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The Correlation between the Right Little Finger, Eye - Ear Distance and Vertical Dimension of Occlusion among Students of Faculty of Medical Sciences in University of Sulaymani

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Abstracts:
Objective*: The present study evaluates the correlation among vertical dimension of occlusion, eye - ear distance of both right and left sides and the length of the little finger of the right hand.*
Material and methods*: A cross-sectional study was conducted on 200 dentate subjects selected both males and females were involved in the study. Measurements of vertical dimension of occlusion were recorded clinically using modified digital vernier caliper, with the person is seated correctly on the dental chair in an upright position; and instructed to close his teeth in centric occlusion. The ear-eye distances were recorded for the right andleft sides. In the same way, length of little finger of right hand was measured from tip of finger to the further most point on palmer digital crease. The measurements were taken with the hand straight and flat.*
Result: *showed that vertical dimension of occlusion was significantly and positively correlated with the length of the little fingers, in females more compatible than males. But eye-ear distances have a weak correlation with the vertical dimension of occlusion because it has a great difference approximately more than 10 mm for males and more than 11mm for females as compared with the little finger to vertical dimension of occlusion.*
Conclusion*: Since the variations between vertical dimension of occlusion and the length of little finger are within the range of 1mm for females and 2mm for malesrespectively. As a conclusion of the present study vertical dimension of occlusion prediction through this method is reliable, and reproducible. Also the method is simple, economic, and non-invasive; hence, it could be recommended for everyday practice.*
Key word: - *Facial measurement, little finger, vertical dimension*

I. Introduction:

Glossary of Prosthodontic terms [1] defined the vertical dimension of occlusion VDO as a distance measured between two points when the occluding members are in contact, while vertical dimension of rest VDR is defined as the distance between two selected points measured when the mandible is in the rest physiologic position.Determination of the VDO is one of the most important steps in making complete denture [2].The determination of an acceptable VDO for an edentulous patient is even more dependent upon clinical judgment, and upon the skill and experience of the dentist [3].The VDO play multiple essential roles, which are functional, esthetic, physiological, and psychological roles [4].Unfortunately there is no one precise scientific method for determining the correct VDO [5].Silverman reported consistent results in measuring VDO by phonetic methods, in patients with class I jaw relationships. Silverman believed that the exact measurement of the natural VDO is most essential in the successful practice of many phases of dentistry (Silverman1959)[6]. He also believed that the greatest cause of full denture difficulties is the failure to duplicate the normal VDO. In occlusal reconstruction, many fine dentists have found, through experience that increasing the VDO for patients with supposedly shortened VDO ended in failure. The dental profession realizes that it has never had an accurate, scientific, and practical method with which to measure the patient's natural VDO. He reported that to use of the speaking method to measure a patient's VDO before the loss of the remaining natural teeth, and to record this in term of millimeters, and to reproduce this measurement in full dentures after the tooth extraction.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 VDO [7]. The terminology of the initial report has been simplified to describe the same method of measuring VDO[8].

This study was designed to assess the possibility of any correlation between VDO and length of fingers in Kurdish population so that it can serve as a simple and precise method for estimating VDO.Recording the correct vertical jaw relation is believed to be an elusive step, but its significance can't be overlooked if optimum function and aesthetics is to be achieved. It is the responsibility of the dentist to establish an appropriate lower facial height when lost, which should be within the range of patient's adaptability and acceptability. If VDO is registered too high or too low, it would end up deteriorating the existing patient's condition instead of improving

it. Although Prosthodontics as a whole has progressed leaps and bounds with variety of techniques being proposed and practiced for the evaluation of VDO, none of them is scientifically more accurate than other. Each method advocated has its own limitations. They are either tedious, time consuming, require special instrument/equipment, or expose patients to radiation [9].

II. Patients and methods

This study was conducted on 200 physically healthy dentate subjects both males and females with the age range of 20 to 30 years having no deformity of face and little fingers of the right hand were selected from the faculty of medical sciences in Sulaymaniah city, and the following information's were collected; name, age, gender…etc.

