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Relationship of Facial Measurement for Determining the Vertical Dimension in Young Adult Saudi Students

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ABSTRACT

There is no specific scientific method for determining the correct edentulous occlusal vertical dimension. In this study, the establishment of the proportion between the ear-eye to chin-nose distance to determine occlusal vertical dimension.

200 dentulous Saudi students participated in this study. The chin-nose and ear-eye (right & left) distances were measured; the results showed that there is a correlation between these measurements; also this study showed that this facial measurement may be used to predict chin-nose distance and determining occlusal vertical dimension in edentulous patients of the Saudi population in combination with some other methods, which have proved to be helpful .

INTRODUCTION

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).

Esthetics is the primary reason for patients seeking orthodontic /prosthodontic treatment and the resulting soft tissue profile is their measure of therapeutic success(2).

Attention to physical appearance, particularly of the face, has become a very important issue in modern society(3).

Researchers found that physiologic rest position was not consistent even in the same patients, and did not constitute a reliable reference

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position for assessment of occlusal vertical dimension [4].

There is no one specific scientific method for determining the correct occlusal vertical dimension[5].

Consistent results were reported in measuring occlusal vertical dimension by phonetic method, this technique is applicable only in class I jaw relationship [6]

Facial measurements were studied; 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 it was found that all three measurements equal to each other and correspond to the vertical dimension of occlusion (chin – nose distance). [7,8]

Another anthropometric method was described, 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[9] .

Ear-eye distance and chin-nose distance may be correlated. In a study the relationship between the ear-eye to chin- nose distance was assessed, and the usefulness of this method for ascertaining occlusal vertical dimension was determined. [10]

Morikawa et al.,[11] have developed A device for measuring the occlusal vertical dimension was developed and it called TOM gauge, and they showed excellent reproducibility of record of vertical dimension of occlusion in complete denture fabrication.

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[12]. 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 was equal to each other[13].

The aim of this study is to establish the measurements of the vertical dimension, chin-nose distance and ear-eye distance correlation among Saudi adult students, to determine the usefulness of this method for ascertaining occlusal verical dimension.

MATERIALS AND METHODS

The sample consisted of 200 males completely dentulous Saudi students with an age range between 19-24 years that were selected from the student of Salman Bin Abdulaziz University. The selection of the patients was done according to certain criteria, which include satisfying the criteria of pleasing face, balanced facial profile, competent lips, and normal overjet and overbite relationship, class I angle classification, with the permanent dentition completely erupted (except for wisdom teeth), had no congenital anomalies, none of these subjects had undergone, orthopedic, orthodontic treatment or, orthognathic surgery and no previous history to facial trauma. Each subject was seated on a dental chair, asked about name, medical and dental history. Extra and intra oral clinical assessment had been made, measurements were measured directly on the subject's face and taken under standardized conditions keeping Frankfort plane parallel to floor. During registration of the vertical dimension (VD), the subject's head must be erect, The occlusal vertical dimension (OVD) was determined by asking subject to relax and occlude his teeth in centric occlusion with lips closed, and the distance between the two marks was measured. By using the ear-eye distance (from meatus of the external auditory canal

to lateral canthus of eye) were recorded for both the right and left sides, 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. An electronic digital caliper was used to measure the measurements in millimeters fig(1). To make landmark determination as consistent as possible, a given landmark was identified for each subject at one sitting. Each was then checked by another student. In order to minimize measurement error, all measurements were performed by two students working independently.

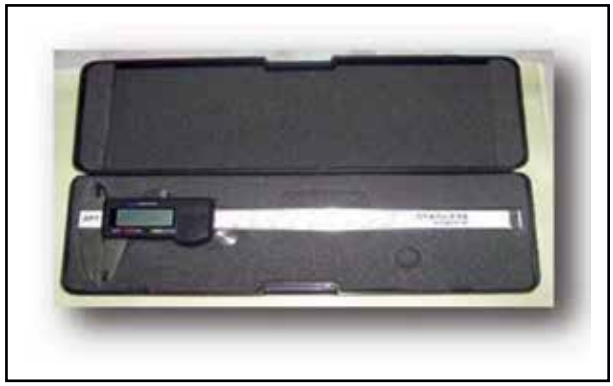

Fig. (1) Digital calliper

Fig. (2) The distance from the mesial wall of the external auditory canal to the lateral corner of the eye

RESULTS

All the collected data were statistically analyzed. 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 eye-ear	70.44	2.4
Left eye-ear	70.31	2.3
Chin-nose	68.39	2.8

A significant correlation had been found between right ear-eye distance and chin-nose distance, also it was found significant correlation between left ear-eye distance and chin-nose distance as been showed in table (2)

Table (2) *Correlation between ear –eye and chin-nose distances*

	Chin-nose	**Significance**
Right ear-eye	**0.644343**	**Sig.**
Left ear-eye	**0.691821**	**Sig.**

Sig=P<0.1

DISCUSSION

An accurate evaluation of facial vertical dimension for completely edentulous patients is essential for the prosthesis success. The dentist cannot increase or decrease the VDO beyond patient's physiologic requirements. Unfortunately, there is no specific scientific method for determining the correct VDO. A great deal depends on dentist's skill, knowledge, judgment and experience[14] .

Anatomical landmarks of the face was considered a method of occlusal vertical dimension record[15] .

Measurement of anatomic landmarks of the face has been a controversial method of recording occlusal vertical dimension. 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 relaxed lip with the teeth in occlusion. In theory these measurements should be equal. However, the asymmetry of faces makes the value of average measurements with these anatomic landmarks questionable[16].

The results showed that (right & left) ear-eye distances could be used to predict chin-nose distance with reasonable accuracy.

This method could be recommended in everyday clinical practice for prediction of vertical relation of occlusion, as it is a simple, economic and non-invasive method, however in combination with some other methods, which have proved to be helpful.

CONCLUSION

The distance between the ear and the eye on right or left side can predict the occlusal vertical dimension, it is an easy method can be used for ascertaining the occlusal vertical dimension.

This facial measurement may be used to predict chin-nose distance and determining occlusal vertical dimension in edentulous patients of the Saudi population in combination with some other methods, which have proved to be helpful.

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