

# Estimation of Different Facial Landmarks as a Guide in Inter canine Distance Determination (Clinical Study)

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## الخلاصة

**الأهداف:** لتقييم العلاقة بين بعض الأبعاد الوجهية والمتضمنة (عرض جناحي الأنف والفم والميزاب الشفوي العلوي وكذلك المسافة ما بين العذارية) مع المسافة المستقيمة بين قمتي النابيين العلويين لغرض الاستفادة منها في التطبيق السريري. **المواد وطرائق العمل:** في هذه الدراسة السريرية تم فحص (١٤٠) طالب و طالبة من طلاب كلية طب الأسنان / جامعة الموصل حيث أخذت القياسات الوجهية والسنية مباشرة من كل طالب و طالبة باستخدام أداة قياس رقمية إلكترونية حيث جمعت البيانات وحللت إحصائياً بواسطة الكمبيوتر لمعرفة و تحديد العلاقات ما بين هذه العوامل المدروسة. **النتائج:** أظهرت نتائج هذه الدراسة أن جميع الأبعاد المقاسة كانت أكبر عند الذكور مقارنة بالإناث والتي هي إحصائياً مختلفة معنوياً بين كلا الجنسين وباستخدام معامل ارتباط "بيرسون". أظهرت النتائج عدم وجود علاقة ارتباط معنوية بين الأبعاد الوجهية المقاسة مع المسافة المستقيمة بين قمتي النابيين العلويين في الإناث، بينما كل من المسافة بين العذارية وكذلك عرض الميزاب الشفوي العلوي له علاقة ارتباط معنوية مع المسافة المستقيمة بين قمتي النابيين العلويين عند الذكور والتي من الممكن استخدامها لتحديد هذه المسافة عند الذكور عند تعويض الأسنان العلوية الأمامية. **الاستنتاجات:** بالاعتماد على النتائج السابقة فإن المسافة المستقيمة بين قمتي النابيين العلويين عند الذكور تساوي حاصل قسمة المسافة بين العذارية على العامل (٣,٣) بينما حاصل ضرب عرض الميزاب الشفوي العلوي بالعامل (٢,٧٥) يعطينا تقييماً للمسافة المستقيمة بين قمتي النابيين العلويين.

## ABSTRACT

**Aims:** To evaluate the relationship between some of facial parameters including [(alae of nose, mouth, philtrum of upper lip) widths with interzygomatic distance] and straight maxillary intercanine distance for clinical application advantage. **Materials and Methods:** In this clinical study, (140) dental students in College of Dentistry/University of Mosul were examined and their facial and dental measurements were taken directly from each student by using an electronic digital vernier caliper. The data were collected and analyzed with computer to determine the correlation between the studied factors. **Result:** The results of this study demonstrated that all the measured parameters were larger in males than females which being statistically different between the two sexes and the Pearson Product Moment Correlation Coefficient test revealed that non of the facial parameters were measured had a significant correlation with straight maxillary intercanine cusp tips distance in females, while both of interzygomatic distance and philtrum width of upper lip had a significant correlation with straight maxillary intercanine cusp tips distance in males which they could be used to determine this distance for replacement of maxillary anterior teeth in males. **Conclusion:** Depending on previously mentioned results the straight maxillary intercanine distance was equal to interzygomatic distance divided by a factor of ( 3.3), while multiplying the width of the philtrum of upper lip with a factor of ( 2.75) gives us an estimation of the straight maxillary intercanine cusp tips distance.

**Key words:** intercanine distance, esthetic, facial parameters.

Kassab NH. Estimation of Different Facial Landmarks as a Guide in Inter canine Distance Determination (Clinical Study). *Al-Rafidain Dent J.* 2013; 13(2): 305-308.

