STUDY OF MORPHOMETRY OF CLAVICLE – LENGTH AND ANGLES

ABSTRACT

Background: The clavicle is a complex bone, and is most frequently fractured bone of human skeleton. Most of the fractures occur at the middle third of the shaft of the bone. The present study was done to measure in length and angles (medial and lateral angles) of clavicle. The angles of clavicle are very important for anatomists, orthopedicians, surgeons and forensic anthropologists. Materials & Methods: 60 dry clavicles collected from dept of Anatomy at NRI Medical College, Chinnakakani, Guntur Dt. Length, medial and lateral angles of clavicle were studied. Results: The average mean length of clavicle on right side 14 cm and on left side 7 cm. The range of medial angle on right side medial angle was 154° and lateral angle was 150° and on left side medial angle was 155°, lateral angle was 150°. Conclusion: The study of length and angles of clavicle is important for clinicians, anatomists, orthopedics and also far anthropologists.

KEYWORDS:
Clavicle, Clavicle length, medial and lateral angles.

Introduction:
The clavicle is a subcutaneous, horizontally placed long bone. The clavicle is the bony connection between the upper limb and the trunk. It consists of medial sternal end and lateral acromial end and shaft Trotter M and Peterson [1] The two ends are weight bearing ends, by articulating with sternum on medial end and acromion on lateral end.(Ellis, Rumaus, Moore & Dalley)[2,3,4]

Clavicle is the first foetal bone to undergo primary ossification and it is the last bone to completely ossify (stranding et al 2005)[5]

Parsons and Oliver [6,7], found that length of left clavicle was usually greater than that of right.

Similar observations were recorded by Jit and Singh [8]

Terry [9], noted the length of clavicle in female American Negroes and male American whites, the left bone was longer than the right but not statically significant

Huang et al [10] recorded medial and lateral angle of clavicle with specific relevance to screw and plate fixation.

Daruwall ZJ et al [11], correlated sternal and acromial angles with medial and lateral depths and results were: sterna angle is larger in women than in men and acromial angle is also larger in women.

The female clavicle was found to be shorter, less curved, thinner and smoother than the male. Male bones are heavier and the muscular markings are more prominent than in females chavda et al [12]

M.A McGraw et al[13], stated that, males and females attain 80% of their total clavicle length by 12 and 9 year of age.

R Sudha et al [14], studied, differences between the length of the clavicles and curvatures angles of both side in south Indian population.

The shaft is gently curved with convexity forwards in its medial two thirds and concavity forwards in its lateral third.

The clavicle having two curvature that are lateral and medial curvatures. Lateral curvature is shorter and medial curvature is longer and shows a slight difference between genders.

Attention to the length and curvature is needed when using a plate and to the weight and diameter when using an intramedullary nail. The purpose of this study was to measure length, medial angle and lateral angles. To know about comparative differences between curvatures of the right and left clavicles.

Materials and methods: 60 unpaired clavicles of unknown sex and age was studied from the bones, collected from Dept of Anatomy, NRI Medical College, Chinnakakani, Guntur Dt. To know about comparative differences between curvatures of the right and left clavicles.

Attention to the length and curvature is needed when using an intramedullary nail. The purpose of this study was to measure length, medial angle and lateral angles. To know about comparative differences between curvatures of the right and left clavicles.

Conclusion: The study of length and angles of clavicle is important for clinicians, anatomists, orthopedics and also far anthropologists.

Fig 1: Measuring instruments

Fig 2: Contour of the right clavicle as seen from above
The comparison of the average length and angles of clavicles are given below. Singh and Gandgrade [20] measured the length of the bone on the right side. The average medial angle of clavicle was 151.68° on the right and 151.89° on the left side. The same study was done by Kaur H, et al [19] and he recorded that the average length of American Negros were 152.32° and 141.24° on the right side and 152.60° and 144.68° on the left side. Ahmad et.al [18] recorded mean length of 136.2mm and range was 35.8° for the medial and lateral angles. According to J. Walters [17] study the mean angle differences between the medial and lateral ends of the clavicle to the shaft were 25.2° and 3.35°. The range of lateral angle of right clavicle was 150±80 an left was 150±7.3°. Toon Huysmans et al [16] stated, that the average length is 16.3 ± 11cm on the right 14.2 ± 10.59cm on the left 14.3 ± 9.55 cm. The range of medial angle was 154±4.47° on the right and 14.65° on the left.

**Observations:**

<table>
<thead>
<tr>
<th>Sample size</th>
<th>Length of Clavicle (average) in cm</th>
<th>Angles</th>
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<tbody>
<tr>
<td>60 dry bones</td>
<td>Right length</td>
<td>Left length</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
<td>154°</td>
</tr>
<tr>
<td>SD (Standard Deviation)</td>
<td>1.5</td>
<td>1.43</td>
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</table>

The average mean length of right clavicles is 14±1.5cm and left was 7±1.43cm. The range of medial angle of right clavicle was 154±4.47° and left was 155±3.35° . The range of lateral angle of right clavicle was 150±80 and left was 150±7.3°.

**Discussion:**

Parson reported that left clavicle is longer than right in 54%, right longer than left in 34% and in 12% are equal length, in 100 paired bones.

According to Khaleel Nagarchi et al [15], the average mean length was on right 142.2 ± 10.59cm on left 143.95 cm. The range of medial angle was 135° - 163°. The range of lateral angle of right clavicle was 150±80 and left was 150±7.3°.

Ahmad et.al [18] recorded mean length of 136.2mm and range was 112.6 – 172.0cm in a radiographic study.

In study of Terry R J found that the mean medial and lateral angles of clavicle of American Negros were 152.32° and 141.24° on right side and 152.60° and 144.68° on left side.

The same study was done by Kaur H, et al [19] and he recorded that the average medial angle of clavicle was 151.68 on right and 151.89 on left side. Singh and Gandgrade [20] measured the length of the bone and supported their previous observations.

**Conclusion:**

**References:**