All the participants should have had classI centric jaw relationship, periodontally sound teeth in both jaws. Subjects with the following conditions were excluded from the study:

- Open bite or deep bite cases
- Teeth anomalies
- attrition
- extensive prosthesis or restorations in the oral cavity
- temporo-mandibular joint disorders, or any other pathology in the maxillofacial region
- history of trauma
- Orthodontic treatment or orthognathic surgery.

Anthropometric measurements of chin-nose distance VDO, eye _ ear distance and the length of the little finger of the right hand were recorded clinically in millimeters using a modified digitalvernier. To record VDO, the subjects were instructed to bite lightly on the posterior teeth with lips in repose and head well stabilized. We modified the tips of digital vernier caliper for recording VDO to allow a precise position in horizontal and vertical planes without causing any discomfort to the subjects. The lower tip of caliper was placed firmly below the chin so that the soft tissues were compressed by pressure exerted and thus caliper coming as close as possible to the lower border of mandible against the skin. Now the upper shortened tip of caliper was raised until it lightly touched the base of nasal septum as seen in figure 1 and the measurement was made.

Figure 1 Measurement of the chin-nose distance (VDO)

Before measurement was done, the patient should be comfortable with lips in repose and should not exhibit any facial strain. The ear-eye distances (from meatus of the external auditory canal to outer canthus of eye) were recorded for both the right side which seen in Fig 2

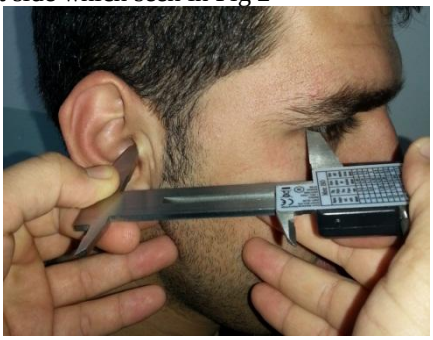

Figure 2 ear-eye distances

Length of little finger of right hand was measured from tip of finger to the farther most point on palmer digital crease figure 3The measurements were taken with the hand straight and flat. While taking on finger measurements be sure that nails of the subjects were trimmed.

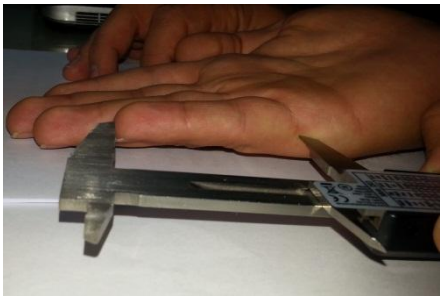

Figure 3 Measurement of little finger of the right hand

In order to calculate these data's to estimate VDO Statistical Package for Social Sciences (SPSS) Software Version 20 was used. And also to analyze the recorded measurements and both descriptive statistics (tables) and analytic statistics (coefficient of Pearson) were used to correlate the data at significant level of 0.05%.

III. Results

Descriptive statistics

Table 1 shows the various measurements were statistically analyzed, in order to assess and analyze the results. The mean and standard deviation of all measurement recorded in the present study for all 200 cases (126 male and 74 female) showed in Table 1

Table1 Mean and standard deviation of all precipitants

Measures	*Chin -Nose distance*	Eye – ear distance RT	Eye – ear distance LT	Length of little finger of the right hand
Mean	*66.17mm*	*75.39mm*	*75.33mm*	*64.71mm*
Standard Deviations	*6.23mm*	*3.84mm*	*6.46mm*	*5.29mm*
Total	*200*	*200*	*200*	*200*

Frequency

Table 2 shows the mean of sample cases (according to gender) for the chin – nose distance (vertical dimension of occlusion), eye – ear distance (RT and LT) and length of the little finger of the right hand.

