 ± 7.47 degree and 39.34 ± 6.96 in right and left side respectively and mean value of central edge angle of wiberg was more in males as compared to females both in left and right hip. Hence knowledge of these parameters of hips can be used for better understanding of osteoarthritis and acetabular dysplasia prevalence.

Keywords: Acetabulum, CE angle, acetabular dysplasia

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Introduction

The centre edge (CE) angle of Wiberg is a measure of the depth of the acetabulum and the cover of the femoral head [1, 2]. The central edge angle which was first described by Wiberg in 1939, is a most important radiographic measurement on AP view of hip joint. It is used as a diagnostic criteria for differentiating a normal hip from dysplastic hip. This angle is used to access the superior and lateral coverage of femoral head by bony acetabulum. Wigberg reported values ≥ 25 degree is normal, between 20 degree to 25 degree is considered borderline, whereas those ≤ 20 degree are associated with acetabular dysplasia [3]. The value of mean centre-edge angle of a normal hip in male and female was 37 degree and 35 degree respectively. The centre-edge angle is widely used radiographic methods to determine acetabular dysplasia but sometime it may not provide accurate measurement due to the following reason 1. Various pathological condition of the femoral head which make it difficult to locate the centre. 2. Bony spur or osteophytosis at lateral edge of acetabulum. 3. Subluxation of hip. Sometimes subluxation of contralateral hip, or simple loss of joint space alters the Wiberg angle. Therefore the acetabular angle and acetabular depth are used for the diagnosis of acetabular dysplasia to compensate the limitation of Wiberg angle [4].

Material and Methods

The present study was carried out in Department of Anatomy, on pelvic radiographs of 200 (100 Males and 100 females) patients of Haryana in 2018. All age groups of patients with radiologically normal x rays of hips (AP view), were included in the study. The angle of wiberg were measured by the method described by Wiberg (1953). Comparison of the angles was made between right and left hips and between males and females.

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Statistical Methods

Once data was collected and tabulated using MS Office Excel, the tabulated data was then analyzed. Data were tabulated and analysed statistically. Quantitative variables are expressed as means \pm SD and p value < 0.05 was taken as significant

Results

We included 200 radiographs of pelvis AP view Following observations were made in this study

Table -1: Descriptive statistics for mean of central edge angle of Wiberg in degree (n=200 (100M & 100 F))

	Male		Female	
	Right	Left	Right	Left
Mean	37.52	40.25	36.45	39.34
SD	± 4.75	± 5.70	± 7.47	± 6.96

Table no 1 and graph no 1. Shows that in males the mean value of central edge of wiberg's of acetabulum of right and left side are 37.52 and 40.25 with standard deviation ± 4.75 and ± 5.70 respectively & in females the mean value of right and left side are 36.45 and 39.34 with SD ± 7.47 and ± 6.96 respectively.

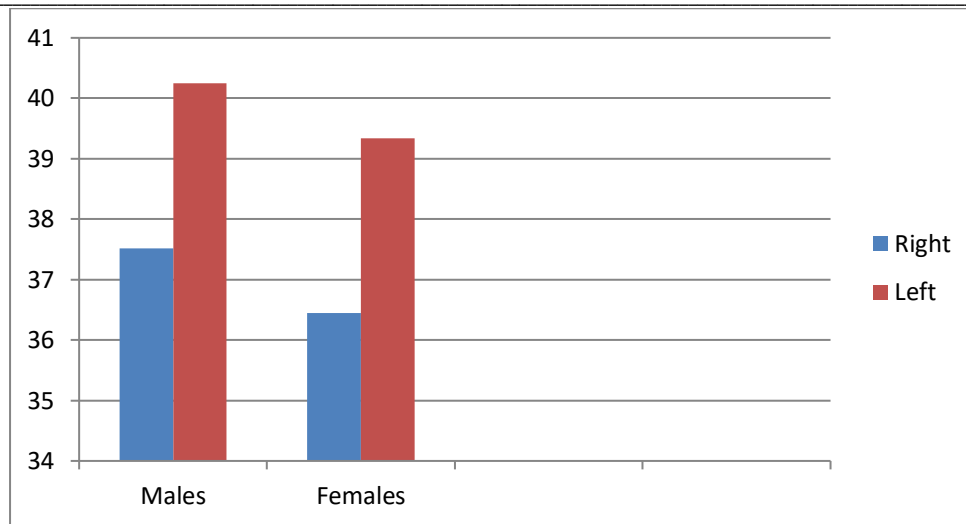


Figure 1: Central edge angle of Wiberg of acetabulum in males and females

Discussion

From table 2 we found that the degree of central edge angle in our study was greater than that in the studies of acetabulum in Japan, China, England, Sinsapur, Denmark, Turkey, Serbia, South -Nigeria and South Indian populations and was nearly similar as in Korean and UK populations. It was also found that in males there is a significant difference in value of central edge angle in right and left sides of hips. The t-value of right and left side central edge angle was -6.945 (p- value 0.000) and in present study the mean value of central edge angle was more on left side in males.

Table 2: Comparison of mean of CE angle of Wiberg (in degree) of present study with the previous studies

S. NO	Authors	Year	Population	Central edge angle of wiberg
1	Nakamura et al[5].	1989	Japan	32.2±6.4 in males and 32.1±6.9 in females
2	Croft et al[6].	1991	England	36.2±6.9
3	Lau et al[7]	1995	China	30.5±6.4
4	Smith RW et al[8]	1995	UK	38.0±6.5
5	Goker et al[9]	2005	Turkish	34.5±7.4 in males & 35.0±7.0 in females
6	Jacobsen et al[10]	2005	Demark	35.0±7.3 in males & 34.0±7.4 in females
7	Umar et al[1].1	2006	Singapur	31.2±7.9
8	Saika et al[12].	2008	South India	32.7
9	Park JM et al[13]	2011	Korea	37.9±5.6
10	Jermic D et al[14]	2011	Serbian	33.5±5.8 in males & 33.3±6.9 in females
11	Okoseimimiema SC et al[15]	2012	South - Nigeria	34.39±5.53 in males & 35.58±5.74 in females
12	Present study	2018	Haryana (India)	37.52±4.75 (Right hip) and 40.25±5.70 (left hip)in males & 36.45±7.47 (right hip) and 39.34±6.96 (left hip) in females

Similarly in females there is a significant difference in value of central edge angle in right and left side of hips. The t-value of right and left side central edge angle was -5.887 (p-value 0.000) and it was also found that the mean value of central edge angle was greater on left side in females.

The difference in central edge angle between left and right hips is difficult to explain. Ralis and McKibbin (1973)[16] reported that the hips are shallowest at the time of birth and become gradually deeper with age. Wynne -Davies (1970)[17] observed that the central edge angle increases gradually throughout adult life and the differences in the loading stresses sustained by the two hips may account for the variations in acetabular depth

Conclusion

It was concluded from above study that in Haryanvi populations the mean value of central edge angle of wiberg in males was 37.52 degree in right hip and 40.25 degree in left hip. And in females CE angle mean was 36.45 degree in right hip and 39.34 degree in left hip. Mean central edge angle was more in males as compared to females

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