

# Study of Dimorphism of Humerus in Maharashtra Population

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## Abstract

45 male and 45 females right and left dried, non pathological humerus were measured with vernier caliper and weighed with digital weighing machine. The vertical diameter of superior articular surface, transverse diameter of superior articular surface, circumference of superior articular surface, circumference of mid shaft in males and females of right and left humerus were studied and found highly significant P values in both sexes and right left humerus ( $P < 0.01$ ). These parameters will be quite useful to medico- legal expert, anthropologist because morphometric values of mesoderm are uncertain.

**Key words:-** vertical, transverse, circumference, articular, diameter vernier caliper

## Introduction

humerus bone is named after sense of humours feels, when medial epicondyle is touched because it is crossed or in contact with ulna nerve, humerus is long bone of the arm forms shoulder joint and elbow joint. A biological profile which includes age, race or ethnicity and stature, sex when determined from the various human remains require certain parameter to determine with accuracy<sup>(1)(2)</sup>. Many criteria are available to determine sexual dimorphism of human skeleton( appendicular and axial)<sup>(3)(4)</sup>. But least data is available for sexual dimorphism of humerus. Hence attempt was made to differentiate male bones of humerus with females humerus with morphometric parameters in Maharashtra population, because skeleton of a particular individual or ethnic group is able to adapt to its owners life.

## Material and Method

45 male and 45 females dried non-pathological humerus were selected for study humerus were available at Anatomy department and forensic department of

IIMSC and R.C warudi– Jalna (Maharashtra) In addition to this, anatomy Department of Government Medical College Aurangabad.

Each bone was put in anatomical position and its metrical study was carried out by vernier caliper and weight of bones was carried by digital weighting machine. The obtained values were calculated by 2007 Microsoft computer (values of the males bones were compared with females bones)

The pathological, fractured bones were excluded from the study. The duration of the study was about three years.

## Observation and Results

Parameters of right humerus

**Table-1** – Comparison of vertical diameters of superior articular surface in male and females – Mean value of male humerus was 4.45cm( $SD \pm 0.12$ ) and females was 3.53 Cms ( $SD \pm 0.08$ ) and t test was 42 ( $P < 0.01$ ) p value was highly significant

**Table-2** – comparison circumference of superior articular surface of humerus Mean value of male was 13.8 ( $SD \pm 0.37$ ) and females was 12.4 ( $SD \pm 0.13$ )'t' test was 25 P value was highly significant ( $P < 0.01$ )

**Table-3** - Comparison of mid shaft circumference of humerus mean value of male was 6.22( $SD \pm 0.20$ ) and

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females was 5.77 (SD±0.12) t test value was 13, and P value was highly significant (P<0.01)

Parameters of left humerus

**Table-4-** Comparison of vertical diameters of superior articular surface. Mean value of male was 3.83 (SD±0.45) and females was 3.16(SD±0.20) t test value was 09 and P value was highly significant (SD±0.01)

**Table-5 -** Comparison of circumference superior articular surface. Mean value of male was 12.5 (SD±0.10) t test was 26 and P value was highly significant (SD±0.01)

**Table-6 -** comparison of mid-shaft circumference of humerus mean value was 5.73(SD±0.01) and female was 5.12 (SD±0.01) t test was 29 and P value was highly significant (P<0.01)

**Discussion**

In The present study of sexual dimorphism of humerus in Maharashtra population. In the study of right humerus the comparison of vertical diameter of superior articular surface. Mean value of male was 4.45 (SD+0.12)and females was 3.53 (SD±0.08) t test 42,pvalue was highly significant (P<0.01) (Table-1). Comparison of circumference of superior articular surface. The mean value of male was 13.8 (SD±0.37)and females was 12.4 (SD±0.13) t test was 25 and p value was highly significant (p<0.01)(Table-2). Comparison of mid-shaft circumference the mean value of male was 6.22 (SD±0.20), females was 5.77 (SD±0.12) t test was 13, p value was highly significant (P<0.01)(Table-3).

The parameter of left humerus (cms) comparison of vertical diameter of superior articular surface. The mean value of male was 3.83(SD±0.45) and females was 3.16 (SD±0.20) t test was 09, p value was highly significant (P<0.01)(Table-4). Comparison of circumference of superior articular surface of humerus . The mean value of male was 12.5 (SD±0.10) and females was 11.80 (SD±0.17) t test was 26, P value was highly significant (P<0.01)(Table-5). Comparison of mid-shaft value of male was 5.73 (SD±0.01) and female was 5.12 (SD±0.01) t test 29, P value was highly significant (P<0.01)(Table-6) These finding were more or less in agreement with previous studies<sup>(5)(6)(7)</sup>.

These difference could be attributed a more variable life style and differential patterns of physical labour expected of males versus females <sup>(8)</sup> . Moreover

early maturity of females than males, giving two or more addition years to develop physically to males <sup>(9)</sup>.

It has been also suggested that sexual dimorphism changes have strong genetic bases. It has been noted that population consuming very low or very high protein of demonstrated least amount of sexual dimorphism<sup>(11)</sup>. Hence nutritional status also play vital role in sexual dimorphism

**Summary and Conclusion**

The present study of sexual dimorphism of humerus in Maharashtra population. Will be quite useful to medico- legal expert, anthropologist and anatomist. But this study demands further embryological, genetic nutritional, hormonal, biomechanical study because exact mechanism factors and duration of ossification is still unclear

This research paper was approved by ethical committee of jiu'a Indian Institute of medical science and research Warudi-Badnapur (Taluq) Jalna (Dist) (Maharashtra)

**Table-1: Comparison of Vertical diameter of the superior articular surface in right humerus of male and female**

	Male	Female
Mean	4.45	3.53
SD	0.12	0.08
Test statistic	t = 42, p<0.01	

Vertical diameter of the superior articular surface in right humerus is significantly more in male than in female(p<0.01).

**Table - 2: Comparison of Circumference of the superior articular surface of humerus in male and female**

	Male	Female
Mean	13.87	12.41
SD	0.37	0.13
Test statistic	t = 25, p<0.01	

Circumference of the superior articular surface of humerus is significantly more in male than in

female(p<0.01).

**Table-3: Comparison of Mid- shaft Circumference of right humerus in male and female**

	Male	Female
Mean	6.22	5.77
SD	0.20	0.12
Test statistic	t = 13, p<0.01	

Mid- shaft Circumference of right humerus is significantly more in male than in female(p<0.01).

**Table-4: Comparison of Vertical diameter of superior articular surface in male and female left humerus**

	Male	Female
Mean	3.83	3.16
SD	0.45	0.20
Test statistic	t = 09, p<0.01	

Vertical diameter of superior articular surface is significantly more in male than in female(p<0.01).

**Table-5: Comparison of Circumference of superior articular surface of left humerus in male and female**

	Male	Female
Mean	12.55	11.80
SD	0.10	0.17
Test statistic	t = 26, p<0.01	

Circumference of superior articular surface of humerus is significantly more in male than in female(p<0.01).

**Table-6: Comparison of Mid –shaft Circumference in male and female of left humeres**

	Male	Female
Mean	5.73	5.12
SD	0.01	0.01
Test statistic	t = 29, p<0.01	

Mid –shaft Circumference is significantly more in male than in female(p<0.01).

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