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Morphology and morphometric study of Iliac crest of Hip Bone

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Abstract

The subcutaneous portion of the Innominate bone is made up of iliac crest which is often the favourite place to harvest the bone graft. The whole of the iliac crest cannot be of use in harvesting the bone graft which we have found out in the morphometric study of the anterior iliac crest.

Keywords: Iliac crest, iliac tubercle, bone grafting

Introduction

The iliac crest is the thick curved upper border of the ilium, the most prominent bone on the pelvis. It is palpable through its extent. It extends from anterior superior iliac spine to the posterior superior iliac spine with upwards convexity^[1]. The crest is convex superiorly but is sinuously curved, being concave inward in front, concave outward behind^[2]. The iliac crest has ventral segment that is anterior 2/3rd and dorsal segment or posterior 1/3rd. It divides into an outer and inner lip separated by the intermediate zone. Outer lip bulges out about 5 cm away posteriorly from the anterior superior iliac spine and called as tubercle of iliac crest. The iliac crest is the commonest site to harvest the autologous bone graft. The bone grafting is a very common surgical procedure for orthopaedic and reconstructive surgeons^[3, 4, 5, 6]. The iliac crest being the bone, approached very frequently for harvesting the autologous bone graft has been studied to find the thickest position through morphometry to delineate the place which can be the site of good harvest of bone graft without compromising the integrity of the iliac crest^[7, 8, 9, 10].

Material and Methods

The Morphometry of anterior Iliac crest was studied on the innominate bones available with us. The thickness of the whole of ventral iliac crest was measured at every 5 mm increment. The widest and the narrowest part was marked and measured.

Results, Observations and Discussion

We had 20 innominate bones on which measurement on anterior iliac crest were carried out. As viewed from above the iliac crest appears to 'J' shaped. The average length of the anterior iliac crest has been 17 cm (range from 15.5 to 18.5) from anterior superior iliac crest (ASIS). The average dimensions moving from anterior to posterior at every 5 mm interval from anterior superior iliac crest are

Table 1: Width from ASIS (in cms)

Distance from ASIS(cms)	At ASIS	.5	1	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Width (mm)	10	12	13	14	15	16	16	16	18	19	19	20	19

Table 2: Width from ASIS (in cms)

Distance from ASIS (cms)	6.5	7	7.5	8.0	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13
Width (mm)	16	15	13	11	9	7	7	7	6	9	9	10	10	11

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Table 3: Width from ASIS (in cms)

Distance from ASIS (cms)	13.5	14	14.5	15	15.5	16
Width (mm)	12	12	12	12	13	13

The widest place at the iliac crest is 5.5 cm posterior to the iliac crest. The widest part, called as iliac tubercle narrows down anteriorly and posteriorly. The anterior decrease in width is gradual, and the width at ASIS is 10mm. whereas the decrease in the width posteriorly is abrupt and moving 5 cm posterior to the widest part, ie at a distance of 10.5 cm posterior to the ASIS, the iliac crest is narrowest with width of 6 mm. The narrowest portion of the Iliac crest also correspond to the highest part of the iliac crest.

There is a rhomboid shaped column of thick bone, extending from thicker portion of iliac crest and is directed anteriorly and inferiorly to merge with roof of acetabulum. This rhomboidal column is made up of the thickest bone of the anterior iliac crest and can be safely used for harvesting bone graft.

On searching for a similar study in literature we could not find any such study to compare with.

The information collected through this study can be useful in planning the approach for harvesting the autologous bone graft by surgeons which is needed for a variety of procedures involving nonunion, fusion and reconstruction surgeries [11]. The information can also be utilized for decreasing the complications associated with harvesting of bone graft from anterior iliac crest.



Fig 1: Anterio superior iliac crest



Fig 2: Lateral surface of Iliac crest

Conclusion

The medical science is ever evolving science because of newer inputs found from the various studies. We have found that the thicker bone to be utilized from Iliac crest is anteroinferior portion of anterior iliac crest and this information will be of use for orthopaedic and reconstructive procedures.

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