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Morphological Assessment of Shape of Sternal End in Dry Adult Human Clavicles

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Abstract:
BACKGROUND: Clavicle bone performs significant role in movements of upper limb. Clavicle is a long horizontal bone bearing a two ends i.e. sternal end, acromial end and a shaft. The sternal end bears an impression on its lower surface that may be in the form of a tubercle, fossae or a depression called as costoclavicular area or rhomboid impression. Sternal end provide attached to sternum to form sternoclavicular joint. Morphology of this area is clinically vital for determination of age for radiological and forensic point of view.
MATERIALS AND METHODS: This study was conducted on 100 dry clavicles, out of which 50 were of right and 50 were of left side with unknown sex and age. In this study shapes of sternal end were observed with variations, photographed and compared with literature. Bones were taken from department in a tertiary care medical institute in Punjab.
RESULT: In this study 100 clavicles comprising of 50 right and 50 left were taken and different shapes were perceived. Out of 100 bones only 39 bones were showing triangular shape of sternal end out of which 22 of right side and 17 of left side. Circular shape of sternal end seen in 19 bones out of which 9 of right side and 10 of left side. Quadrangular shape of sternal end seen in 42 bones out of which 19 of right side and 23 of left side.
CONCLUSION: Besides of quadrangular Triangular and Circular. There is no various study investigated on shapes of sternal end. This one can be useful variation factor. Sternal end plays vital role in forensic point of view.

Keywords: Clavicle, Sternal End and Sternoclavicular Joint

INTRODUCTION

Bones can reveal the basic frame of human body and may provide useful information about the biological identity of the dead bodies [1]. Morphology of clavicle has been a topic of interest for researchers for a long time. This study is useful for orthopaedic surgeon for management of clavicular fractures as well as for anatomic and forensic experts to explain gender, development and age related differences [2]. The clavicle bone is subcutaneous throughout its length and makes a prominent feature of the neck [3].
The clavicle also known as a collar bone and it is a modified as a long bone [4]. The name of the clavicle bone comes from two words i.e. CLAVIS (key) and ICLE (diminutive). Clavicle bone is longer and broader in males than females as well as more curved in males than females. The curvature and length varies in both sides of the clavicle bone [5]. The clavicle bone is the only long bone that placed horizontally in the body and it is the bone which start ossify first and complete its ossification at last [6].

It consists of two ends one is Sternal end It is triangular or quadrangular in shape with large circular facet for the attachment of articular disc Sternoclavicular joint formed by articulation of the medial (sternal) end with the clavicular notch of the manubrium sterni. The articulation of first costal cartilage with the inferiorly extended articular surface of the sternal end[7]. acromial end is a flat in shape with oval shape small facet. It form the acromioclavicular joint by the articulation with the acromion process of the scapula[8.]

The sternal end of the clavicle has been exemplified to be beneficial to determine age of young adults, though, there is no various studies have examined about age-related changes occur to the sternal end post epiphyseal fusion[10]. that degeneration of the fibrous disc covering the sternal end of the clavicle commenced around the fourth decade and continued through the ninth decade of life[11].

MATERIAL AND METHOD

To study the morphology of the Sternal end on clavicle, the bones were obtained from the Anatomy Department of Sri Guru Ramdas Institute of Health and Sciences, Amritsar. Total 100 clavicle bones were studied, out of which 50 were of right side and 50 were of left side. The various shapes of this end were observed.

RESULT

The sternal end of clavicle bone showed different shapes. In this study 100 dry human clavicles of unknown age and sex were studied out of which 50 right and 50 left side were taken and different shapes were perceived. Out of 100 bones only 39 bones were showing triangular shape of sternal end out of which 22 of right side and 17 of left side. Circular shape of sternal end seen in 19 bones out of which 9 of right side and 10 of left side. Quadrangular shape of sternal end seen in 42 bones out of which 19 of right side and 23 of left side. In our study chi square test is applied (p=0.584) value found which is not statistically highly significant.

