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Morphometric Analysis of Dry Adult Human Mandibular Ramus

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Abstract

Context: *Mandible is the lower jaw bone providing attachment of muscles of mastication and facial expression and provides pathway for inferior alveolar nerve and vessels. The mandibular ramus is almost vertical in adult but more oblique in old age. The anterior part of ramus can be used as the donor site for reconstruction of small bone defects in the oral and maxillofacial region. A relatively short mandibular ramus may be an important unfavorable anatomic factor in difficult laryngoscopy. The aim of this study was to determine the morphometry of mandibular ramus from various anatomical landmarks in one hundred eighty five dry adult human mandibles.*

Materials and Methods: *A cross-sectional, analytical type of study was conducted in the department of Anatomy, Dhaka Medical College, Dhaka from July 2010 to June 2011. Morphometry of mandibular ramus was measured with the help of digital sliding calipers.*

Results: *The mandibular ramus was at the same distance from each landmark on both sides demonstrating symmetry. There was no significant difference in the values on the right and left sides of the mandibles.*

Conclusion: *Anatomical knowledge of this study might be useful in certain surgical procedure.*

Key words: *Mandibular ramus, morphometry.*

Introduction

The mandibular ramus is quadrilateral, and has two surfaces, four borders and two processes. The lateral surface is relatively featureless. The anterior part of ramus is thin above but the posterior is thick and rounded and can be used as the donor site for reconstruction of small bone defects in the oral and maxillofacial region [1, 2]. The mandibular ramus suffers morphological alteration associated with tooth losses [3, 4].

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The mandibular foramen (MF) is located above the center on the medial surface of the ramus. The mandibular canal starts at the MF and descends obliquely forward in the ramus and later in the body of mandible containing the inferior alveolar neurovascular bundle [5].

Despite the significance of mandibular ramus, little attention has been given to the study of the morphometry of mandibular ramus associated anatomical characteristics in Bangladesh; hence this study has been conducted to investigate the morphometry of mandibular ramus with respect to the surgically encountered anatomical landmarks.

Materials and Methods

One hundred eighty five dry adult human mandibles with complete dentition and intact alveolar margin of unknown sex collected from the Department of Anatomy of Dhaka Medical College, Sir Salimullah Medical College and Shaheed Suhrawardy Medical

College, Dhaka. Morphometry of mandibular ramus was determined using the maximum length of ramus from the base of mandible to (a) the highest point of the head of mandible (fig 1) (b) the mandibular notch (fig 2) and the maximum breadth of ramus from anterior edge of ramus to posterior edge of ramus which were measured with the help of digital slide calipers. The distances of various landmarks were calculated as a mean of two measurements recorded independently by two researchers. Measurements were recorded to the nearest millimeter.

A comparison of the mean values between sides was performed using the paired 't'-test, p-value ≤ 0.05 was considered statistically significant.

Results

The mean and standard deviation values of various parameters are shown in table-[2]. It was found that there was no significant difference in the values on the right and left sides of the mandible. The distances (mean±SD) from the base of mandible to the highest point of the head of mandible was 64.22±5.77 mm and 64.05±5.92 mm, to the mandibular notch was 46.32±7.21 mm and 46.24±8.49 mm; the distances (mean±SD) from anterior edge of ramus to posterior edge of ramus was 30.48±2.36 mm and 30.31±2.32 mm on right and left side respectively.

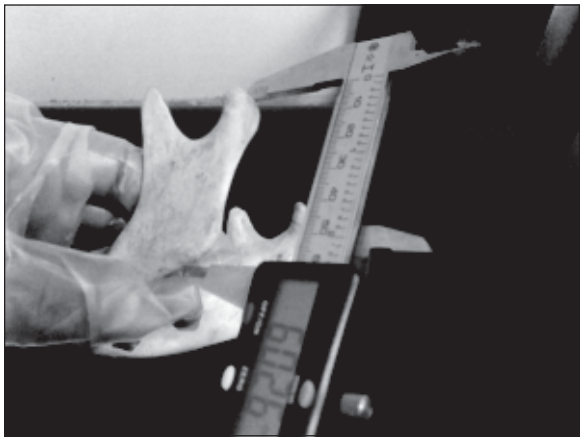

Fig.-1

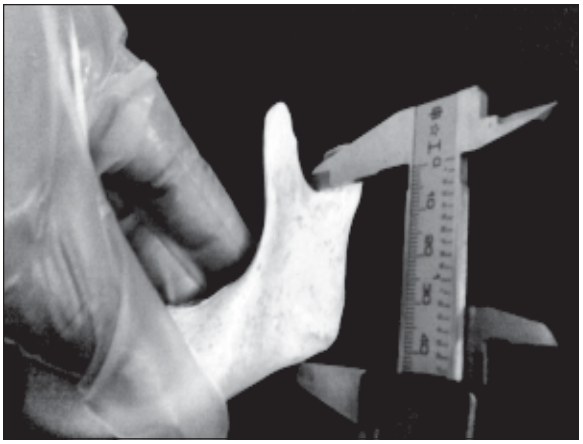

Fig.-2

Table-I

Morphometry of mandibular ramus

Variables	Right side Mean±SD	Left side Mean±SD	P value
Distance from the base of mandible to the head of mandible	64.22±5.77 (50.19-78.32)	64.05±5.92 (50.48-78.23)	>0.10[ns]
Distance from base of the mandible to the mandibular notch	46.32±7.21 (18.68-58.76)	46.24±8.49 (15.75-79.97)	>0.50[ns]
Distance from the4 anterior edge to the posterior edge of ramus	30.48±2.36 (20.05-38.80)	30.31±2.32 (19.70-38.59)	>0.50[ns]

Comparison between right and left side done by paired Student's 't'test, ns= not significant, *= significant.

Discussion

In the present study, the mean (±SD) distance between the base of mandible and the highest point of the head of mandible was 64.22±5.77 mm and 64.05±5.92 mm on right and left side respectively. The present finding was consistent with Rai et al [6] but differed from Saini et al. [7] and Rosa et al. [8]

The mean (±SD) distance between the base of mandible and the mandibular notch was 46.32±7.21 mm and 46.24±8.49 mm on the right and left side respectively of the total mandibles. This finding of the present study was consistent with Keros et al. [9] but differed from Jerolimov et al. [10] The mean (±SD) distance between anterior edge of mandibular ramus and posterior edge of mandibular ramus was 30.48±2.36 mm and 30.31±2.32 mm on right and left side respectively. This finding of the present study was consistent with Keros et al.[9], Jerolimov et al.[10], Oguz and Bozkir [11], Kilarkaje et al. [12] and Ennes and Medeiros [13].

Conclusion

It was found in this study that the maximum length of mandibular ramus was 64.22±5.77 mm and the maximum breadth of the mandibular ramus was 30.48±2.36 mm. The mandibular ramus was at the same distance from each landmark on both sides demonstrating symmetry. This study provides statistical data to identify the morphometry of the mandibular ramus, which maintains bilateral symmetry. These data may be useful in reconstructive surgery and anthropological assessments.

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