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Articular eminence Inclination and its relationship with incisors mesiodistal inclination in skeletal class I occlusion adults with no clinical and radiographic symptoms of TMDs

Dr. Yazan Jahjah*
Dr. Hazem Hassan**

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□ ABSTRACT □

Articular eminence participates in the functional formation of the posterior guidance of the mandibular movement, it's the anatomical point where functional stresses can result in alteration of the contours of the articular eminence, and its inclination respectively, Hence, orthodontists need to know the relationship between the articular eminence Inclination and the mesiodistal inclination of upper and lower incisors to achieve more stable results of orthodontics treatment. Aim The aim of this research is to investigate the relationship of upper and lower incisors mesiodistal inclination with the inclination of the articular eminence in class I skeletal occlusion in adult subjects with no clinical nor radiographic symptoms of TMDs. Materials and methods: In result of radiographic study and a multistage clinical examination protocol, 46 Caucasian patients with no prior orthodontics treatment were selected (19 males, 27 females) from 16 to 27 years of age with skeletal class I occlusion and no clinical or radiographic signs and symptoms of TMDs. Furthermore, cephalometric evaluating of the Inclination of the articular eminence and the mesiodistal inclination of the incisors was performed; Pearson's Correlation Coefficient was calculated to investigate the relationship of articular eminence Inclination with the mesiodistal inclination of the incisors. Results: no significant relationship between incisors mesiodistal inclination and the articular eminence inclination was found. Conclusions the steepness of the articular eminence appears not to vary with mesiodistal inclination of the incisors in skeletal class I occlusion adults with no clinical and radiographic symptoms of TMDs.

KeyWords: articular eminence Inclination, incisors mesiodistal inclination, skeletal class I occlusion, clinical and radiographic asymptomatic TMDs orthodontics patients.

***Assistant Professor, Orthodontics and Dentofacial Orthopedic Department, Dental School, Tishreen University, Lattakia, Syria .**
**** Associate Professor, Orthodontics Department, Dental School, Tishreen University, Lattakia, Syria.**

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ميلان المنحدر المفصلي وعلاقته مع الميلان الأنسي الوحشي للقواطع لدى بالغين ذوي إطباق صنف أول هيكلي بدون أعراض سريرية وشعاعية لإضطرابات المفصل الفكي الصدغي

الدكتور يزن جحجاح*
الدكتور حازم حسن **

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□ ملخّص □

يشارك المنحدر المفصلي في التكوين الوظيفي للقيادة الخلفية لحركة الفك السفلي، إنه النقطة التشريحية حيث تستطيع الإجهادات الوظيفية أن تسبب تغيراً في حواف المنحدر المفصلي وبالتالي تغيراً في ميلانه أيضاً، ومن هنا تنبع أهمية التحقق من وجود علاقة بين ميلان المنحدر المفصلي من جهة وبين الميلان الأنسي الوحشي للقواطع العلوية والسفلية وذلك لتحقيق نتائج معالجة تقويمية أكثر استقراراً.

هدف البحث: دراسة العلاقة بين ميلان المنحدر المفصلي من جهة وبين الميلان الأنسي الوحشي للقواطع العلوية والسفلية وذلك لدى بالغين ذوي إطباق صنف أول هيكلي وبدون أعراض سريرية ولا شعاعية لإضطرابات المفصل الفكي الصدغي.

مواد وطرق البحث: من خلال الإستعانة بفحص الشعاعي وفحص سريري متعدد المراحل تم انتقاء 46 مريض من العرق قوقازي ممن لم يخضعوا لمعالجة تقويمية سابقة (19 ذكر و27 أنثى) تراوحت أعمارهم بين 16 و 27 سنة ذوي إطباق صنف أول هيكلي وبدون أعراض سريرية وشعاعية لإضطرابات المفصل الفكي الصدغي، حيث تم إجراء تقييم شعاعي سيفالومتري لميلان المنحدر المفصلي وللميلان الأنسي الوحشي لمحاور القواطع حيث تم لاحقاً إجراء تحليل معامل ارتباط بيرسون ما بين ميلان المنحدر المفصلي والميلان الأنسي الوحشي لمحاور القواطع.

