# Determination of Stature and Sex from Human Clavicle

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***Research Article***

***Abstract:*** Clavicles of known age, sex and stature of different bodies, which came for autopsy, were removed by routine method and from the Length, Mid Circumference, Weight and Medial Curvature of the clavicle it was possible to differentiate the sex and estimate the stature of an individual.

***Key words:*** Length of the clavicle, Mid Circumference of the clavicle, Weight of the clavicle, Medial Curvature of the clavicle

## Introduction

Determination of identity of an individual from skeletal remains may assume great importance in some cases in the field of Forensic Medicine. Determination of stature and differentiation of sex from bones have drawn the attention of many research workers and results are highly encouraging especially when the whole skeleton is available. In the earlier studies conducted in Punjab, it was possible to estimate the stature of an individual from clavicle by multiplying clavicle's length with a multiplication factor 11.1. To determine the sex from clavicle, the previous researches had taken into consideration the maximum length, mid circumference and weight of clavicle. The present study was aimed to determine the reliability of determining the stature and differentiating sex from clavicle.

## Materials and Methods

Present study was conducted on 60 human clavicles of known age, sex and stature of different bodies, which came for autopsy at Tirunelveli Medical College. This included 40 male and 20 female clavicles. The age varied from between 13yrs and 70yrs. The clavicle was removed by routine method and cleaned. The following points

i) Length of the clavicle.
ii) Mid Circumference.
iii) Weight.
iv) Medial Curvature.

were noted in the dry specimen and tabulated with the help of osteometric board, electronic weighing machine and protractor.

## Observation

Statistically analyzed data of few bodies are given in the following tables:

**Table 1:** Stature from Clavicular Osteometry

| Sp.No. | Age/ Sex | Length In cm | Cadaveric Length | L x 11.8 Or L x 11.3 | Calculated Height Result(cm) |
|---|---|---|---|---|---|
| 33 | 13/F | 10.2 | 140 | 10.2x11.8 | 120.36 |
| 20 | 16/M | 14.7 | 172.2 | 14.7x11.8 | 173.46 |
| 11 | 19/F | 12.9 | 156 | 12.9x11.8 | 153.5 |
| 3 | 19/M | 14 | 165 | 14x11.8 | 165.2 |
| 22 | 37/M | 15.2 | 170 | 15.2x11.3 | 171.76 |
| 38 | 33/M | 15.5 | 174 | 15.5x11.3 | 175.13 |
| 27 | 55/F | 13.0 | 153 | 13.0x11.8 | 154.4 |
| 5 | 65/M | 14.5 | 169 | 14.5x11.8 | 171.1 |
| 14 | 70/F | 12.2 | 150 | 12.2x11.8 | 143 |

**Table 2:** Limits of Male and Female Groups for Clavicular Dimensions in Present Study

| Character | Sex | Limits |
|---|---|---|
| Cl Mc | Male<br>Female | 3.5 to 4.6 cm<br>3 to 3.6 cm |
| ClL | Male<br>Female | 12.8 to 15.8 cm<br>10.2 to 13.5 cm |
| Weight | Male<br>Female | 15 to 30.8 gms<br>8.5 to 20.o gms |
| Angulation | Male<br>Female | $24^o$ to $52^o$<br>$19^o$ to $34^o$ |

ClL Length of the Clavicle
Cl Mc Mid-Circumference of the Clavicle

## Discussion

It was observed that the change in the length of the clavicle increases as age advances. The length of the clavicle is directly proportional to the height of the individual between the age of 19yrs and 65yrs. Before the age of 19 and after the age of 65, there is no correlation between the length of the clavicle and stature. According to Singh and Sogal who worked in East Punjab population the multiplication factor is 11.1. In the studies conducted by the Tirunelveli Medical College, the multiplication factor is 11.8 and 11.3 respectively if the

length of the clavicle is less than 15 and more than 15. The clavicle is almost is 8% of the total body height.

Regarding the sexing of clavicle as a general rule sex difference, do not appear in the bone until puberty/adolescence. According to Inderjit and Shammer Singh who worked on Punjabis

- The length of the clavicle is more than 15.7 cm in male and less than 11.9 in female.
- Weight was more than 20.87 gm in male and less than 7.8 in female.
- The mid-clavicular circumference was more than 3.4 cm in male and less than 2.7 in female.

In the present study, there is a notable difference, which is given in the table 2. In the present study other than the above 3 criteria the medial curvature of the clavicle and conoid process which is very sharp and projecting in females and flat and rough in males were also taken into consideration to minimize the influence of any variation in any one of the factors on the result. In the present study, the percentage of accuracy was found as follows:

- The accuracy of determination of stature in male bones 85% in female 85%
- The accuracy of determination of sex in case of male bones 92.5% in female bones 85%

## Conclusion

The present study clearly proves that calculating the stature of a person varies in different racial population. Thus indicating the need of separate studies in different regions. In assessing the sex of an individual this study includes more parameters, there by increasing the accuracy.

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