ANALYSIS OF GENDER BY USING MINIMUM RAMUS BREADTH IN SOUTH INDIAN POPULATION - A RETROSPECTIVE

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Abstract

Introduction: Gender estimation is a very important part of a study in the field of anthropology and forensic sciences. In the skeleton, gender estimation is the first step of the identification process as subsequent methods for age and stature estimation are sex-dependent. Skeletal components such as the pelvis and skull are investigated for gender estimation and the mandible is a practical element to analyze sexual dimorphism in fragmented bones.

Materials and Method: Study was conducted among fifty males and fifty females using the orthopantomograph between the ages of fifty and sixty.Computational analysis of the obtained data was done using the spss software and results were obtained.

Results: The mean Ramus breadth for male is 36.67 ±1.13 , the mean Ramus breadth for female is 36.63±0.85 ,the standard deviation for male is 5.675, the standard deviation for female is 4.274

Conclusion: Mandibular ramus can be considered as a valuable tool in gender estimation and the most reliable measurements were obtained of linear objects in the horizontal plane by digital panoramic imaging but the use of mandible ramus breadth is not reliable.

Keywords: Ramus, Breadth, Dimorphism,Mandible.

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1. Introduction

In our biological system, an organism's development of sexual characteristics is determined by its sex. Although there are different sexes in animals, male and female are the two most significant sexes in the majority of organisms. Allosomes, also referred to as sex chromosomes, are what determine sex in humans (XX females, XY males). Different numbers and sets of genes are present on the X and Y chromosomes (about 1,000 genes on the X and only a few genes on the Y). [1]During the early stages of mammalian evolution, the normal autosomes gave rise to the allosomes. Sex chromosomes have undergone morphological differentiation as a result of gene loss on the Y chromosome and restriction of recombination.[1,2]

A person's identity is made up of their bodily traits, whether they are diseased, pathologically abnormal, or functionally or psychically .[3]Forensic investigators find that the most difficult problem to solve is human identification, particularly when trying to ascertain a person's age, sex, stature, ethnicity, etc. In life, each individual has a distinct identity, and in forensic odontology, it is important to identify a live or deceased person using the distinctive traits and features of their teeth and jaws. Given that teeth and skeletal remains continue to exist for a very long time after a person has passed away, determining an individual's age and sex can be challenging. [3,4]

The mandible is the largest and sturdiest bone in the face. It has two broad rami that rise from the back of the body's posterior end and a horizontally curved body that is convex forward. Processes coronoid and condyloid are carried via the rami. 4 Since it is the facial skeleton's most resilient bone and holds its shape better than other bones, the mandible is regarded as being suited for study. The relative difference in the musculoskeletal system's development, notably the masticatory muscles linked to the mandible, may be the cause of sexual dimorphism in the jaw.[5]

The mandible's ramus is its vertical portion. Mandibular angle refers to the location where it joins the body (i.e. gonial angle). Age, sex, and ethnicity all affect the angle, which can range from 110° to 130°. Men typically have a greater angulation. [6]

The condylar process and the anterior process, collectively known as the coronoid process, make up the upper section of the ramus (posterior process). The masseteric nerve and vessels traverse the incursion between them, known as the mandibular notch.

In medico-legal investigations, the identification of skeletal remains is of utmost importance. The pelvis and skull are the skeletal elements that are most frequently studied to determine gender, with the mandible serving as a useful tool to examine sexual dimorphism in the broken bones. It is more durable and better kept than many other bones due to the presence of a dense covering of compact bone.[7] The mandibular ramus exhibits considerable univariate sexual dimorphism and can be used to distinguish between sexes. Metric analyses on the radiographs are frequently determined to be of greater utility for determining the skeleton's sex due to their objectivity, correctness, and reproducibility. Our team has extensive knowledge and research experience that has translate into high quality publications [8–17].This study aims to find out if minimum ramus breadth is of significance to sexual dimporphism in fifty to sixty year olds.

2. Material and Method

Study was conducted among fifty males and fifty females using orthopantomography between the ages of fifty and sixty from the department of oral medicine and radiology of Saveetha dental college. Patients with good oral health and hygiene were taken into consideration for the study. Exclusion criteria for the study included patients having a history of extraction, fracture, or any other serious developmental problems that would have affected mandible size.

Plan meca software used for the sample collection and the study was conducted in the department of forensic odontology. The sample and the data was transferred to SPSS software and the results were obtained.

3. Results

Computational analysis of the obtained data was done using the spss software and results were obtained.The mean Ramus breadth for male is 36.67 ±1.13 , the mean Ramus breadth for female is 36.63±0.85 ,the standard deviation for male is 5.675, the standard deviation for female is 4.274.

Table1:

Group Statistics

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Ramusbreadth	Male	25	36.6720	5.67564	1.13513
	Female	25	36.6280	4.27420	.85484

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ramusbreadth	Equal variances assumed	1.868	.178	.031	48	.975	.04400	1.42101	-2.81313	2.90113
	Equal variances not assumed			.031	44.597	.975	.04400	1.42101	-2.81877	2.90677

From table 1, The mean Ramus breadth for male is 36.67 ±1.13 , the mean Ramus breadth for female is 36.63±0.85 ,the standard deviation for male is 5.675, the standard deviation for female is 4.274. P value = 0.178>0.05 hence the obtained value is statistically insignificant.

