

Sexual dimorphism of Humerus in Uttar Pradesh population - A Retrospective Metrical Study

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Abstract

Back ground: There are many criteria to identify male and female bones in appendicular and axial skeleton but least data is available to differentiate male and female humerus.

Method: 25 male and 25 female non-pathological dried macerated bones were studied. Each bone was put in anatomical position and metrical parameters were carried out by vernier calliper and weight of the bones by digital weighing machine.

Results: Mean value of transverse diameter of lower articular of surface in males was 5 cm (SD±0.1), in females 4 cm (SD±0.1) t test was 47.5 and p<0.01. Mean values surgical neck of humerus in males 9.2 (SD±0.1) females 7.02 (SD±0.1) t test 46.5 p<0.01. Mean value of transverse diameter of articular surface humerus in male 4 (SD±0.1), 3 (SD±6.1) in female t test value was 47.2 and p<0.01. Mean value of length of humerus in males 34.4 cm (SD±3.0) and 29.85 (SD±3.6) in females t test value of weight in males was 103.08 (SD±207), 88.0 (SD±1.8) in females t test was 32.6 and p<0.01.

Conclusion: This metrical study will be more useful to anatomist, anthropologist and above all medico-legal expert.

Keywords: Vernier calliper, digital weighing machine, transverse diameter, surgical neck.

Introduction

Humerus bone is one of the long bone participate in both shoulder joint and elbow joint to facilitate movements and keeps the upper limb away from the trunk ⁽¹⁾⁽²⁾. Humerus is the named after sense of humour caused when ulnar Nerve is touched which crosses medial epicondyle of the humerus. There are many criteria to differentiate sexual dimorphism of appendicular skeleton and axial skeleton like crania, angle of mandible, pubic angle, diameter of foramen magnum, sacral Index ⁽³⁾⁽⁴⁾, but least data is available to differentiate male and female humerus and ethnic importance because many factors are known to influence and modify the course of bone development such as deprivation of raw materials and vitamins, hormonal imbalances and abnormal mechanical situation. Hence attempt was made to study the various parameters of both sexes of adult normal bones.

Material and Methods

25 male and 25 female humerus bones available at Jawaharlal Nehru Medical College and Hospital (JNMC) Aligarh were studied.

Inclusive Criteria: Non – Pathological dried, macerated adult humerus of both sexes were selected.

Exclusive Criteria: Pathological, broken (fractured) bones were excluded from the study.

Methods: Each bone was put in Anatomical position and metrical parameters were carried out by vernier calliper and weight of the bones was carried out by digital weighing machine. The duration of study was from October 2015 to December 2017.

Statistical Analysis: The obtained metrical values of both sexes bones were compared with 't' test. The statistical analysis was carried out in SPSS software.

Observation and Results

Table-1: Study of various parameters in both sexes – Mean value of Males 5 cm (SD±0.01) in Males and 4 cm (SD±0.01) in females in the transverse diameter of lower articular surface of human and t test was 47.5 and p<0.01. Mean of Males 9.2 (SD±0.1) and 7.04 (SD±0.1) in females in the surgical neck of humerus, t test value was 46.5 and p<0.01 Mean value of Males 4 (SD±0.1) and 3 (SD±0.1) in females in transverse diameter of articular surface of humerus 't' test value was 47.2 and p<0.01. Mean value of length Males 34.4 cm (SD±3.0) and 29.85 (SD±3.6) in females and t test value was 42.3 and p<0.01. Mean value of weight males 103.08gm (SD±2.7) in Males, 88.8gm (SD±1.8) in females the weight of humerus t test value was 32.6 and p<0.01.

Discussion

In the present sexual dimorphism of metrical study in UP population Mean value of male 5(SD±0.1), 4 (SD±0.1) in female transverse diameter of lower articular surface of humerus t test was 47.5 and p value was highly significant (p<0.01) Mean value of surgical neck of humerus in males was 9.2cm (SD±0.1), in females 7.04cm (SD±0.1) t test value was 46.5 and p value was highly significant (p<0.01). Mean value of transverse diameter of superior articular surface of humerus in Males was 4cm (SD±0.1) in female 3cm (SD±0.1) t test value was 47.2 and p value was highly significant (p<0.01) Mean value of length of humerus in males was 34.4(SD±3.0) in females 29.85 (SD±3.6) t test value was 42.3 p value was highly significant (p<0.01).

Mean value of weight of humerus males was 103.08(SD±2.7) in females 88.8(SD±1.8) t test value was 32.6 and p value was highly significant (p<0.01) (Table-1). These values were more or less in agreement with previous studies ⁽⁵⁾⁽⁶⁾⁽⁷⁾.