النتائج: لم نجد إرتباطاً ذو دلالة إحصائية ما بين ميلان المنحدر المفصلي وبين الميلان الأنسي الوحشي لمحاور القواطع.

الخلاصة: لا يوجد إرتباط ما بين ميلان المنحدر المفصلي وبين الميلان الأنسي الوحشي لمحاور القواطع العلوية والسفلية لدى البالغين ذوي إطباق صنف أول هيكلي ليس لديهم أعراض سريرية وشعاعية لإضطرابات المفصل الفكي الصدغي.

الكلمات المفتاحية: ميلان المنحدر المفصلي، الميلان الأنسي الوحشي لمحاور القواطع، إطباق صنف أول هيكلي، مرضى تقويم بدون أعراض سريرية وشعاعية لإضطرابات المفصل الفكي الصدغي.

* مدرس– قسم تقويم الأسنان والفكين –كلية طب الأسنان – جامعة تشرين– اللاذقية– سورية .
** إستاذ مساعد– قسم تقويم الأسنان والفكين –كلية طب الأسنان – جامعة تشرين– اللاذقية– سورية .

Introduction:

Mandibular movements are guided mainly by (TMJ), contact of the teeth, and the function of masticatory muscles. Understanding the trace of reaction of this forces acting across the temporomandibular joints (TMJ) is very intricate due to the complicated morphology and functional physiology of the TMJ [1, 2].

The steepness of the articular eminence participates in the formation of the posterior guidance of the mandibular movement (condylar movement in the TMJ), it's the anatomical point where masticatory force redirecting to provide temporomandibular joint stability during both static Incisal biting and during incisal biting associated with mandibular rotation and translation.[1]. Hence, it is the articular eminence which bears most of the stresses transmitted through the condyle of the jaw in function [33].This explains the contrast between the extremely thin roof of the glenoid fossa and the thick articular eminence [33, 44] , Hence, articular eminence inclination is influenced by more factors than simply genetic control, or just response to environmental factors. [33, 5]. However, TMJ stability is affected by the combination of reaction forces acting along the jaw joints and by the presence of fore and aft condylar translation [1], this is a functional stresses which can result in alteration of the contours of the articular eminence, and its inclination respectively [66,77,88], this affected with the lingual guiding inclines of the maxillary anterior teeth (so called anterior guidance) functioning in lateral excursions or protrusive movement of the mandible [99], but the path of the contact translation of the teeth (anterior guidance) is related by the mesiodistal inclination of lower anterior incisors also [2,9], Hence, orthodontists need to know the relationship between the articular eminence Inclination and the mesiodistal inclination of upper and lower incisors (if any), to achieve more stable results of orthodontics treatment.

Study Objectives

The aim of this research is to investigate the relationship of upper and lower incisors mesiodistal inclination with the inclination of the articular eminence in class I skeletal occlusion in adult subjects with no clinical nor radiographic symptoms of Temporomandibular Disorders.

Materials And Methods

Subjects.

One hundred and forty two Caucasian adult subjects (55 males, 87 females) with no prior orthodontics treatment (17 to 33 years of age) who seek treatment at orthodontic clinics at the Department of Orthodontics and Dentofacial Orthopedics at Tishreen University (In the period between 2010 and 2014) were submitted to strict a multistage clinical examination protocol In order to select class I skeletal occlusion adult subjects with no clinical or radiographic symptoms of Temporomandibular Disorders. In addition, lateral cephalometric and panoramic graphs were obtained and studied; gender of subjects was randomly selected.