**Received:** 13/3/2012

**Sent to Referees:** 14/3/2012

**Accepted for Publication:** 2/5/2012

## INTRODUCTION

In many countries of the world, much greater emphasis has to be placed in an individual's appearance and social professional interaction become even more numerous and more fleeting.<sup>(1)</sup> Loss of teeth affects facial appearance leads to psychological trauma. It is therefore essential that aesthetically pleasing and functionally comfortable dentures are provided.<sup>(2)</sup> In fact, the position of maxillary canines is of great importance for achieving a good esthetic, so chosen of its form and position is important because it is so visible during an

expressive smile and reflect patient vigor,<sup>(3, 4)</sup> the width of nose serve as a guide for selection of mesio-distal dimension of anterior teeth and positioning the canine.<sup>(5)</sup> The intercanine distance is important dimension for various purposes; e.g., age, sex and genetic variations and environmental changes, as well as its importance in the diagnosis and treatment of incipient malocclusion,<sup>(6)</sup> and it is defined as a linear distance between right and left canines (deciduous or permanent) in which the canine cusp tips were used to identify and measure this distance.<sup>(7-9)</sup> The estimation

of maxillary intercanine cusp tips position had been suggested by Wehner *et al.*<sup>(10)</sup> other researchers<sup>(11)</sup> found a demonstrable relationship between interalar width and maxillary intercanine cusp tips width whereas the measurements that tabulated by Smith<sup>(12)</sup> demonstrated a low relationship between radiographic measurement of interalar width and maxillary intercanine cusp tip width while in young edentulous subjects a correlation between maxillary cupid's teeth and the corners of the mouth had been found.<sup>(13)</sup>

Esthetically the selection and arrangement of anterior teeth edentulous patients in natural and pleasing form has removed a challenging experience.<sup>(5)</sup>

The aim of this study was to determine which of facial parameters that had been measured in the study has more significant relationship to straight maxillary intercanine distance and determine the consistency in ratio between them to be used for clinical applications.

## MATERIALS AND METHODS

One hundred and forty dental students (80 females and 60 males) from College of Dentistry/University of Mosul; their ages were over 18 years, so their permanent canines were fully erupted and facial growth was completed. Those were selected randomly but excluded from this clinical study all the students who had been treated orthodontically or by restorative procedure. The measurement procedure for the facial parameters which include: [(alae of the nose, mouth and philtrum of upper lip) widths with interzygomatic distance] were obtained directly from each student

according to other studies<sup>(14, 15)</sup> by using an electronic digital vernier (Lezaco /ARJ/2771/China) which measure to the nearest of 0.01 mm. For the straight maxillary intercanine distance, this distance was measured directly intraorally from canine tip to another.<sup>(7-9)</sup>

The descriptive statistical analysis which included mean and standard deviation for all variables were determined and t-test was used to determine the significant difference between males and females in all measured facial parameters the Pearson Product Moment Correlation Coefficient test was conducted by computer program to determine the relationship between straight maxillary intercanine cusp tips width with the above mentioned, facial measurements in both sexes.

## RESULTS

The results of this study showed that all the measured facial and dental parameters were larger in males than females and the analysis of data revealed that a high significant differences exist between the two sexes at level of significance (0.01) for all the measured facial parameters except for Philtrum width of upper lip (pw) in which the difference between the means of two sexes was low significant at level of significance (0.05) as shown in Table (1), also this table showed that the means of straight maxillary intercanine distance (SMICD) were (36.2, 34.4) mm for males, females respectively, thus the difference between the means of this distance was (1.8) mm which was highly significant at level of significance (0.01).

Table (1): The means and standard deviation values with *t*-test for (SMICD) with some facial parameters.

Parameters	Females	Males	<i>t</i> -test	significance
	n=80	n=60		
Mean±SD				
IZD	110.35±5.9	120.90±6.4	-9.979	HS**
NW	35.26±1.5	38.26±1.65	-11.066	HS**
MW	45.40±3.1	50.20±3.3	-8.740	HS**
PW	10.92±7.2	13.20±5.2	-2.175	s*
SMICD	34.41±1.3	36.20±3.8	-3.498	HS**

IZD: Interzygomatic distance(mm); NW: Nose Width(mm); MW: Mouth Width(mm); PW: Philtrum width(mm); SMICD: Straight maxillary intercanine distance(mm), SD: Standard deviation, d.f= 138, s\*: the significant at level of 0.05, HS\*\* the significant at level of 0.01.

