



## Original Research Article

## A comparative morphological study of human hyoid bone in Malwa Region of Central India

Narayan Parmar<sup>1</sup>, Vijay Chouhan<sup>2,\*</sup>, Ravi Jain<sup>3</sup>, Manish Chaturvedi<sup>4</sup>

<sup>1</sup>Dept. of Anatomy, Amaltas Institute of Medical Sciences, Dewas, Madhya Pradesh, India

<sup>2</sup>Dept. of Anatomy, Government Medical College, Ratlam, Madhya Pradesh, India

<sup>3</sup>Dept. of Anatomy, R D Gardi Medical College, Ujjain, Madhya Pradesh, India

<sup>4</sup>Dept. of Anatomy, Gajra Raja Medical College, Gwalior, Madhya Pradesh, India



## ARTICLE INFO

## Article history:

Received 06-09-2020

Accepted 09-09-2020

Available online 17-10-2020

## Keywords:

Anthropometry

Greater cornua

Lesser cornua

Hyoid bone

## ABSTRACT

There are many tools and a technique for identification of sex in unknown human skeletons one of them is morph metric study of the human hyoid bone is a useful tool. Work for hyoid bone with respect weight and different measurement of identification of sex. In our study 32 male and 18 female bones of age group range 15 to 60 years were received from the human deceased body during post-mortem. In greater part dimension there is a obvious dissimilarity between male & female hyoid bone. The Mean, Range, SD & all parameter of the hyoid bone were calculated by the typical technique.

**Materials and Methods:** The material include 50 specimens of hyoid bones received from deceased human body during dissection, museum at Index medical college institute and research centre at Indore and autopsy at M.G.M Medical College, Indore from 2013-2016. Out of 200 medico legal cases in the age range from 15 years to 60 years, measurements carried out with the help of vernier caliper & electronic weighing machine.

**Result:** The consequences of these boundary female qualities are not exactly the in male. The mean vertical length between center of the foremost surface of the body & cross over line drawn between the tubercles of more cornua in the midline in males is  $36.812 \pm 3.16$  mm & in females is  $32.31 \pm 2.44$  mm, the distinction being significant (p value < 0.001).

**Conclusion:** The investigations of the male human hyoid bone for the principal of the estimations were more when contrasted with the estimations of female human hyoid bones. In a large portion of the boundaries there was a clear differentiation between the estimations of both male female. For recognition of sex in these bones, single figuring may not be adequate to choose the sex of the bones and it gets required to see all the estimation before choosing the sex of a unidentified hyoid bone.

© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

### 1. Introduction

Hyoid is located in the front of midline of neck just above the larynx and below the mandible & U-shaped bone. It lies inverse the upper aspect of the fourth cervical vertebra and around 2 cm underneath the degree of the lower edge of the mandible when the head is very still. It is suspended from styloid cycle of the transient bone by the styloid tendons. It is the main bone in the body that explains with no different

bones. Hyoid bone gives solid connections to the muscles, that frames the floor of the mouth and to the tongue above, to the larynx underneath, and to the epiglottis and pharynx posteriorly.<sup>1</sup>

The hyoid bone serves as a fulcrum for the muscles involved in the process of swallowing. During the process of swallowing, the suprahyoid muscles elevate the hyoid bone when the mandible is fixed. Various muscular attachments<sup>2</sup> of the hyoid bone.

\* Corresponding author.

E-mail address: [varuny.indore09@gmail.com](mailto:varuny.indore09@gmail.com) (V. Chouhan).

**Table 1:** Human hyoid bone in male & female

S. No	P arameters	M (N=32)		F (N=18)	
		Mean±SD	Range	Mean±SD	Range
1	Max. len. of greater cornua – right side	32.07±2.052	28-37	28.73±2.454	24-32.5
2	Max. len. of greater cornua – left side	32.01±2.008	28-37	28.68± 2.398	24-33
3	Among tubercle of greater cornua – transverse length – external (outer measurement )	44.59±7.944	31-70	38. 49±4.973	31-48
4	Among tubercle of greater cornua – transverse length – middle (central measurement )	41.03±7.671	28-66	35.34±5.963	25-45
5	Among tubercle of greater cornua – transverse length – internal (inner measurement )	37.25±7.749	23-62	32.69 ±5.685	22-42
6	Among internal surface of greater cornua length – at their middle	33.12±4.973	22-43	28.25 ±2.735	24-33
7	Lesser cornua – length – right side	5.5±1.22	3.49-10.0	4.7 ±0.699	3.50-6.0
8	Lesser cornua – len. – left side	5.5±1.22	3.49-10.0	4.7 ±0.699	3.50-6.0
9	Transverse len. among bases of lesser cornua	21.46±3	11.5-27	18.6 ±2.87	10.5-22
10	Measurement of body in middle one side to another side	22.641±3.170	13.5-27	20.369± 1.595	18-23
11	Body anterior posterior Measurement in middle	6.222±1.252	4-9	5.536 ±1.207	4-8
12	Body len. among the upper and lower margins	11.856±1.553	9-17	10.01 ±1.073	7-11.5
13	Among middle of anterior surface of body - and transverse line among the tubercles of greater cornua in the midline –vertical measurement	36.811±3.159	30-44	32.313 ±2.445	26-36
14	The posterior surface of body max. dept of concavity in the middle	1.8392± 0.646	1-3	1.536 ±0.534	1-25
15	Wt. of human hyoid bone	0.9973± 0.254	0.67-1.78	0.7215±0.1153	0.49-0.90

### 1.1. Greater cornua

Are attached to the body by cartilage, in younger life, however after 50 years age they are typically joined by bone. They venture backwards from the lateral ends of the body & flattened, taper posteriorly & each end in tubercle, when the throat is grasped amid finger & thumbs above the thyroid cartilage, the greater cornua can be acknowledged.<sup>1</sup>

## 2. Materials and Methods

For this study the material include 50 specimens of hyoid bones received from deceased human body during dissection, museum at Index medical College Institute and research centre at Indore and autopsy at M.G.M Medical college Indore from 2013-2016, out of 200 medico legal cases in the age group ranging from 15 years to 60 years.

