

Mandible branch assessment as sex determination for human identification. Luiza S. Alves*, Estela Oliveira*, Luiz F. Júnior, Paulo H. F. Caria.

Abstract

Sex determination is the first step to identify corpses or skeletal remains and mandible is more easily sexed bone, with accurately above 90% however, skeletal features vary by population. We measured mandibular branch in Brazilian population to determine sex. Methods: Five mandibular anthropometric parameters were measured in 100 Brazilians adult mandibles, 80 males (mean 38.58 years), 20 females (mean 31.75 years), and the relationships of these variables with gender were determined. Collected data were analyzed using descriptive statistics and Pearson correlation coefficient. Results: No significant statistical difference was observed between the two genders samples. Pearson's correlation coefficient indicated average correlation to moderate in three measures (1&2: 0.64; 3&4: 0.68 and 4&5: 0.73) last measurement was the strongest. Conclusion: The five anthropometric parameters used on this study were not enough to differentiate the sex in mandibles. Brazilian population has a high-level of miscegenation, than a major experimental sample can provide greater accuracy in determining the sex.

Key words: Mandible, sex determination, human identification

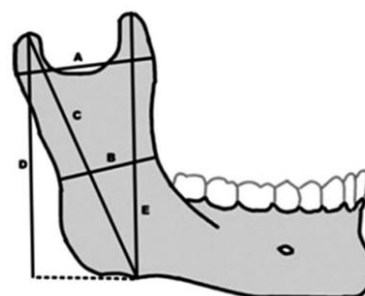
Introduction

Sex determination by bones also allows estimate the age and height of people¹. When the whole skeleton can be analyzed, sex can be determined with 100% accuracy. However, in mass accidents, bones are usually fragmented, sex determination, is compromised. There is sexual dimorphism in almost all bones of the human skeleton, but the skull is the most dimorphic. Mandible is more easily sexed structure of skeleton, with accuracy of up to 92%^{2,3}. Thus, when no intact skull is found, mandible can play a vital role in sex determination⁴. Different studies have been conducted to test the mandible efficiency in sex determination^{4,6}, but few have been conducted in people with great miscegenation as Brazilians. Objective: Measure mandibular branch in Brazilian population to determine sex and provide assessment parameters.

Results and Discussion

Five measurements were performed on a sample of 100 dry mandibles of adults, 80 males (mean age 38.58 years) and 20 females (mean age 31.75 years). Only intact mandibles were used on this study. All measurements were done using a digital caliper with an accuracy of 0.1 mm, 3 times to minimize observer error and the average values were considered. Results: In a sample of one hundred mandibles, the mean age was 35.1 years. Descriptive statistic of Mandibular measurements were not significantly different between the two genders. Pearson's correlation coefficient indicated average correlation to moderate in three measures (1&2: 0.64; 3&4: 0.68 4&5: 0.73) and Height of the coronoid process measurement presented the strongest correlation. Sexual mandible dimorphism is the result of several correlated influences such as environmental, genetic or hormonal. Different studies relate metric mandible characteristics and its reliability for sex determination, accurate results ranging from 60-90%. Most authors^{6,7} measured 5 to 7 variable, and studies that focus on less than 5 parameters have an accuracy of determining the sex of about 80%. Comparing the present study with other studies indicate the mandible is appropriate to defined dimorphic traits, although the racial miscegenation has attenuated the differences with studies in European populations

Image 1. Mandible dimensions evaluated:



(A) Maximum width of the field. (B) Width branch. (C) Condylar height / height maximum branch of the jaw. (D) Height projected the mandibular branch. (E) Height of the coronoid process. By Vodanovic et al. (2006)⁷

Table 1. Pearson's correlation.

	1	2	3	4	5
1	1	0,64*	0,32	0,46	0,39
2	0,64*	1	0,38	0	0,31
3	0,32	0,38	1	0,68*	0,74
4	0,46	0	0,68*	1	0,73**
5	0,39	0,31	0,74	0,73**	1

Conclusions

The five anthropometric parameters used on this study were not enough to differentiate the sex in mandibles. Brazilian population has a high-level of miscegenation than a major experimental sample has to be evaluated.

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