Table 2 mean of precipitants according to gender

No.	Cases	Chin -Nose distance	Eye – ear distance		Length of little finger of the right hand
			RT	LT	
1	All	66.17mm	75.39mm	75.33mm	64.71mm
2	Male	68.63mm	76.96mm	77.45mm	66.84mm
3	Female	61.97mm	72.73mm	71.73mm	61.07mm

Table 3 shows the correlation between chin-nose distance to eye-ear distance RT andchin-nose distance to little finger of the right hand for male and femaleprecipitants

Table 3Paired Samples Test (Paired differences)

	gender	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	upper	t	d.f.	Sig. (2-tailed)
VDO – eye-ear RT	male	-8.32mm	5.70mm	.50mm	-9.33mm	-7.31mm	-16.37mm	125	.000
	female	10.75mm	5.86mm	.68mm	12.11mm	9.39mm	15.76mm	73	.000
VDO – little finger	male	1.79mm	6.55mm	.58mm	.63mm	2.94mm	3.06mm	125	.003
	female	.90mm	5.50mm	.63mm	-.36mm	2.18mm	1.41mm	73	.161

Table 4one-Sample Test of the male and female precipitants measurements

	gender	Test Value = 67.59mm					
		t	d.f.	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
VDO	male	2.089	125	.039	1.043mm	.054mm	2.031mm
	female	2.000	73	.049	1.134mm	.003mm	2.265mm
Eye-ear RT	male	2.011	125	.047	.598mm	.009mm	1.187mm
	female	2.000	73	.049	.725mm	.002mm	1.448mm
Eye-ear LT	male	2.917	125	.004	.831mm	.267mm	1.396mm
	female	2.001	73	.049	2.017mm	.008mm	4.026mm
Little finger of RT hand	male	1.993	125	.048	.752mm	.005mm	1.500mm
	female	2.013	73	.048	1.148mm	.011mm	2.284mm

Table 5 one- sample test and statistics of male and female participants

From the observation of the above tables, results revealed that there was statistically significant relation between the recorded measurements both in males and female precipitants which P<0.05, especially in tables 8, because approximately they are the summation of the whole above table.

Descriptive statistics of the parameters studied were presented in Table 5, it was observed that, in males the mean value of chin – nose distance (VDO) was ***68.63 mm***, whereas in females, the mean value was ***61.97*** mm. Thus, VDO is more in males compared to females. In males, the mean value of right eye – ear distance was ***76.96*** mm while the mean value of the left eye – ear distance was ***77.45*** mm. The difference between them is ***0.49*** mm. While in females, the means of right eye – ear distance was ***72.73*** mm but the mean value of the left eye – ear distance was ***71.73*** mm. Thus, the difference between them is ***1.0*** mm. Males had greater distance between eyes and ears as compared to females. In males, the mean value of length of little finger was ***66.84*** mm whereas in females, the mean value was ***61.07*** mm. Thus males had longer little finger as compared to females.

So in a simple equation the vertical dimension of occlusion in this study is determined by:

In males

Chin- nose distance - length of little finger

68.63 mm – 66.84 mm = 1.79mm ~ 2.0mm

So for determination of the VDO in male equal to length of the little finger ***+ 2 mm***…

In females

Chin- nose distance - length of little finger

61.97 mm - 61.07 mm = 0.9 mm ~ 1 mm

So for determination of the VDO in female equal to length of the little finger ***+ 1 mm***…

IV. Discussion:

Losing teeth and acquiring an artificial prosthesis is not a pleasurable event for any individual. Nevertheless, the agony of the patient can be lessened to some extent by providing a prosthesis which restores the original facial appearance and functions akin to natural teeth. Unquestionably, establishing a correct VDO of face is one of the important factors to be considered in accomplishing this objective. Literature review depicted that many methods have been described and used by professionals over the years for the purpose of VDO determination, but none of them is fully accepted or considered completely correct. 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 [10]**.** To overcome these difficulties this study was undertaken to find a simple yet feasible method by studying the relationship between VDO, eye – ear distance and length of little finger of the right hand, taking into account that the growth of body parts takes place in proportion to each other.