This sexual dimorphism could be attributed more variable life style and differential patterns of physical labour expected of males versus females ⁽⁸⁾. More over early maturity of females than males, giving two or more addition years to develop physically than male bones ⁽⁹⁾. It has been also suggested that, sexual dimorphism changes have strong genetic make-up ⁽¹⁰⁾. It is also noted that dietary or nutritional intake also plays vital role in sexual dimorphism ⁽¹¹⁾. Hence nutritional status empowers the genes and hormones to function efficiently.

In addition to this skeletal structures have ability to adapt their structure to meet the changing demands and to restore their structural integrity and functional efficiency provided they are well nourished.

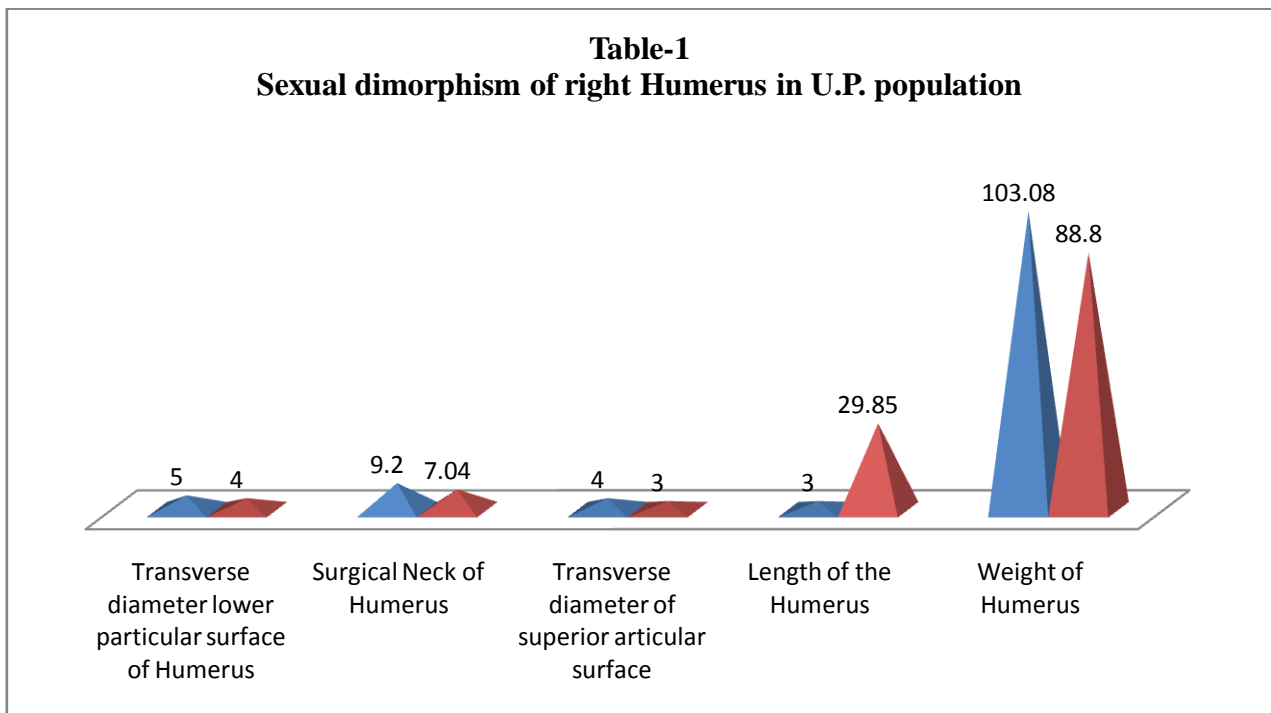
Summary and Conclusion

The present study of sexual dimorphism of humerus will be useful to anatomist anthropologist and medico legal expert to identify the sexes with particular ethnicity. But this study demands further, genetic hormonal nutritional ethnic biomechanical study because bone is the most plastic tissue next to blood.

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Table-1: Sexual dimorphism of right Humerus in U.P. population

Sl. No	Parameters	(Total No. of Bones: 50) (No of Bone of male 25+ female 25)			
		Male Mean Value (SD±)	Female Mean value t test	t test	p value
1	Transverse diameter lower articular surface of Humerus	5 (SD±0.01)	4 (SD±0.1)	47.5	p<0.01
2	Surgical Neck of Humerus	9.2 (SD±0.01)	7.04 (SD±0.01)	46.5	p<0.01
3	Transverse diameter of superior articular surface	4 (SD±0.1)	3 (SD±0.1)	47.2	p<0.01
4	Length of the Humerus	34.4 (SD±3.0)	29.85 (SD±3.6)	42.3	p<0.01
5	Weight of Humerus	103.08 (SD±2.7)	88.8 (SD±1.8)	32.6	p<0.01



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