

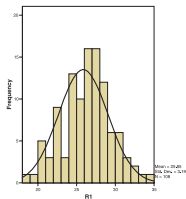
36.33mm in R2, 33.32 mm in R3 and 5.63 mm in R4. The correlation between the acetabular diameter and thickness for R1 quadrant (25.85 mm), for example, was 0.504 & R square was 0.254. This was highly significant ( $p < 0.01$ ). R2 and R3 also showed significant correlation ( $p < 0.01$ ) but in case of R4 it was not significant ( $p = 0.158$ ) (Table 1).

**Table-1:** Correlation analysis of acetabulum ( $n = 108$ )

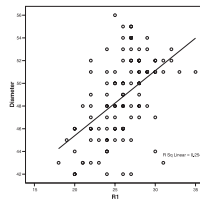
Quadrant	Mean Thickness (mm)	R	R <sup>2</sup>	Significance
R1	25.85	0.504	0.254	<0.01(S)
R2	36.33	0.472	0.222	<0.01(S)
R3	33.32	0.480	0.231	<0.01(S)
R4	5.63	0.158	0.025	0.158(NS)

S-Significant NS- Not significant

The histogram of the dependent variable (thickness of acetabulum) showed a normally distributed curve (Fig. 2). The scatter plot of the dependent variable to the diameter was found to be within the linear best-fit line (Fig.3).



**Figure 2** The histogram of the thickness of acetabulum showing normally distributed "Bell" shaped curve (R1 – Antero superior quadrant thickness of acetabulum in mm)



**Figure 3** The scatterplot of the dependent variable to the diameter of acetabulum (R1 – Anterosuperior quadrant thickness of acetabulum in mm)

Mean thickness at R1 was found to be about 50% of acetabular diameter. The average thickness at R2, R3 & R4 was found to be about 75% , 68% and 11.7% of acetabular diameter respectively. The average posterior quadrant thickness (posterosuperior and posteroinferior) was the maximum (33mm) and it was found to be about 70% of the acetabular diameter . The antero-inferior quadrant was found to have the minimum thickness ( about 11 % of acetabular diameter).

Interobserver analysis showed more than 90% agreement ( $k=90\%$ ). It was found to be a better agreement.

## DISCUSSION

The average acetabular diameter in our study is found to be  $48.74 \pm 3.62$  mm ( $n=108$ ). Our findings are similar to that as observed by Eric Vandebussche et al(2008)<sup>4</sup>( $48.5 \pm 4.4$  mm) but differs with that of the average observed by Namchai Varodompon et al(2002)<sup>5</sup> (51.82 mm)in their study on Thai population. Chauhan R. et al (2002)<sup>6</sup> in their study on North Indian hip joints in cadavers, have

reported the average acetabular diameter in males on the right side as  $47.10 \pm 2.09$  mm and on the left side as  $47.48 \pm 3.05$  mm. In females they found it as  $44.38 \pm 3.01$  mm on the right side and  $46.0 \pm 2.28$  mm on the left side

Namchai et al(2002)<sup>5</sup> noted the thickness of the postero-superior and postero-inferior quadrants to be 85% and 72% of the average acetabular diameter. In our study the thickness of R1 quadrant was found to be about 50% of acetabular diameter and at R2, R3 & R4 it was found to be about 75% , 68% and 11.7% of acetabular diameter respectively.

The present study revealed that the posterior quadrants (R2 & R3 together) are the thickest quadrants with maximum bone stock and can accommodate screws ranging from 33 mm to 36 mm safely. Stranne SK et al (1991)<sup>7</sup> have reported that the screw fixation over the superior part of ilium, posterior column and over the ischium was the strongest since these areas possess the maximum bone stock for adequate and safe fixation of screws. The antero-inferior quadrant is the quadrant with least thickness and least available bone stock. Transacetabular placement of screws in this quadrant therefore needs special care since improper placement may cause damage to the external iliac vessels, obturator vessels and nerve. Our study showed a statistically significant linear correlation between the acetabular diameter and thickness in South Indian population. Therefore we strongly feel that the diameter of the acetabulum can be used as a guideline in the pre-operative assessment of the thickness of the different acetabular quadrants and length of screws that can best fit that particular quadrant and hence achieve adequate fixation. Gender and Age of the bones were not taken into account in the present study. These factors can be included in future studies.

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