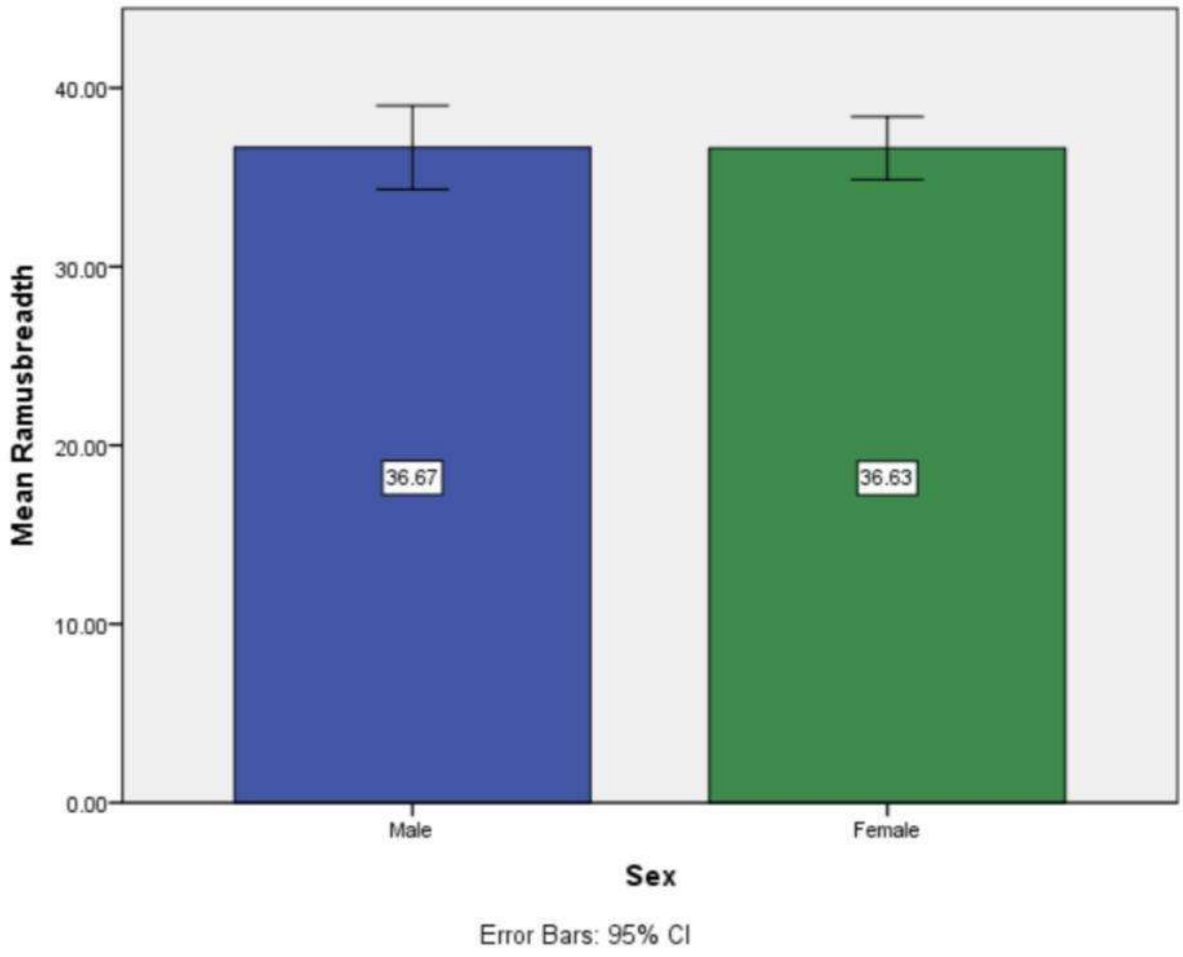

Figure 1

From the above bar graph , we can conclude that the mean ramus breadth of male and female is 36.67mm and 36.63mm respectively.

4. Discussion

Mandibular ramus measurements were subjected to discriminant function analysis. The breadth measured on the mandibular ramus using orthopantomographs showed statistically insignificant results , indicating that ramus breadth do not express strong sexual dimorphism. In our study the obtained value was statistically insignificant suggesting that there are no strong sexual dimorphism when it comes to mandibular breadth. [7,18]

The second most anthropomorphic and visibly noticeable part of the skeleton is the skull. As the most dimorphic bone in the skull, the mandible may be crucial in determining sex in situations where a full skull cannot be obtained. When typical forensic data are not available, anthropometry of the face and intraoral regions might be useful in the field of forensic odontology.[19]

In another study, Discriminant function analysis was used to examine measurements taken from the mandibular ramus. The mandibular ramus exhibits high sexual dimorphism, as evidenced by the statistically significant sex differences between sexes for each of the five variables assessed using an orthopantomograph[3]. Regarding the minimum ramus breadth, condylar height, and projective ramus height, the mandibular ramus showed the greatest univariate sexual dimorphism. With all five variables included, the overall prediction rate was 76%.[19,2021]

In a conducted study,The projective height of the ramus showed the most sexual dimorphism, whereas the minimum ramus breadth showed the lowest. With a P value of 0.05, the maximum ramus breadth, condylar height, and ramus projective height were statistically significant.

5. Conclusion

Mandibular ramus can be considered as a valuable tool in gender estimation and the most reliable measurements were obtained of linear objects in the horizontal plane by digital panoramic imaging but the use of mandible ramus breadth is not reliable. In future studies other parameter such as condylar height , ramus height , gonial angle can be used for proper sex determination and high accuracy.

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Conflict of Interest :
All the authors declare that there was no conflict of interest in the present study

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