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Assessment of the Height of Mandibular Ramus According to Dental Status

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ABSTRACT

Aim: *To compare the ramus height between dentulous and edentulous groups using dental panoramic tomography.* ***Materials and methods:*** *Orthopantomographic images of 15 dentulous and 15 edentulous subjects, aged 20-60 years were compared and evaluated to measure the ramus height.* ***Results:*** *The results showed significant difference in ramus height between dentulous and edentulous mandibles (p=0.001).* ***Conclusion:*** *It can be concluded that mandibular basal bony morphology changes as a consequence of tooth loss, which could be expressed as shortening of ramus height measurement and ramus height could be the best parameter to predict edentulous and dentate status.* ***Clinical significance:*** *As seen in this study, the ramus height would be decreased due to teeth loss and this may affect the morphology of the face of edentulous patients, so fabricating of a new dental prosthesis of the loosing tooth or teeth immediately may limit ramus height decreasing after losing of teeth.*

Keywords: Dental panoramic tomography, Mandible, Ramus height

INTRODUCTION

The mandible is the biggest, most grounded, and lowest bone in the face. It shapes the lower jaw and holds the lower teeth in place [1]. The primary parts of the mandible are body, ramus, alveolar process, condyle, coronoid process, mandibular foramen, and mental foramen [1]. The mandibular condyle is an osseous prominence of the back and upper border of the ramus of the mandible [2]. Ramus is plate of the mandible that extends upward and backward from the body of the mandible on each side. Ramus height is measured parallel to the tangent at the posterior border of the ramus between the most cranial point of the condyle and the intersection point with the lower border of the ramus mandibulae (the gonial point (Go)). The intersection with the lower border of the ramus mandibulae was obtained using a line parallel to the tangent at the posterior border of the ramus that ran through the most cranial point of the condyle. (Figure 1). The condyle has specific directional capabilities for growth and adaptive remolding in selective reaction to various mandibular rotation and displacement movement [3,4]. The condylar cartilage is a main growth site of the mandible. Changes in the lengths of the mandibular ramus and condylar process either represent mandibular growth or pathological processes in the temporomandibular joint (TMJ). Ramus height could be changed due to several factors such as orthodontics treatment, malocclusion, tooth loss, temporomandibular disorder, using dental panoramic radiograph in the measurement of ramus height has been evaluated and considered a reliable method [5-10]. The aim of this study is to compare the measurement of the ramus height between dentulous and edentulous groups using digital dental panorama.

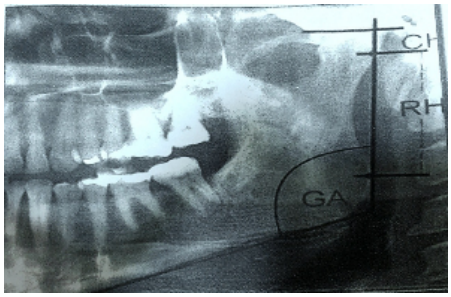

Figure 1 Example of a dental panoramic image showing the ramus height (RH), condylar height (CH) and Gonial angle (GA) [6].

MATERIALS AND METHODS

Sample

Panoramic radiographs of patients who attended the Oral Radiology Department in College of Dentistry, Baghdad University between October 2016 and May 2017, were retrieved from records and were retrospectively evaluated. Thirty radiographs were selected, 15 dentulous and 15 edentulous. The participants were aged between 20-60 years. Clear panoramic radiographs on which all structures are visible were included in the study.

Exclusion Criteria

Mixed dentition, fracture, pathological lesions, developmental anomalies of the mandible systemic disease that effect the bone were excluded from the study.

For standardization purposes, the radiographs included were only those taken by a radiographer on the same panoramic unit (Planmeca Promax Dimax 3 Digital Panoramic X Ray, manufactured by: Planmeca, United States) considering standard exposure parameters. Planmeca Romexis® software suite was employed to measure the ramus height as per Obwegeser and Luder [2].

Data Analyses

The analyses were performed using SPSS for windows version 11 (IBM Corp. IBM SPSS Statistics for Windows, Version 11. Armonk, NY: IBM Corp.). Student's t-tests were carried out to compare values for the dentulous and edentulous. The level of significance was set at p=0.001.

RESULTS

Thirty radiographs were evaluated meeting the criteria for inclusion and analysis. Table 1 illustrates the values of the dentulous and edentulous subjects.

Table 1 Comparison of dentulous and edentulous values

Groups	Mean	SD	Median	p-value
Dentulous	56	2.16406	56	0.001
Edentulous	45	2.30765	46	
SD: Standard Deviation				

DISCUSSION

It is essential to determine the mandibular morphology when orthognathic surgery, especially mandibular ramus osteotomy, is performed. Many studies have reported the morphology of the mandibular ramus in asymmetric mandibles because the mandibular ramus is intricate. In this study, there is statistically significant difference in mean values of dentulous and edentulous groups and these findings disagree with the study made by Mattila, et al., and

Shahabi, et al. who found no significant difference between dentulous and edentulous ramus height [11,12]. This can be attributed to the difference in the sample size and race variations.

Our study agreed with Huumonen, et al., in 2010, who showed a significant difference in ramus height between dentulous and edentulous groups [6].

The articular structures of the temporomandibular joint (TMJ) can be suffered from remodeling due to change in occlusion and this change in occlusion may be due to orthodontic treatment or loss of teeth. The result of articular structures remodeling is decreasing in the ramus height and resorption of the condyle [4,13].

CONCLUSION

Mandibular basal bony morphology changes as a consequence of tooth loss, which could be expressed as shortening of ramus height (RH). RH showed statistically significant lower values in edentulous group than that of dentate group. Ramus height can be a promising parameter to differentiate edentulous from dentate status.

Clinical Significance

As seen in this study, the ramus height would be decreased due to teeth losing and this may affect the morphology of the face of edentulous patients. So, fabricating of a new dental prosthesis of the loosing tooth or teeth immediately may limit ramus height decreasing after losing of teeth.

DECLARATIONS

Conflict of Interest

The authors have disclosed no conflict of interest, financial or otherwise.

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