

Estimation of the width of artificial anterior teeth in relation to the width of opposing natural teeth (A comparative study)

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ABSTRACT

The purpose of this study is to determine the width of the missing central incisor of one arch when the central incisor of the other arch is available in persons living in the north of Iraq, and to compare these measurements with persons living in the middle of Iraq.

Four hundred Iraqi students from University of Mosul, North of Iraq were selected for this study. The measurements of maxillary and mandibular central incisors were done on (800) stone casts.

A new method was concluded in this study to determine the width of a missing central incisor in relation to the opposing central incisor using the following equation:

The width of maxillary central incisor = The width of mandibular central incisor \times 1.65.

Key Words: Width of maxillary central incisor, selection of teeth, esthetic.

الخلاصة

يهدف هذا البحث إلى تحديد عرض السن المفقود في أحد الفكين بدلالة الأبعاد التي يتم قياسها بدلالة الأسنان الموجودة في الفك الآخر. وكما تهدف الدراسة إلى مقارنة القياسات للأسنان لأشخاص يقطنون في المنطقة الشمالية مع القياسات في الدراسات السابقة لأشخاص يقطنون في المنطقة الوسطى من العراق.

تم فحص (٤٠٠) مريض في المنطقة الشمالية (طالبة كلية طب الأسنان - جامعة الموصل). وتمت القياسات على (٨٠٠) قالب جبسي للفك العلوي والسفلي.

وتم استنتاج طريقة جديدة للحصول على قياسات دقيقة ومقاربه للقياسات الطبيعية للأسنان المفقودة بدلالة الأسنان الموجودة بالاعتماد على المعادلة التالية:

قياس عرض السن القاطع الأمامي للفك العلوي = قياس عرض السن القاطع الأمامي للفك السفلي

$\times 1.65$

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INTRODUCTION

The primary function of the anterior teeth in maxillary denture is to fulfill esthetic needs.

When patient's complain about the size of anterior replacement teeth, the maxillary central incisor is usually the focus of the complaint, which is generally that the tooth is too large rather than too small^(1,2).

A common error is to select artificial incisors that are smaller than the natural incisors. This is because the artificial teeth are positioned too close to the ridge and are set in nearly straight-line⁽³⁾.

A maxillary central incisor is usually about one and a half times the breadth of the mandibular central incisor^(4,5).

The aims of this study are:

1. To determine the width of the missing central incisor of one arch when the central incisor of the other arch is available in persons living in the north of Iraq.
2. To compare these measurements with a previous study done on persons living in the middle of Iraq.

MATERIALS AND METHODS

Four hundred students from the College of dentistry, University of Mosul (244 females and 156 males) with age range of (19-23) years were included in this study, these students meet with the following criteria:

- 1- They had permanent maxillary and mandibular anterior teeth.
- 2- They had no history of orthodontic treatment.
- 3-They did not have any caries, or restoration that affect the width of the maxillary or mandibular anterior teeth.
- 4-They had no crowding or spacing between the teeth.

Each student was examined using dental mirror and probe under the dental unit light, measurements of the teeth were done clinically by using a flexible ruler. For each patient upper and lower impression were taken to fabricate stone casts.

Measurements were done on (800) stone cast. The width of maxillary and mandibular central incisors was measured on the cast six times by using digital vernia nearest to (0.01) in addition to the flexible ruler.

Statistical analysis was done to calculate the ratio of width of maxillary and mandibular central incisors for each case.

The mean ratio was performed for the male and female groups and finally a total ratio for the sample was calculated and a special equation was concluded for this study.

RESULTS AND DISCUSSION

All measurements were calculated and the mean of width of maxillary and mandibular central incisors is listed in table (1), and shown in figure (1).

The mean width of maxillary central incisors for female group was (9.02) mm with a range of (7.5-10) mm, where as the mean width of mandibular central incisors was (5.52) with a range of (4.5-6.5) mm.

For the male group, the mean width of maxillary central incisors was (9.16) mm with a range of (7.4-11) mm, slightly larger than the width of maxillary central incisor of female, where as the mean width of mandibular central incisors was (5.49) mm with a range of (4.5-6) mm^(1,6,8).

The ratio of the width of maxillary to mandibular central incisors was calculated and tabulated in table (2). The ratio of female group was (1.63), and for the male group is (1.66). The mean ratio for the total sample was found to be (1.65).

Table (1): The mean width and range of maxillary and mandibular central incisor in millimeters

Group	No. of Sample	Maxillary Central Incisor		Mandibular Central Incisor	
		Mean Width (Mm)	Range (Mm)	Mean Width (mm)	Range (mm)
Female	244	9.02	7.5-10	5.52	4.5-6.5
Male	156	9.16	7.4-11	5.49	4.5-6
Total	400	9.09	7.4-11	5.50	4.5-6.5



Figure (1): Mean width of central incisor

Table (2): The mean ratio of the width of maxillary central incisor to the width of mandibular central incisor

Group	No. of Sample	Mean Ratio
Female	244	1.63
Male	156	1.67
Total	400	1.65

From this study, the results coincide with those done in the middle of Iraq⁽⁷⁾. But there was a slight difference (0.01-0.08 mm.) from other studies done previously as shown in table (3)^(7,9,10,11).

From the results of this study it is concluded that:
The width of maxillary central incisor = The width of mandibular central incisor \times 1.65.

Table (3): The results of other studies compared to this study

Previous & New Research	Mean Width Central (Mm)		Size Range of Central (Mm)		Average Ratio Max./Man.
	Maxilla	Mandible	Maxilla	Mandible	
Black 1902 ⁽¹⁰⁾	9.0	5.4	8-11	5-6	1.67
Ballard 1944 ⁽¹¹⁾	8.91	5.67	5.5-11	4.5-10	1.57
McArthur 1985 ⁽⁹⁾	8.86	5.43	7.8-11.4	4.6-6.9	1.64
Al-Azzawi 1987 ⁽⁷⁾	9.0	5.48	8-11	4.5-6.5	1.65
Hatim 2002	9.09	5.50	7.40-11.00	4.50-6.00	1.65

CONCLUSION

- ⇒ Selection of artificial teeth in the absence of pre-extraction records can be done by depending on this equation:
- ⇒ The width of maxillary central incisor = The width of mandibular central incisor \times 1.65.
- ⇒ The width of maxillary central incisor of female was slightly smaller than that of male group.
- ⇒ The width of mandibular central incisor of female was slightly larger than that of male group.
- ⇒ The results in this study are close in value to those results presented by Al-Azzawi and Al-Ameer at 1987 for adults from the middle of Iraq.

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