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IDENTIFICATION OF SEX FROM HYOID BONE FEATURES: A STUDY IN EASTERN INDIA

Anatomy

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ABSTRACT

Sex determination from bones is essential to anthropology and forensic medicine. The present study was conducted to examine various characteristics of the hyoid bone in relation to sex determination. The study was done on 218 adult hyoid bones obtained from medicolegal autopsies in a tertiary care medical college and hospital. All the parameters in the present study were significantly greater in males compared to females. Various features of the hyoid bone can be used to determine sex.

KEYWORDS

Hyoid bone, sex determination

INTRODUCTION

Sex determination from skeletal remains can be extremely useful for a multitude of reasons. Various parts of the skeleton are employed for this purpose and each part has its unique advantages and disadvantages.[1] The hyoid bone is of immense value in forensic and other branches of medical science, and these fields have utilised numerous aspects of this bone for advancement and understanding.[2] Although the relationship between hyoid bone shape and fracture pattern figures prominently in forensic investigations of strangulation, few quantitative data exist on age and sex differences in hyoid morphology.[3]

The hyoid bone has anterior and posterior surfaces, and superior, inferior and two lateral borders, which, in their upper part, articulate with the greater cornua. To the anterior surface, are attached, the lesser cornua.[4]

The present study examined these and other characteristics to determine sex.

MATERIALS AND METHODS

The present research work was undertaken in a tertiary care medical college and hospital of West Bengal. 300 hyoid bones were taken from cadavers after autopsy from the above mentioned hospital during a period of 1 year. The subjects were aged 18-70 years. Decomposed, damaged or mutilated bones were excluded, and ultimately 218 bones were included in the present study.

Hyoid bone from each cadaver was subjected to the measurements mentioned below:

1. Length of the left greater cornu
2. Length of the right greater cornu
3. Side to Side dimension (width) of the body in the middle.
4. Antero-posterior dimension of body in the middle.
5. Distance between the upper and lower margins of the body (height).

RESULTS

Table 1. Hyoid bone parameters (in mm) in male and female subjects as Mean±SD (Range).

	Male	Female
Length of the left greater cornu	33.12+4.57(28.96-36.91)	28.46+ 3.93(25.01-32.59)
Length of the right greater cornu	32.97+3.98(29.18-36.58)	28.93+4.14 (25.66-33.81)
Width of the body	24.11+5.84(16.92-29.63)	20.79+ 4.79(17.84-24.58)
Antero-posterior dimension of body	6.25+0.96(4.66-9.94)	5.17+ 0.82(3.73-8.69)
Height of the body	11.24+ 1.96(8.91-15.45)	9.36+ 1.32(7.73-12.07)

DISCUSSION

In our study we found the length of the left greater cornu to be 33.12±4.57 in males and 28.46± 3.93 in females. The parameters are comparable with the values of Savitha et al, where the respective values were 30.04± 3.25 and 27.78± 2.71, and Vohra et al where the respective values were 31.87±3.84 and 28.4±3.44.[5,6] Also, in our study we found the length of the right greater cornu to be 32.97± 3.98 in males and 28.93±4.14 in females. The parameters are comparable with the values of Savitha et al, where the respective values were 31.58 ±3.17 and 29.04 ±3.32, and Vohra et al where the respective values were 31.84 ±3.62 and 28.62±3.22.[5,6]

Width of the body in our study was 24.11± 5.84 and 20.79± 4.79 in males and females respectively. The same parameters had values of 23.08±2.66 and 20.12±1.51 in a study by Sameera et al, and 25.94±3.47 and 25.05±30.95 in a study by Vohra et al;[6,7] thus, width of body in our study is comparable to the same in other studies, whereas the width in females as found by Sameera et al is greater than our finding.

We found antero-posterior dimension of body to be 6.25± 0.96 and 5.17± 0.82 in males and females respectively. Values of the same parameters were 6.16±1.19 and 5.55±1.03 according to Sameera et al, and 3.67±0.9 and 3.4±0.76 according to Vohra et al;[6,7] in this respect our findings tally with those of Sameera et al but differ from those of Vohra et al.

In our study, height of the body was 11.24± 1.96 and 9.36± 1.32 in males and females respectively. Vohra et al found comparable values of the same parameters i.e 11.01±1.65 and 10.54±1.62, also comparable values were found by Savitha et al i.e. 10.09 ±1.4 and 9.55 ±1.03; also comparable values were found by Moustafa i.e. 11.15 ±1.13 and 10.04 ±1.01.[5,6,8]

All the parameters in our study were highly significantly greater in males compared to females ($p<0.001$). Okasi et al also stated that the hyoid bone is generally larger in men.[9]

Parameters from the present research work can be utilised in forensic studies, anthropological investigations and allied scientific branches to determine sex of a subject.

Data from this work indicate that sexually dimorphic features of the hyoid bone may be important in distinguishing male and female cadavers. To a certain extent, hyoid bone may be useful as a sex indicator in relevant exploratory studies.[10]

Sex determination of a cadaver from unidentified remains is an important analytical field and this groundwork may be the base of scrutiny and follow-up. Experts have provided several newer modalities to facilitate unravelling of unknown facts and to improve accuracy of methods. Further research can help in precision of diagnosis and standardization.[11]

The present study showed that values of all parameters were greater in males compared to females; thus, determination of sex can be done with great accuracy by analysis of different parameters of hyoid bone.

CONCLUSION

Parameters examined in the present study showed greater values in males than females. Various features of the hyoid bone can be used to determine sex.

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