Sample estimation

To determine the minimum sample size to be statistically significant, a pilot study was realized on 46 subject (who were selected according the multistage clinical examination and radiographic examination). It has been found that descriptive statistics

results follow the normal distribution; therefore, determining the minimum sample size to be statistically significant was according to the following formula:

$$n = \frac{Z^2.\sigma^2}{(e)^2}$$

(N): is the sample size ;.(z): is the value corresponding to a confidence level, estimated at 95% (Z = 2.58) at Confidence level of 99 % (i.e. significance level is 0.019), (σ): highest Standard Deviation value within the all the variables, (σ 11.92)

(e): Margin of error (maximum acceptable error in mean estimate) (e=5)

Thus:

$$n = \frac{(2.58)^2 (11.9)^2}{5^2} \approx 37.8$$

According to this pilot study, we determined that to get an exact estimate about the mean of patients' results, and the error in his estimate doesn't exceed 5 of the mean, with a significance level of 99% requires a sample size (n) of 38 patients as minimum, whereas the size of the sample in this study was n= 46.

-Multistage clinical examination protocol:

Subjects must have fully erupted permanent dentition up to second molar tooth with no supernumerary toot and /or supplementary tooth. Furthermore, exclusion criteria were for subjects with, open bite, deep bite, closed bite, congenital anomalies/ syndromes and/or marked asymmetries.

Personal data was collected from all subjects and they were questioned about clinical symptoms of TMDs. Subjects with bruxism, polyarthritis, traumatic injuries and infections in TMJs, or any TMDs in there medical history, were excluded.

To exclude patients with compensated temporomandibular disorders, (these who usually give no TMDs history) a Manual Functional Analysis for Patients with no History of Symptoms according to Bumann. [1111] was performed.

Later on, primary accepted patients were clinically examined of the included assessment of the following: TMJ sounds (clicking or crepitation), range and deviation of mouth opening, tenderness to palpation of the joint and the masticatory muscles, and joint or muscle pain during mouth opening and protrusive or lateral mandibular movements. A Joint Dysfunction index (JDi) was derived from the results of these clinical examinations, as previously devised by Helkimo [12] and Wiberg. [**Error! Reference source not found.**13], briefly, the criteria of the (JDi) were as follows: (JDi 0): Clinically normal joint function, (JDi I): Clicking or crepitation, no pain during mandibular movement, no locking or dislocation, no pain localized to the preauricular area, (JDi II): Tenderness to joint palpation and/or pain during mandibular movement and/or joint locking or impairment of TMJ movement. Only the subjects with (JDi 0) were accepted.

-Panoramic radiographs study:

Because the panoramic radiographs findings agree with those from tomograms in 60-70% of joints [14,15], and because the pronounced radiographic changes in the panoramic radiographs were found in the temporomandibular joints of up to 90% of asymptomatic patients [16], panoramic radiographs was obtained and studied according to Bumann. [1111] In order to exclude asymptomatic patients with radiographic changes due to compensated Temporomandibular Disorders.

In result of the multistage clinical examination protocol and study of panoramic, only 46 Caucasian patients (19 males, 27 females) from 16 to 27 years of age, (mean age of 21.02 years: females average age was 21.15 years; males average age was 20.84 years) with no clinical or radiographic signs and symptoms of Temporomandibular Disorders were selected to be as subjects for this current study, all 49 subjects have class I skeletal occlusion according to the cephalograms study. Descriptive statistics for the age of the male, female, and all subjects of the sample are presented in Table 1

Table 1 Descriptive statistics for the age of the male, female, and all subjects of the sample

	Count	Min	Max	Mean	Standard Deviation	Sample Variance
♂ *age*	19.00	16.00	28.00	20.84	3.53	12.47
♀ *age*	27.00	16.00	28.00	21.15	3.85	14.82
♂&♀ *age*	46.00	16.00	28.00	21.02	3.68	13.58

lateral cephalometric analysis:

Evaluating the skeletal class of occlusion, and the axial inclination of the upper and lower incisors on the lateral cephalograms:

Although Ricketts [17] found no relation between the type of occlusion and the slope of the eminence, but, it's well known, that skeletal discrepancies in both the anteroposterior and vertical directions are highly dependent upon the relationship of the mandible to the cranium, it can be hypothesized that the positions of the glenoid fossae relative to the skull are related to the various skeletal discrepancies [18], and the sagittal jaw discrepancies could lead to dentoalveolar compensatory changes in the position and axial inclination of the upper and lower incisors [19,20,21,22,23]. To limit the compensatory inclination of the incisors, we decided that skeletal class I occlusion should be one of the criteria for selecting the subjects of the sample of this study. For evaluating the skeletal class of occlusion, because we utilized ANB angle suggested by Riedel in 1952 [24], because it is one of an accepted method of assessing the sagittal jaw base relationship [19,20,21,22,24,25,26,27,28]. Subjects with ANB angle value ranges between 0 degrees to 4 degrees were accepted because they were classified as skeletal class I occlusion subjects as was suggested by Steiner [19, 20, 21].

For evaluating mesiodistal inclination of the upper and lower incisors, they were cephalometrically assessed in reference to the NA and NB lines (beside the Inter incisal angle) according to Steiner [19, 20, 21].as following:

−Mesiodistal inclination of maxillary incisors: The anteroposterior inclination of the maxillary incisors was determined by the angular relationship of the maxillary incisor axis to the line from Nasion to point A (NA). Angle is reading in degrees.

−Mesiodistal inclination of mandibular incisors: The anteroposterior inclination of the mandibular incisors was determined by the angular relationship of the mandibular incisor axis to the line from Nasion to point B (NB). Angle is reading in degrees.

−Inter incisal angle: The inter incisal angulation relates the relative position of the maxillary incisor to that of the mandibular incisor. Angle is reading in degrees.

With the purpose to enhance viewing and dealing with the anatomical structures of the articular eminence on the lateral cephalograms [29], lateral cephalograms has been scanned into JPEG digital format at 300 dpi and an 8-bit greyscale using scanner with 1600 dpi imaging 40 800 pixels per line and 48-bit color depth, and displayed on 15-inch LCD screen Notebook with resolution of 1366 X 768, high-pixel resolution with pixel pitch of 0.297 mm, a contrast ratio of 450:1, and a brightness of 250 cd/m 2, with 32-bit color. The digital tracing of the lateral cephalogram was done using Dolphin Imaging Software Version 11 (Dolphin Imaging). All the cephalometric measurements in this study are angular only; all of them were to the nearest 0.01 degrees.

Cephalometrics points for evaluating mesiodistal inclination of the upper and lower incisors:

(N) Nasion [31, 32].

(A) Downs' A-point; Subspinale [31, 32].

(B) Downs' B-point; Supramentale [31, 32].

(Isa) Incisor superior apex (upper incisor root) [19, 20, 21].

(Is) Incisor superior (upper incisor tip) [19, 20, 21].

(Ii) Incisor inferior (lower incisor tip) [19, 20, 21].

(Iia) Incisor inferior apex (lower incisor root) [19, 20, 21].

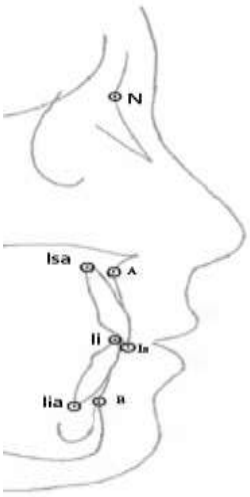

Figure 1 Cephalometrics points used for evaluating mesiodistal inclination of the upper and lower incisors

For evaluating mesiodistal inclination of the upper and lower incisors, the following cephalometrics angular measurements were performed on the cephalograms:

1- ANB angle: The angle around the center N and between the markers A and B. (in degrees) [19, 20, 21].

2- ILs/NA angle: The angle between the line Is-Isa and the line A-N (in degrees). [19, 20, 21].

3- ILi/NB angle: The angle between the line B-N and the line Iia-Ii (in degrees). [19, 20, 21].