## 3. Result

The mean length of more prominent cornua – outside (right side) males is 32.08±2.05mm & in females it is 28.74±2.45mm, the mean length of more cornua (left side) in males is 32.02±2.009mm & in females is 28.69±2.39mm. The consequences of these boundary female qualities are not exactly the in male. The mean vertical length between center of the foremost surface of the body & cross over line drawn between the tubercles of more cornua in the midline in males is 36.812±3.16 mm & in females is 32.31 ± 2.44 mm, the distinction being significant (p value < 0.001).

## 4. Discussion

We are correlating with Harjeet, Jit I<sup>2</sup> & other studies. Since metric examinations of hyoids are regularly centered

around size instead of morphological shape, it is conceivable that misclassifications can happen for those bones that are nearer in size to individuals from the other gender as opposed to those of its own sex.<sup>3</sup> The male hyoids are bigger than female hyoids in all measurement, our study is similar with the study of Harjeet & Jitl<sup>2</sup> the distinction being statistically significant ( $p$  value  $< 0.001$ ). This may bring about littler males being mistakenly delegated females and bigger females. Utilizing an absolutely metric, measurable technique gives a target way to deal with testing for contrasts fit as a fiddle.<sup>4</sup> The muscles fix the hyoid unresolved issue, mandible & skull above and to thyroid ligament, sternum bone and scapula beneath. The strong development of rumination, deglutition and phonation depends on the incredible versatility of the hyoid bone.

The former concentrated on the cross over length in the midst of tubercles of more prominent cornua – External<sup>5</sup> and the cross over length among the tubercles of more noteworthy cornua-Middleresults were further in male hyoids as assess to female hyoids.<sup>6</sup> Mean length of more prominent cornua – outer (right side) males is  $32.08 \pm 2.05$ mm and in females it is  $28.74 \pm 2.45$ mm, the mean length of more noteworthy cornua (left side) in males is  $32.02 \pm 2.009$ mm and in females is  $28.69 \pm 2.39$ mm. The consequences of female qualities are lesser than the male worth is profoundly huge ( $p$  esteem  $< 0.001$ ).

As indicated by Ranjith and Pillai S<sup>7</sup> the mean load of the hyoid bone in male was  $1474.41 \pm 289.67$  mg and that of the female hyoid bone was  $960 \pm 233.36$  mg. The hyoid bone is mostly suspended by tendons which reach out from the tips of the styloid cycles to the hyoid littler horns. In addition, the soundness may rely upon the anatomical and productive connection between the hyoid bone and the laryngeal ligament. Nonetheless, by eliminating size from the sex assurance measure the probability of misclassifications could be diminished. Tragically, explicit shapes are regularly hard to pass judgment and onlooker predisposition might be acquainted while attempting with order the hyoid as one specific shape or the other.

## 5. Conclusion

The investigations of the male human hyoid bone for the principal of the estimations were more when contrasted

with the estimations of female human hyoid bones. In a large portion of the boundaries there was a clear differentiation between the estimations of both male female. For recognition of sex in these bones, single figuring may not be adequate to choose the sex of the bones and it gets required to see all the estimation before choosing the sex of a unidentified hyoid bone.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

1. Feneis H, Dauber W. Pocket atlas of human anatomy: based on the international nomenclature. vol. 500. 4th ed. Stuttgart; New York: Thiem; 2000.
2. Harjeet JI. Shape, Size and Sexual dimorphism of the hyoid bone in northwest Indians. *Journal of Anatomical Society of India*. 1996;45(1):4–22.
3. Brodie AG. Anatomy and physiology of head and neck musculature. *Am J Orthod*. 1950;36(11):831–44.
4. II. Osteology. 5b. 9. The Hyoid Bone. Gray, Henry. 1918. Anatomy of the Human Body.
5. Reesink EM, Immerseel AAHV, Brand R, Bruintjes TD. Sexual dimorphism of the hyoid bone? *Int J Osteoarchaeol*. 1999;9(5):357–60.
6. Saphire O. The text book of Autopsy Diagnosis and Technique. 4th ed.; 1958.
7. Ranjith PS. A Post mortem study of 100 hyoid bones using weight as parameter. *J Indian Acad Forensic Med*. 1988;10:31–3.

## Author biography

**Narayan Parmar** Assistant Professor

**Vijay Chouhan** Assistant Professor

**Ravi Jain** Assistant Professor

**Manish Chaturvedi** Assistant Professor

**Cite this article:** Parmar N, Chouhan V, Jain R, Chaturvedi M. A comparative morphological study of human hyoid bone in Malwa Region of Central India. *Indian J Clin Anat Physiol* 2020;7(3):320-322.