Is There an Association Between Torus Mandibularis and Bite Force?

Torus Mandibularis ile Çiğneme Kuvveti Arasında Bir İlişki Var mı?

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**ABSTRACT**

Objective: This study was performed to test the hypothesis that subjects with torus mandibularis (TM) have higher bite force than those without.

Material and Methods: It is known that Frankfort-mandibular plane angle (MI) correlates significantly negatively with bite force. The study was performed on 79 adult subjects with sound dentition and MI was compared between subjects with TM (35 subjects) and without TM (44 subjects).

Result: It was found that MI was smaller in subjects with TM than subjects without TM (t = 3.089, P = 0.003).

Conclusion: Subjects with TM seem to have higher bite force than those without TM.

**ÖZET**

Amaç: Bu çalışma torus mandibularisi (TM) olan bireylerin çiğneme kuvvetlerinin TM'si olmayanlara göre daha yüksek olduğu hipotezini çözümlemek amacıyla gerçekleştirilmiştir.

Materyal ve Metod: Frankfort-mandibular düzlem açısı (MI) ile çiğneme kuvveti arasında önemli ve negatif yönde bir ilişki olduğu bilinmektedir. Çalışma sağlıklı dentisyona sahip 79 yetişkin bireyde gerçekleştirilmiş ve MI TM si olan (35 birey) ve TM si olmayan (44 birey) bireyler arasında karşılaştırılmıştır.

Bulgular: MI'nin TM si olan bireylerde TM si olmayan bireylere göre daha dar olduğu saptanmıştır (t = 3.089, P = 0.003).

Sonuç: Çalışmamızın sonuçlarına göre TM si olan bireylerin çiğneme kuvvetlerinin TM si olmayan bireylerinkinden daha yüksek olabileceği söylenebilir.
INTRODUCTION

Torus mandibularis (TM) is a well-known osseous anatomical variation of mandible localized on the lingual surface of premolar region. TM consists of spongious and compact bone and shows various presentations. In most instances they are asymptomatic and do not require treatment\(^1\).

The etiology of TM has long been debated, with arguments centering on genetic versus environmental factors\(^1\). Eggen and Natvig\(^2\) found that people who consumed a coarse diet had a higher prevalence of TM than those who consume a soft diet. It has been shown that there is a significant negative correlation between bite force and number of missing teeth\(^3\). Interestingly, the study by Eggen and Natvig\(^4\) revealed that subjects with TM had more teeth present than those without torus. Kerdpon and Sirirungrojying\(^5\) reported a strong association between oral parafunctional habits in the form of clenching and grinding and the presence of TM. It is known that the forces generated by these habits are higher than those of functional activities\(^6\).

All of these studies suggest that TM is related to increased stresses on the mandible. However there is another possible factor which has not been investigated yet. Do the subjects with TM have higher bite power than those without TM?

It is known that inclination of the mandibular plane in relation to the Frankfurt plane (MI) correlates significantly negatively with bite force\(^7-10\).

The present study was undertaken to test the hypothesis that subjects with TM might have higher bite forces by comparing MI between subjects with and without TM.

MATERIAL AND METHODS

The study was performed at Hacettepe University Faculty of Dentistry Department of Oral Diagnosis and Radiology. Subjects were randomly selected from volunteer adult patients attended for dental examination. The general inclusion criteria were as follows; no history of orthodontic treatment, no excessive soft tissue on the region of angulus mandibularis, presence of healthy full or nearly full dentition, no severe tooth wear on occlusal surfaces. The subjects of the study group required to have TM which was distinctly visible. In this group\(^11\) patients had one uni/bilateral missing molar or premolar. The neighbor teeth were in the original position and showed intact relation with opposing teeth. The subjects without TM constituted the control group. According to these criteria, 35 (8 male, 27 female) subjects with TM, 44 (9 male, 35 female) subjects without TM were found acceptable for the study.

Protractor-ruler device (Ormocepha;Ormco Corp. Ca.,USA) was used to measure MI. All measurements were taken by one investigator (LBÇ). The subjects were positioned upright in the dental chair without headrest. Measurements were taken when the teeth were in intercuspal position and the Frankfurt horizontal plane was parallel to the floor. The measurements were repeated after a week interval in randomly selected 10 subjects to calculate the reproducibility of the measurement. Statistical analysis revealed no significant difference between the first and the second measurements (Wilcoxon Signed Ranks Test \(z=0,000\) \(p=1,000\)).

Means and standard errors were calculated for all variables. Student’s t test was used to assess the differences between the groups.

RESULTS

The age ranged from 19 to 54 years (35±1,91) in the TM present group and from 16 to 48 (27±1,21) in the control group. Although the groups were statistically significantly different with respect to age (t=3,568, \(P=0,001\)), there were no significant relationship between age and MI (\(r=-0,054\)).

MI was \(17.4^\circ\) (±0,75) in the TM present group and \(21^\circ\) (±0,9) in the control group. There was a statistically significant difference between groups with respect to MI (t= 3,089, \(P=0,003\)).
DISCUSSION

Previous studies suggested the concept that TM is related to increased stresses on the mandible. The present study demonstrated that subjects with TM have more parallel oriented mandibular plane than subjects without TM. This morphologic characteristic has been shown to be associated with high bite force. So, the results of the present study also suggest that TM is related to increased stresses on the mandible.

Waltimo et al. and Varella described individuals with significant occlusal tooth wear due to parafunctional activities and intensive mastication as having anteriorly rotated mandible which indicates more parallel orientation of mandibular plane. In the present study in both groups the posterior teeth showed minimal flattening of cusp tips which could be designated as score 1 according to Smith and Knight tooth wear index. Besides the effect of heavy loading, the amount of wear increases with age. In the present study the effect of age on MI was eliminated with the inclusion criterion about the state of occlusal surfaces.

A protractor-ruler device is used to measure the Frankfort-mandibular plane angle when lateral skull radiographs are not routinely available. An extensive clinical examination of the underlying skeletal structures can be obtained with this device. We have preferred to perform the study with this device because we have considered radiation hygiene. The measurement procedure was quite simple and the measurement error was minimal. However, as the determination of the mandibular plane in subjects with excessive soft tissue on the mandible was difficult we have not included this type of subjects to the study.

REFERENCES


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