4- Interincisal angle: The angle between the line Iia-Ii and the line Isa-Is (in degrees). [19, 20, 21].

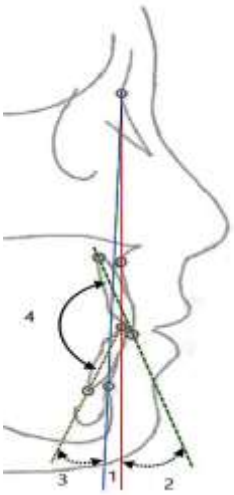

Figure 2 cephalometrics angular measurements used for evaluating mesiodistal inclination of the upper and lower incisors

Evaluating Inclination of the eminence evaluating on the lateral cephalograms:

Because {in every instance the reference frame which utilized the Frankfort horizontal plane was appreciably better than that which utilized sella-nasion} [30], we measured the articular-eminence inclination in relation to the Frankfurt horizontal plane. As it is well known, Frankfurt horizontal plane (FH) defined as a line connecting Orbitale (the most inferior–anterior point of the orbital rim), and Porion (the highest point of the meatus acusticus externus) [30, 31, 32, 33].

To evaluate the inclination of the articular eminence on the cephalograms we utilized Frankfort/ Articular Eminence angle (FAE angle) suggested by Widman [33] and other researchers [34, 35, 36], FAE angle formed by Frankfurt horizontal plane (FH) and the articular eminence tangent (AET) [33, 34, 35, 36, 37]

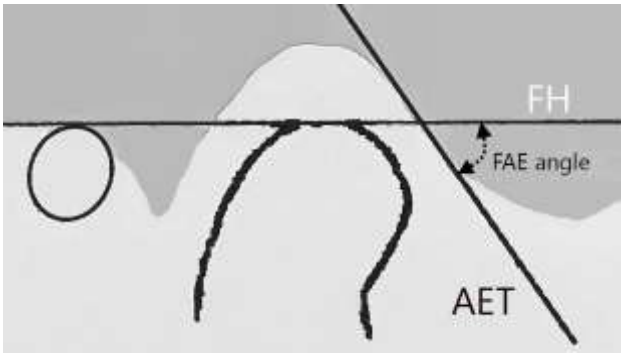

Figure 3 Frankfort/ Articular Eminence angle (FAE angle) for evaluating the inclination of the articular eminence on the lateral cephalograms

Error of method:

All the cephalometric measurements in this study are only angular measurements, all of it were repeated twice with a minimum interval of one month by the same investigator, the initial measurements and the repeated measurements were compared by using a paired t-test to check any systematic error. Random errors were checked using the Dahlberg formula. The t-test at the .05 level did not show any significance. The random error for the measurements varied between 0.43 and 0.52.

Statistical method:

Using Microsoft Excel of Microsoft office 2013, Pearson's Correlation Coefficient was calculated (amongst all the subjects, amongst males only, and amongst female only) to investigate:

1. The strength of a linear association (dependence) of **ILs/NA angle** (indicating the mesiodistal inclination of maxillary incisors) with **FAE angle** (indicating the inclination of the articular eminence), to test the null hypothesis that there is no relationship between the mesiodistal inclination of maxillary incisors and the articular eminence inclination.
2. The strength of a linear association (dependence) of **ILi/NB angle** (indicating the mesiodistal inclination of mandibular incisors) with **FAE angle** (indicating the inclination of the articular eminence), to test the null hypothesis that there is no relationship between the mesiodistal inclination of mandibular incisors and the articular eminence inclination.
3. The strength of a linear association (dependence) of **Interincisal angle** with **FAE angle** (indicating the inclination of the articular eminence), to test the null hypothesis that there is no relationship between the Inter incisal angle and the articular eminence inclination

RESULTS:

Descriptive statistics for ANB angle of the male only, female only and all subjects of the sample, are presented in Table 2.

Table 2 Descriptive statistics for ANB angle of the male only, female only, and all subjects of the sample.

