

# Relation between Missing Molars and Articular Eminence Inclination

Noor Suhail, B.D.S<sup>[1]</sup>, Areej A. Najm, B.D.S, Msc<sup>[2]</sup>, Maryam A. Abdulkareem, , B.D.S<sup>[2]</sup>, Jwan A. Mohammed, B.D.S<sup>[2]</sup>, Mina A. Abdulkareem, B.D.S<sup>[2]</sup>

<sup>1</sup>Dentist, Ministry of Health / Iraq

<sup>2</sup>Oral diagnosis department / College of Dentistry / University of Baghdad, Iraq

**Abstract:** Background: The articular eminence (AE) is part of the temporal bone on which the condylar process slides during mandibular movements. Aim of this study is to evaluate the correlation between unilateral missing molar and inclination of articular eminence. Material and methods: In this retrospective study, (32) digital panoramic radiograph selected from archives of radiology clinic, oral diagnosis department /College of dentistry / University of Baghdad. Patients age ranged between (25-69 year). About (64) joints of (14) males and (18) females with unilateral missing molars were evaluated and articular inclination measured. Result and discussion: The mean value of the articular-eminence inclination of missing side for male group (47.42°) was lower than those of female group (47.83°), and the mean value in all missing side was (47.62°) higher than non-missing side (46.87°). Conclusion: this was the second study on the effect of unilateral molar loss on articular eminence inclination and we could not find any significant differences association in the study group.

**Keywords:** articular eminence, missing molars, gender

## 1. Introduction

Occlusion is an important component of temporomandibular joint (TMJ). Little is known about the association between missing teeth and TMJ changes, the temporomandibular joint (TMJ) is a complicated articular system located between the mandible and the temporal bone<sup>[1]</sup>. It enables the mandibular functions via a dynamic balance mechanism and has the ability to move within the three planes of space. The glenoid fossa creates the superior bone part and the mandibular condylar process creates the inferior bone part of the joint<sup>[2]</sup>.

The articular eminence (AE) is part of the temporal bone on which the condylar process slides during mandibular movements. The inclination of the AE varies across the population and dictates the path of condylar movement as well as the degree of rotation of the disc over the condyle.

There is no doubt that the TMJ is one of the most complex joints of the body and its structure is further complicated by its close proximity to the dentition, muscles, and other oral structures. Because of this intimate relationship with the dentition, it is essential for dentists to have a sound understanding of the stomatognathic system.

The normal value of articular eminence angle in adults has been reported to be 30°–60°. Articular eminences having inclination values smaller than 30° have been characterized as flat, and those having values greater than 60° have been characterized as steep<sup>[2]</sup>.

Previous studies have shown that tooth wear and tooth loss may cause deleterious effects at the TMJ such as resorption of the AE and may accelerate the development of degenerative joint disease<sup>[3]</sup>. Although there is a wealth of literature on the morphology of TMJ components<sup>[4]</sup>, little is known about the association between unilateral missing posterior teeth and the osteoarthritic changes in

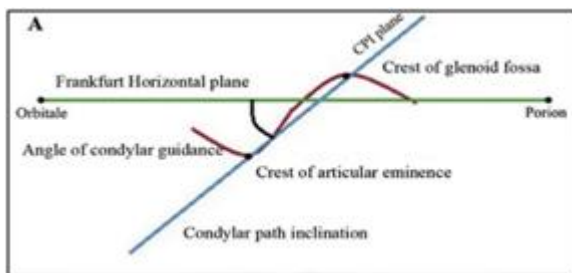
the TMJ, such as flattening of the AE in contemporary populations.

## 2. Materials and Methods

In this retrospective study, (32) digital panoramic radiograph selected from archives of radiology clinic, oral diagnosis department /College of dentistry / University of Baghdad. Patients' ages ranged between 25–69 year. About (64) joints of (14) males and (18) females with unilateral missing molars were evaluated and articular inclination measured.

Panoramic radiographs taken in radiology clinic by Planmeca Romexis software and the measurement done directly by the program on the screen.

The sagittal outlines of the left and right articular eminence and glenoid fossae could be traced on the monitor. The left and right "orbitale" (the lowest point in the margin of the orbit) and the "porion" (the highest point in the margin of the auditory meatus) were identified and the Frankfurt horizontal plane was constructed by joining the two landmarks on each side. The most superior point on the glenoid fossa (the crest of glenoid fossa) and the most inferior point on the articular eminence (the crest of articular eminence) were identified and a second line to represent the mean condylar path inclination (CPI) was constructed by joining the two points. Using these two planes, the articular eminence inclination was measured using the top-roof line method which was the angle between the CPI plane and the Frankfort horizontal plane.



**Figure 1:** Top-roof line method: line diagram of the panoramic tracing of the angle of sagittal condylar guidance

### 3. Results

The sample distributions are shown in table [1], there were 14 male and 18 female included in this study. The ages ranged from 25 to 69 years.

