

FACIAL MEASUREMENT METHOD FOR DETERMINING OCCLUSAL VERTICAL DIMENSION⁺

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Abstract

There is no precise scientific method for determining the correct edentulous occlusal vertical dimension. This study established the proportion between the ear-eye to chin-nose distance for determining occlusal vertical dimension. 200 denlulous Iraqi patient participated in this study. The ear-eye (right & left) and chin-nose distance were measured; the results revealed that there is a positive correlation between these measurements; also this study showed that this facial measurement may be used for clinical assessment of occlusal vertical dimension.

المستخلص

لا توجد طريقة علمية لتحديد البعد العمودي الاطباقي الصحيح لمرضى الدرد (عديمي الأسنان)، وهذه الدراسة قد اجريت لدراسة التناسب بين مسافة الأذن للعين إلى مسافة الأنف للذقن . أجريت هذه الدراسة على ٢٠٠ مريض عراقي من ذوي الأسنان الكاملة ، تم قياس مسافة الأذن للعين (يميناً ويساراً) ومسافة الأنف للذقن لكل مريض. أثبتت نتائج التحليلات الأحصائية وجود علاقة إيجابية بين مسافة الأذن للعين (يميناً ويساراً) مع مسافة الأنف للذقن ويمكن اعتبار طريقة القياس الوجهي طريقة صحيحة في تقييم البعد العمودي الاطباقي .

Introdction

The occlusal vertical dimension refers to the distance measured between two points when the occluding members are in contact, and the rest vertical dimension is defined as the distance between two selected points measured when the mandible is in the rest physiologic position[1].Determination of the occlusal vertical dimension is one of the most important steps in making complete denture[2],the vertical dimension of occlusion play multiple essential roles, which are functional, esthetic, physiological, and psychological roles[3].The determination of an acceptable vertical dimension of occlusion for an edentulous patient is even more dependent upon clinical judgment ,and upon the skill and experience of the dentist[4].Unfortunately

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there is no one precise scientific method of determining the correct occlusal vertical dimension [5].

Researchers found that physiologic rest position was not consistent even in the same patients, and did not constitute a reliable reference position for assessment of occlusal vertical dimension [6].

Silverman reported consistent results in measuring occlusal vertical dimension by phonetic methods, this technique is applicable only in class I jaw relationships [7].

Facial measurement can be used to aid in determining an acceptable occlusal vertical dimension, many prosthodontists have long sought to find constant anthropometric measurements within the face [8]. The Willis device is designed to measure the distance from the lower border of the septum of the nose to the lower border of the chin and the distance from the outer canthus of the eye to the corner of the lip with the teeth in occlusion, and these measurements were equal to each other [9].

McGee [10] proposed a facial measurement; he correlated the chin-nose distance with the distance from the center of the pupil of eye to a line projected laterally from the median line of the lips, the distance from the glabella to the subnasion, and the distance between the angles of the mouth with lips in repose, and he found that all three measurements equal to each other and correspond to the vertical dimension of occlusion (chin – nose distance). The facial measurement proposed by McGee has the support of Pound [11].

Boyanov described another anthropometric method, and he found that the length of lip line equals the distance between the tubercle of the mouth and the lower border of the chin with the jaw closed. Other researchers found that the upper facial height from the pupil of the eye to the rima oris and the lower facial height from the base of the nose to the lower border of the chin when teeth are in occlusion are equal measurements [12].

Moreover, Morikawa et al. [13] have developed a device for measuring the occlusal vertical dimension and they called it TOM gauge, and they showed excellent reproducibility of record of vertical dimension of occlusion in complete denture fabrication.

Knebelman stated that it is possible to correlate ear-eye distance and chin – nose distance [14]. In this study assessed the relationship between the ear-eye to chin-nose distance, and determined the usefulness of this method for ascertaining occlusal vertical dimension.

Materials and Methods

The sample consisted of 200 dentulous [120 males and 80 females] Iraqi students with an age range between 20-25 years that were selected from the student of medical technology, the algorithm for making this measurement is the same for combinations sex [14]. The selection of the patients was done according to certain criteria, which include patient with class I angle classification, have no extracted teeth, normal overjet and overbite, no history of previous orthodontic or orthognathic surgical treatment, and patient with visible deformation and scars was excluded. The patient was correctly seated on the dental chair with upright position; the patient was instructed to close his jaw in centric occlusion. Before measurement was done, the patient should be comfortable with lips in repose and should not exhibit any facial strain. By using a vernier the ear-eye distance (from meatus of the

external auditory canal to outer canthus of eye) were recorded for both the right and left sides (Fig 1), and then the distance between the nasal spine and lower border of the chin was measured (Fig 2). For each patient the mean of three measurements was taken for each distance.

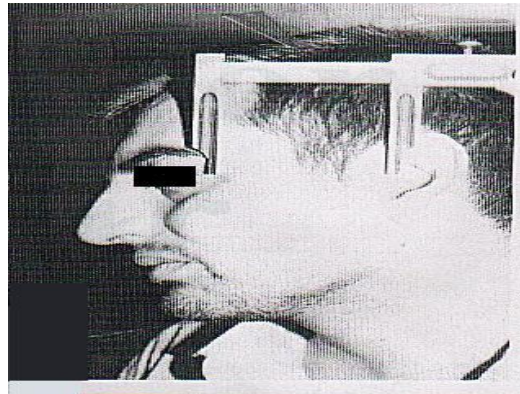


Fig.1



Fig .2

Results

The various measurements were statistically analyzed, in order to assess and analyze the results. The mean, standard deviation of all measurement used in the present study showed in Table (1)

Table (1): Mean and standard deviation of three measurements

Measurement	Mean	SD
Right ear-eye	70.50	2.5
Left ear-eye	70.12	2.3
Chin-nose	68.40	2.9

Through the application of Pearson correlation coefficient test between ear-eye distances and chin –nose distances , it was found that there is a positive correlation at $p < 0.01$ as shown in Table (2),

Table (2): correlation between ear –eye and chin-nose distances

	Chin-nose	Sig.
Right ear-eye	0.6 43254	S
Left ear-eye	0.721930	S

S= $P < 0.01$

Discussion

Measurement of anatomic landmarks of the face has been considered as a method of recording occlusal vertical dimension [15]. The results of this study showed that the mean of right & left ear-eye distance is nearer to the mean of chin-nose distance (Table 1) , and also showed that there is a positive correlation at $P < 0.01$ between the three measurements (Table 2) , and this finding come in agreement with Chou[14].

When selecting a method, the following criteria have been recommended accuracy and reliability of the measurement, adaptability of the technique, type and complexity of equipment needed, cost and the length of the required to make measurement [15].Knebelaman stated that it is possible to correlate ear-eye distance and chin-nose distance and may be used as a method for recording occlusal vertical dimension and he explained that inaccuracies resulting from the use of the Willis gauge method are caused by inconsistent angulations of the instrument especially for convex profiles, and compression of the soft tissue under the chin and septum of the nose by pressure exerted by the gauge[14,16].

Conclusion

Right and left ear-eye distance can be used to predict chin-nose distance with reasonable accuracy for ascertaining occlusal vertical dimension, and it is easy method and no need for complex equipment.

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