	Count	Min	Max	Mean	Standard Deviation	Sample Variance
♂ *ANB*	19.00	1.19	4.41	2.94	1.08	1.16
♀ *ANB*	27.00	0.00	4.39	2.14	1.41	1.98
♂&♀ *ANB*	46.00	0.00	4.41	2.47	1.33	1.76

Descriptive statistics for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle of sample subjects, are presented in Table 3.

Table 3 Descriptive statistics for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle of sample subjects.

	Interincisal angle	*ILs/NA angle*	*ILi/NB angle*	*FAE angle*
Mean	128.91	23.13	25.53	54.26
Standard Error	1.76	1.14	0.99	1.41
Median	128.31	24.53	25.25	55.38
Standard Deviation	11.92	7.71	6.71	9.59
Sample Variance	142.18	59.45	45.07	91.95
Range	66.18	42.99	30.07	50.82
Minimum	97.13	1.14	12.19	26.58
Maximum	163.31	44.12	42.26	77.41
Count	46.00	46.00	46.00	46.00
Confidence Level(95.0%)	3.54	2.29	1.99	2.85

Descriptive statistics amongst sample male subjects (only) for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle, are presented in Table 4.

Table 4 Descriptive statistics for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle amongst sample male subjects only

	Interincisal angle	*ILs/NA angle*	*ILi/NB angle*	*FAE angle*
Mean	127.66	22.19	27.21	55.55
Standard Error	3.37	2.14	1.54	2.74
Median	126.82	24.42	25.66	57.37
Standard Deviation	14.68	9.32	6.70	11.95
Sample Variance	215.61	86.88	44.95	142.82
Range	66.18	42.99	28.83	50.82
Minimum	97.13	1.14	12.19	26.58
Maximum	163.31	44.12	41.02	77.41
Count	19.00	19.00	19.00	19.00
Confidence Level(95.0%)	7.08	4.49	3.23	5.76

Descriptive statistics amongst sample female subjects (only) for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle, are presented in Table 5

Table 5 Descriptive statistics for ILs/NA angle, ILi/NB angle, Interincisal angle, FAE angle amongst sample female subjects only.

	Interincisal angle	*ILs/NA angle*	*ILi/NB angle*	*FAE angle*
Mean	129.79	23.79	24.35	53.34
Standard Error	1.87	1.24	1.27	1.47
Median	129.62	24.67	24.26	52.85
Standard Deviation	9.74	6.45	6.59	7.63
Sample Variance	94.86	41.66	43.37	58.17
Range	49.23	24.93	28.71	31.53
Minimum	105.48	8.07	13.55	36.63
Maximum	154.70	33.00	42.26	68.15
Count	27.00	27.00	27.00	27.00
Confidence Level(95.0%)	3.85	2.55	2.61	3.02

To test the relationship between the inclination of the articular eminence and the mesiodistal inclination of the upper and lower incisors, Pearson's Correlation test was performed between **FAE angle** (Frankfort/Articular Eminence angle), and **Interincisal angle** amongst: sample **male** subjects, sample **female** subjects, and amongst all the subjects (**male & female**) of the sample. Results of this test are presented in Table 6.

Table 6 Pearson's Correlation test relationship of the inclination of the articular eminence with the Interincisal angle.

	Interincisal angle	
♂ *FAE angle*	R= -0.01	Negative weak relationship.
♀ *FAE angle*	R= 0.06	Positive medium correlation
♂&♀ *FAE angle*	R= 0.01	Positive weak relationship

To test the relationship between the inclination of the articular eminence and the mesiodistal inclination of the upper incisors, Pearson's Correlation test was performed between **FAE angle** (Frankfort/ Articular Eminence angle), and ***ILs/NA angle*** amongst: sample **male** subjects, sample **female** subjects, and amongst all the subjects (**male & female**) of the sample. Results of this test are presented in Table 7

Table 7 Pearson's Correlation test relationship of the inclination of the articular eminence with ILs/NA angle