Circular

Triangular

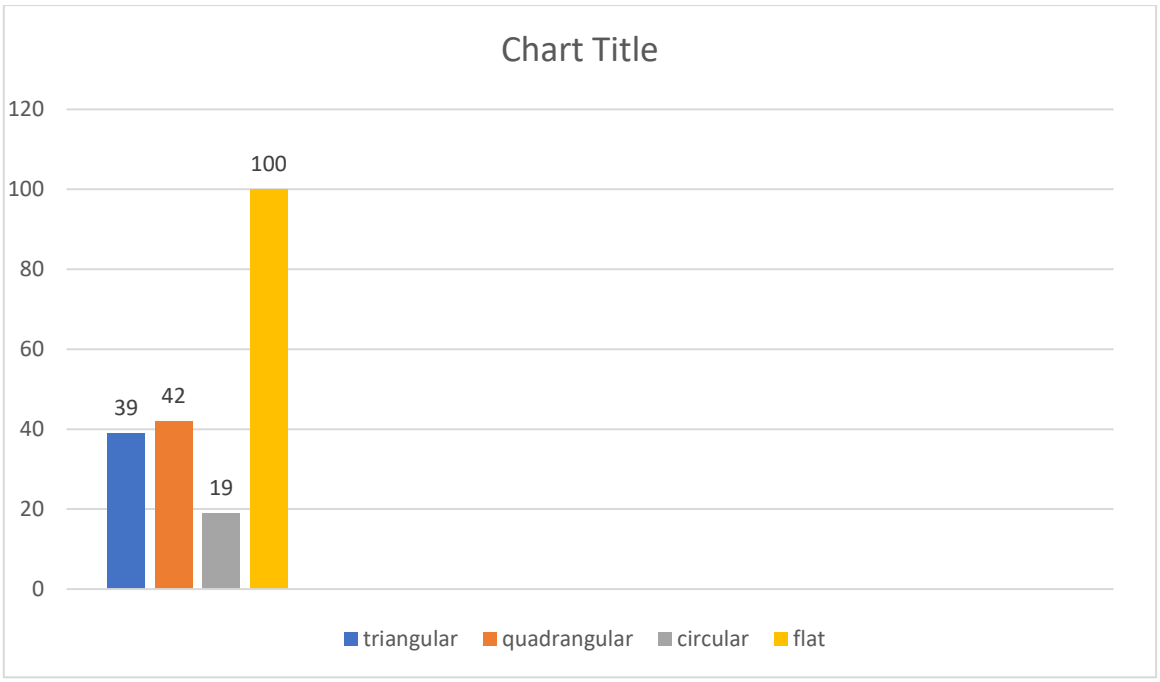
Quadrangular

Table- shape of acromial and sternal end in bones.

Ends	Shape	Right(50)	Left(50)	Total(100)
Acromial end	Flat	50	50	100
Sternal end	Triangular	22	17	39
	Quadrangular	19	23	42

	circular	9	10	19

X^2: 1.075; df:2; p=0.584



BAR CHART SHOWING SHAPES OF ENDS IN CLAVICLE

DISCUSSION

The Present study authorised, "Morphology and Morphometry of Adult Human Clavicle In Punjabi Population" performed on 100 dry adult human clavicle bones of unknown age and sex, obtained from SRI GURU RAMDAS INSTITUTE OF MEDICAL SCIENCES AND RESEARCH, AMRITSAR. In our study morphological and morphometry parameters of Ends and various shapes of sternal end were observed and statistical indices were also seen.

However there is not many researches are there on shapes of sternal end of clavicle. According to Lambert SM (2016) found that sometimes triangular shape of sternal end is seen, but In present study shape of sternal end found to be quadrangular, triangular& circular.

J Walters, M Solomons; S Roche did study the sternal portion of the clavicle which shows variation of sternal end from a circular to quadrangular or prismatic profile in cross-section. According to them cross-sectional profile will also impact the ease or difficulty with which an external fixation device can be securely applied.

According to them From the cross-sectional profile can be seen that zones I and II, the medial end, can be fused into one group with the profile being overpoweringly tubular or somewhat quadrilaterally faceted, borrowing it to a variety of fixation options and inclinations.

CONCLUSION

In present study two different types of shapes were observed (Triangular and Circular), No various study investigated on shapes of sternal end. The sternal end of the clavicle also known as medial end which forms the sternoclavicular joint.it found to be useful in aging young adults, however, no studies have

investigated what age-related changes occur to the sternal end. The development of the medial clavicular epiphysis and its fusion with the shaft of the clavicle have been a subject of the researchers meanwhile the second decade of this century. Computed tomography provides help to evaluating the maturation process of the sternal end of the clavicle. The sternal end of clavicle can be useful in intramedullary nail fixation.

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Contribution of authors:
Priyanka Sharma- Design of study, Data collection, data curation.
Dr. Anupama Mahajan- Conceptualization, Supervision.
Dr. Poonam Verma- Interpretation of data, revision of manuscript

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