

Measurement of the mandibular dental arch in Baghdad patients

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قياس القوس السنية الفكوية في مرضى بغداد

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خلاصة: قمنا بقياس القوس السنية في 220 مريضاً في بغداد (120 من الإناث و100 من الذكور) من المترددين على عيادة الأسنان بجامعة بغداد. وقد أخذنا طبعات ألبينية للمرضى وقمنا ببناء عليها بصنع نماذج من الجبس. وتم تحديد نقاط معينة على النماذج، ومن ثم أخذنا قياسات طولية وعرضية. ووجدنا أن قياسات الطول أصغر من قياسات العرض، الأمر الذي يعني أن القوس بيضوية الشكل. كما أن أقواس الذكور كانت أكبر حجماً من أقواس الإناث.

ABSTRACT We measured the dental arch of 220 Baghdad patients (120 females and 100 males) attending the University of Baghdad Dental Clinic. Alginate impressions were taken from which stone casts were made. Specified points were noted on the casts and length and width measurements were taken. We found that the length measurements were smaller than the width measurements indicating an ovoid shape of arch. Also, the size of male arches was greater than those of females.

Mesure de l'arc mandibulaire chez des patients à Bagdad

RESUME Nous avons mesuré l'arc dentaire de 220 patients à Bagdad (120 femmes et 100 hommes) qui consultaient au dispensaire dentaire de l'Université de Bagdad. On a pris des empreintes à l'alginate qui ont permis de faire des moulages en plâtre dur. Des points spécifiés ont été notés sur les moulages et la longueur et la largeur ont été mesurées. Nous avons trouvé que les mesures de la longueur étaient plus petites que celles de la largeur, ce qui indique une forme ovoïde de l'arc. De plus, la taille de l'arc des hommes était plus grande que celle des femmes.

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Introduction

The human dental arch form is of prime importance to the dentists as well as to anthropologist [1,2]. It is useful in prosthodontic and orthodontic procedures and for describing evolutionary changes in dentition and their variation [3,4]. The relation of the dental arch space to the other vital structures of the mouth, such as the tongue, is also useful to know [5]. Many studies have been conducted on the dental arch using either mathematical description or computer-aided methods [4,6].

Our study aimed to evaluate the lower dental arch shape in the Baghdad area (Iraq), and to assess differences in dimensions according to sex.

Materials and methods

A total of 220 patients attending the University of Baghdad dental clinic during 1993–

1995 were selected for the study. They had been examined by one dentist to standardize the selection. There were 120 females and 100 males with an age range of 17–40 years. It was expected they would all have a normal mandibular dental arch, i.e. they should have fully erupted permanent teeth and class 1 occlusion without any midline deviation [2,3,7]. Alginate impressions were taken for the lower arch of each of the patients and then poured into stone for preparing the cast.

The measurements taken in our study were made after noting certain reference points on the stone casts, such as the middle incisal point, the tips of the canines, and the mesiobuccal cusp tip of the second molar. The measurements were taken for the line passing the lower canine tips (W_1), the line passing the first lower molars over their mesiobuccal cusp tips (W_2), and the line passing the lower second molars over their distobuccal cusp tips (W_3) (Figure 1).

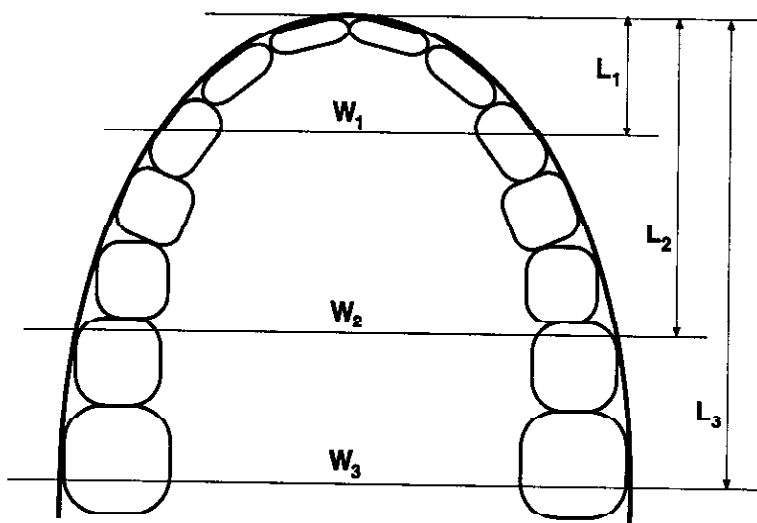


Figure 1 Reference points and measurements for the mandibular dental arch

W_1 represented the anterior arch width, W_2 the middle arch width and W_3 the posterior arch width.

Other measurements were taken for the length of the arch as follows:

- Anterior: the distance (L_1) between the middle incisal point to the line joining the mesiobuccal cusp tips of the first molars was measured (Figure 1).
- Posterior: two distances were calculated; the first (L_2) extended from the middle incisal point towards the mesiobuccal cusp tip of the lower first molars. The second (L_3) started from the middle points towards the distobuccal cusp tips of the lower second molars. L_2 represented the length of the middle segment (premolars) and L_3 the length of the molar region.

The findings were tabulated and the means calculated, after they had been classified according to sex. The results were analysed with the Student *t*-test at the $P = 0.01$ level of significance.

Results and discussion

The data obtained from the stone casts are shown in Table 1. The results show a slight

increase in the means of width measurement than the length measurement. The Student *t*-test was computed for these means and it was found that there was a significant difference between the female and male width measurements, while the difference in length measurements was not significant. It can clearly be seen that the measurements for males (width and length) was greater than for females. This might be explained by the fact that the teeth of Iraqi males are larger than females and thus need a wider arch. These findings have been confirmed by other studies [8,9]; however, some of these studies found the width measurements were greater in females than males [8,9].

BeGole [7] classified the dental arch as rectangular, round or ovoid according to his mathematical results. We found that Iraqi males and females had a predominately ovoid shape, because their width was greater than their length and the width increased towards the posterior segment.

Although measurements taken from stone casts are assumed to be slightly larger than those taken from extracted teeth, due to the initial expansion of the alginate impression and the setting expansion of stone [8], the difference is considered to be small enough to ignore [9].

Table 1 Means of width (W) and length (L) measurements in millimetres by sex

Measurement	Total	Males (n = 100)	Females (n = 120)	t-test
W_1	23.1 ± 1.1	24.1 ± 2.2	22.8 ± 1.3	5.44 ^a
W_2	40.6 ± 3.2	42.3 ± 3.4	39.8 ± 3.3	5.52 ^a
W_3	49.8 ± 4.9	53.7 ± 3.9	47.5 ± 7.2	7.72 ^a
L_1	5.1 ± 2.7	5.1 ± 1.1	5.0 ± 3.1	0.31
L_2	21.9 ± 4.3	22.3 ± 3.2	21.5 ± 6.8	1.08
L_3	34.2 ± 6.1	34.6 ± 3.1	34.2 ± 2.9	0.99

^a Significant at 0.01 level.

Values are given as mean ± standard deviation.

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