	ILs/NA angle	
♂ *FAE angle*	R= -0.05	Negative medium correlation
♀ *FAE angle*	R= -0.02	Negative weak relationship
♂&♀ *FAE angle*	R= -0.05	Negative medium correlation

To test the relationship between the inclination of the articular eminence and the mesiodistal inclination of the lower incisors, Pearson's Correlation test was performed between **FAE angle** (Frankfort/ Articular Eminence angle), and **ILi/NB angle** amongst: sample **male** subjects, sample **female** subjects, and amongst all the subjects (**male & female**) of the sample. Results of this test are presented in Table 8.

Table 8 Pearson's Correlation test relationship of the inclination of the articular eminence with ILi/NB angle.

	ILi/NB angle	
♂ *FAE angle*	R= 0.12	Positive weak correlation
♀ *FAE angle*	R= -0.09	Negative weak relationship
♂&♀ *FAE angle*	R= 0.04	Positive weak correlation

DISCUSSION

In the process of sampling, it has been found that the proportion of females is larger compared with males, furthermore, all subjects are young and this may be because:

1. Majority of members of the Syrian society belong to the young age group.
2. Proportion of females in the Syrian society is larger compared with males.
3. It has been noted that young (both genders) generally more seeking for orthodontic treatment.
4. Females usually more seeking for orthodontic treatment the compared to male.

We found differences amongst the two genders of the sample subjects in the kind and strength of the correlation of the inclination of the articular eminence with angular measurements that were performed on the cephalograms for evaluating mesiodistal inclination of the upper and lower incisors, this was somehow corresponded the results previously reported by Ogawa [3738], Huffer [10], and Cohlmia [34]. In detail, there was no significant relationship of the correlation relationship between inclination of the articular eminence and the Interincisal angle (was weak and Inverse specially for the all the subjects, and male subjects of the sample), this was contrary to Celebic [39], but it was stronger and more direct in the female subjects comparing with males (Tab 6), this mean:

the more high value of the inclination angle of the articular eminence, the more posterior inclination of the both upper and lower incisors, and vice versa.

Regardless of the factor of the gender of the subjects, this was corresponded the results previously reported by Mack [40], Huang [41], and Koyoumdjisky [42].

According to the Pearson's Correlation test, there was a medium strength of a negative relationship between the inclination of the articular eminence and the mesiodistal inclination of mandibular incisors Anyway, this negative correlation was much weaker (almost no relationship) in the female subjects comparing with males (Tab 7). Negative relationship between the inclination of the articular eminence and the mesiodistal inclination of mandibular incisors mean: the more high value of the inclination angle of the articular eminence, the more posterior inclination of the mandibular incisors and vice versa, this was contrary to Celebic [39], but was corresponded the results previously reported by Park [43]

There was no relationship of the inclination of the articular eminence with the mesiodistal inclination of maxillary incisors (it was positive but weak relation according to Pearson's Correlation test) this was contrary to Huffer [10] and Cohlmia [34]. Anyway, this weak correlation was Inverse in the female subjects comparing with males where this correlation was direct but also weak (Tab.8).

CONCLUSION

The steepness of the articular eminence appears not to vary with variations of the mesiodistal inclination of the upper and lower incisors in skeletal class I occlusion adults with no clinical and radiographic symptoms of TMDs. The present study ravel that there was very weak correlation between the inclination of the articular eminence and the mesiodistal inclination of the upper and lower incisors (in skeletal class I occlusion adults with no clinical and radiographic symptoms of TMDs). However, the strength of this weak correlation was more evidently between the inclination of the articular eminence and the mesiodistal inclination of the upper incisors, and it was a direct relationship.

The present study ravel also, that, there is a differences in the kind, strength and direction of the relationship of the inclination of the articular eminence with the mesiodistal inclination of the upper and lower incisors amongst the two genders of skeletal class I occlusion adults with no clinical and radiographic symptoms of TMDs.

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