The difference between the means of interzygomatic distance (IZD) and (SMICD) in females was (75.9) mm and (84.7) mm in males; whereas the distance between the means of nose width (NW) and (SMICD) in females were (0.8) mm and (2) mm in males and the difference between the means of mouth width (MW) and (SMICD) in females were (11) mm and (14) mm in males. Lastly, the difference between the means of (pw) and (SMICD) were (25) mm in females and

(23) mm in males. All these results had been shown in Table (1).

For the significant correlation coefficient test, the result were shown in Table (2). In males the (SMICD) had a high significant correlation coefficient with (IZD) which was (0.374) and with (pw) which was (-0.394) and no significant correlation exist with other parameters while in females there was no significant correlation exist between (SMICD) and all facial measurements.

Table (2): The correlation coefficient between (SMICD) and some facial parameters in both sexes.

Sex	Facial parameters	IZD	NW	MW	PW
Female	SMICD	0.041	0.120	0.209	0.252
Male	SMICD	0.374**	0.039	0.016	-0.394**

IZD: Interzygomatic distance; NW: Nose Width; MW: Mouth Width; PW: Philtrum width; SMICD: straight maxillary intercanine distance; \*Correlation is significant at 0.05 level.; \*\* Correlation is significant at 0.01 level.

## DISCUSSION

In Iraq, most of edentulous patients had no pre-extraction records or diagnostic cast while attending dental clinics so that the possibility of using existing dimension and measurements of the face as a guide for selection of teeth for edentulous patient was recommended.<sup>(14)</sup>

In this clinical study, all the facial measurements with straight maxillary intercanine distance were larger in males than females. This result would be in agreement with other studies,<sup>(14-17)</sup> and the difference between males and females in the (SMICD) measurement was 1.8 mm. This result was nearly the same as that obtained Mohammed,<sup>(14)</sup> in which the difference was (1.77) mm which is due to the differences in the size of the jaws and teeth between the two sexes.

This study also demonstrated that the (NW) was greater than the (SMICD) for both sexes. This result would be in agreement with Mohammed,<sup>(14)</sup> but disagreement with Lee<sup>(18)</sup> who found that both of (NW) and (SMICD) had the same value and with other studies<sup>(7, 11)</sup> that found this difference but the (SMICD) was larger than (NW). The difference of the above mentioned results could be due to sex and racial differences in the studied groups.

The results of correlation coefficient test was agreed with Mohammed's results<sup>(12)</sup> in which the (SMICD) was significantly correlated with (IZD) but the correlation was high in this study in male, but a weak correlation was obtained in Mohammed's study.<sup>(14)</sup> This difference could be due to anatomical and individual variations in face form;<sup>(19)</sup> while in females the results of this study was disagreed with Mohammed's study<sup>(14)</sup> because he found a weak correlation between (SMICD) and (IZD) in females. Also, the difference of the above mentioned results due to the same cause as mentioned above.

It is important to mention that there were no previous clinical studies in our department that took in consideration the significant coefficient between (SMICD) and some of facial measurements in males and females.

## CONCLUSION

In females very small difference exist between nose width (NW) and straight maxillary intercanine distance (SMICD) which was only (0.8) mm.

No facial measurements including interzygomatic distance with nose, mouth and philtrum of upper lip widths could be used to predict the straight maxillary inter-

canine distance in females.

Both of interzygomatic distance and philtrum width of upper lip could be used to predict the straight maxillary intercanine distance in males so that this distance was equal to interzygomatic distance divided by a factor of (3.3 )or multiplying the philtrum width of upper lip by a factor of (2.75).

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