The mean value of the articular-eminence inclination of missing side for male group (47.42°) was lower than those of female group (47.83°), The mean value of the articular-eminence inclination of non-missing side for male group (46.35°) was also lower than those of female group (47.38°) showing in the table [2], and the mean value in all missing side was (47.62°) higher than non-missing side (46.87°) shown in table [3].

**Table [1]:** sample distribution

	No.	%
Male	14	43.75%
Female	18	56.25%
Total	32	100%

**Table [2]:** articular eminence inclination in relation to gender

	Articular eminence inclination			
	Missing side		Non missing side	
	mean	SD	mean	SD
male	47.42°	±8.53°	46.35°	±8.4°
Female	47.83°	±7.86°	47.38°	±8.7°
Total	47.65°	±8.03°	46.93°	±8.4°

**Table [3]:** articular eminence inclination in relation to molars relation

	eminence inclination		P-value
	Mean	SD	
Missing	47.62°	±8.02°	P<0.05 S
Non missing	46.87°	±8.57°	

### 4. Discussion

The articular eminence is a small bone part which is situated in front of the glenoid fossa and its posterior

surface slope varies among people. Although it is an anatomical structure belonging to the cranium, it is exposed to functional load arising from chewing forces with other structures within the TMJ, and these loads influence the morphological shape of it [5].

In the present study people less than 20 years old were excluded because of developmental implication. It has been reported that articular eminence inclination is approximately 45% developed at completion of primary dentition, reaching 70-72% of its adult value around the age of 10 years and 90-94% complete by the age of 20 years [6].

In this study population, although the age range is wide (Table [1] 25-69 years), No significant association found between increasing age and change in Articular eminence inclination.

This results agreed with Jasinevicius [7] could not find any association between age and eminence inclination in their three different studies of measurements on dry skulls, Gupta et al [8] found that Occlusion has not been determined as the dominant cause of TMD problems. However, the interrelationship between this triad of masticatory system, occlusion and temporomandibular joint cannot be overlooked. The effect of partial/ total edentulism on the TMJ health has not been documented through any long term clinical trials due to the complexity of the working of stomatognathic system, Siriwat and Jarabak [9] mentioned that morphological differences due to sex hormones and metabolic activity differences become apparent between male and female patients during the adolescent period. Furthermore, the amount of functional force affecting the temporomandibular joint varies between male and female individuals and causes morphological differences according to gender [10] and may be this was reason for finding any a significant differences association between gender and articular eminence.

In this study eminence inclination was higher in value in females than in males; however, these marginal differences were not statistically significant. This situation was potentially because of the small number of males in the patient group; it is already known that temporomandibular joint dysfunctions occur more often in females than in males.

### 5. Conclusion

In conclusion, this was the second study on the effect of unilateral molar loss on articular eminence inclination and we could not find any significant association in the study group. However, the study found that values for articular eminence inclination range widely and demonstrate great inter subject variability, regardless of the loss of teeth, side of the teeth loss, or gender. Articular eminence inclination was higher in female but without significant difference.

### References

[1] Pandis N, Karpac J, Trevino R, Williams B. A radiographic study of condyle position at various

- depths of cut in dry skulls with axially corrected lateral tomograms. *Am J Orthod Dentofacial Orthop* 1991;100:116–122.
- [2] Katsavrias EG. Changes in articular eminence inclination during the craniofacial growth period. *Angle Orthod* 2002;72:258–264.
- [3] Tallents R H, Macher D J, Kyrkanides S, Katzberg RW, Moss ME. Prevalence of missing posterior teeth and intraarticular temporomandibular disorders. *J Prosthet Dent*, 87, 2002, 45-50.
- [4] Koppe T, Schoebel SL, Baerenklau M, Bruchhaus H, Jankauskas R, Kaduk WMH. Factors affecting the variation in the adult temporomandibular joint of archaeological human populations. *Annals of Anatomy* 2007;189:320–5.
- [5] O’Ryan F, Epker BN. Temporomandibular joint function and morphology: observations on the spectra of normalcy. *Oral Surg Oral Med Oral Pathol* 1984;58:272e9.
- [6] Katsavrias EG, Dibbets JM. The growth of articular eminence height during craniofacial growth period. *Cranio* 2001;19:13–20.
- [7] Jasinevicius TR, Pyle MA, Lalumandier JA, Nelson S, Kohrs KJ, Sawyer DR. The angle of the articular eminence in modern dentate African-Americans and European-Americans. *Cranio* 2005;23:249–256.
- [8] Gupta SK, Pratibha PK, Bhat KM, Mutalik S, Guddattu V. Non-replaced Mandibular First Molars and Temporomandibular Joint Dysfunction. *Nepal Journal of Medical Sciences*, 3(1),2014, 58-63.
- [9] Siriwat PP, Jarabak JR. Malocclusion and facial morphology is there a relationship? An epidemiologic study. *Angle Orthod* 1985;55:127–138.
- [10] Zivko-Babić J, Pandurić J, Jerolimov V, Mioc M, Pizeta L, Jakovac M. Bite force in subjects with complete dentition. *CollAntropol* 2002;26:293–302