And our thesis showed that the length of the little finger of the right hand is nearer to the mean of chin - nose distance, and also showed that there is a positive correlation between these two measurements P <***0.05*** (Table ***3.26***and ***3.27***).

The results supported the research hypothesis that there would be a significant relationship between the VDO and the length of fingers.

The study revealed a sexual dimorphism with higher values for VDO as well as eye – ear distance and the length of little finger of the right hand in males compared to females. Sexual dimorphism in finger length and eye – ear distance is related to post-puberty levels of androgen exposure[11].

Also in this study measurements of only right hand fingers were recorded. This will not create any bias because it is a known fact that physiologically human body maintains symmetry. This result is in agreement with that of Danborno found no differences in the length of fingers of both hands [12]**.**This method is attractive and practical because it is simple, economic, non-invasive, and reliable, requires no radiographs or sophisticated measuring devices and provides reproducible values for future reference. Besides it does not require a great amount of time and experience to master which is another advantage it enjoys over previous methods. The limitation of the study was that it was restricted to the subjects with class I malocclusion and other skeletal or dental malocclusions were not considered. Further the subjects were not categorized based on facial forms. Also the measurement is difficult to record when a patient has a round facial profile with excessive soft tissue bulk under the chin.

To authenticate these findings further studies should be carried out comprising of a broad clinical research program that would include the similar analysis for dentulous population in other ethnic groups and then appropriate regression equations may be constructed which can be accepted universally. However, the operator should keep in mind that VDO is the result of a musculoskeletal balance. The correct VDO can be better described as a range instead of as a fixed point. Therefore, in order to evaluate the VDO, a pluralistic method should be adopted at all the stages of rehabilitation to maximize the benefits and minimize damage to the stomatognathic system.

V. Conclusions

Measurement of little finger has been considered as a method of recording VDO and it's a good parameter for both males and females. But measurement of the eye-ear distance cannot be reliable for recording VDO because of a great difference between the eye-ear and chin-nose distances for both males and females. So the VDO prediction through this method is simple, economic, and non-invasive; hence, it could be recommended for

List of abbreviation

RT	Right
LT	Left
VDO	Vertical dimension of occlusion
OP	Occlusal plane
SPSS	Statistical Package for Social Sciences
VDR	Vertical dimension of rest

References

[1]. Glossary of Prosthodontic terms 8th Ed. J Prosthet Dent 2005; 94:10-85.
[2]. Jackson C. Prediction of hemispheric asymmetry as measured by handedness from digit length and 2D:4D digit ratio. Laterality 2008; 13:34-50.
[3]. Unger J.W. Comparison of vertical morphologic measurements on dentulous and edentulous patientsJProsthet Dent 1990; 64:232-234.
[4]. McCord J.F., Grant A.A., Registration stage II inter-maxillary relation. Brit Dent J 2000; 188:601-606.
[5]. Millet C., Jeannin C. Vertical dimension in complete denture. J EMCO dont 2005; 1:13-28.
[6]. Silverman MM. Accurate measurement of vertical dimension by phonetics and the speaking centric space, Part I. Dent Dig 1951; 57:261-5.
[7]. Fayz F., Eslami A., Determination of occlusal vertical dimension; a literature review.JProsthet Dent 1988; 59:321-323.
[8]. Meyer M. Silverman, DDS Washington D.C.The speaking method is measuring vertical dimension, J Prosthet Dent 2001; 85(5):427–431.
[9]. Turrell A. Clinical assessment of vertical dimension. J Prosthet Dent 2006; 96:79-83.
[10]. Basker R.M., Davenport J.C.The difference between Willis device and caliper method. J Oral Rehabil 2002; 2:243-247.
[11]. Jackson C. Prediction of hemispheric asymmetry as measured by handedness from digit length and 2D:4D digit ratio. Laterality 2008; 13:34-50. 12-Danborno B, Adebisi S, Adelaiye A, Ojo S. Estimation of height and weight from the lengths of second and fourth digits in Nigerians. Internet J Forensic Sci 2009; 3:2.