

Mandibular morphometry and TMJ ankylosis: from the perspective of Indian population

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Introduction

Long-standing ankylosis of the temporomandibular joint (TMJ) prevents the normal opening of the mouth causing reduced mandibular function. Alloplastic reconstruction has been a preferred treatment choice to restore the joint for many patients globally [1]. This study focuses on the evaluation of morphometric measurements of the mandibles of TMJ ankylosis (TMJA) patients in the Indian population.

Methods

The CT DICOM files of 51 TMJA patients (age range 10-56 years) were procured from AIIMS Delhi and reconstructed in Mimics (v25.0). Of these, 16 male and 15 female patients were having unilateral (13 right and 18 left) TMJA while 9 male and 11 female patients were having bilateral TMJA. The significant anatomical landmarks [2] are shown in Figure 1. The morphometric measurements evaluated were ramus length (Co-Go), minimum ramus width (MRW), gonial angle ($\angle\text{CoGoMe}$), and mediolateral condylar width (Co.in-Co.out). The major focus of this study was on ramus length and its comparison with the different sizes of available stock TMJ prostheses. A maximum error of 2% can be considered in all measurements.

Results and Discussion

The measured landmarks of mandibles are shown in Figure 1. The ramus length was observed to have a minimum value of 23.77 mm (mean 48.31 mm) in Indian males unlike, 20.37 mm (mean 44.63 mm) in Indian females. The minimum size (45 mm) of a widely used standard commercial TMJ implant (Zimmer Biomet Microfixation™, Jacksonville, FL, USA) suffers length as well as medio-lateral fit discrepancy which might cause some long-term disabilities in ankylosis patients. To eliminate this size discrepancy, the size of presently available stock prostheses should be reduced according to the minimum possible size of the lower jaw of TMJA patients. A few other anomalies such as the inclination of the ramus with the sagittal plane, and the irregular gap between the mid-length of the TMJ implant and the ramus which might be assessed with normal mandibles in a future study.

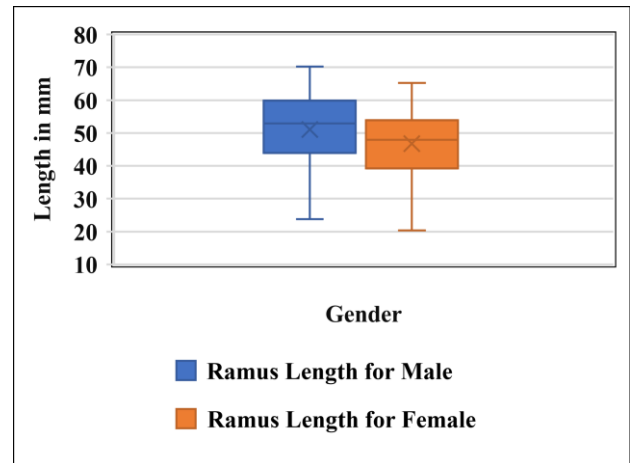


Figure 1: A box plot to show the morphometric variation within the measured mandible in the Indian population

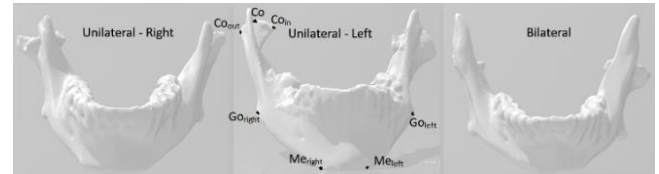


Figure 2: Anatomical landmarks for morphometric measurements in the human mandible

References

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2. Qiang Dong et al. Scanning, 9996857, 2021.

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