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Original Research

To determine the Correlation between the occlusal vertical dimension and length of thumb in coastal Andhra population

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***ABSTRACT*:**
Aim of the study: To determine the Correlation between the occlusal vertical dimension and length of thumb in coastal Andhra population. **Materials and methods:** The present study was conducted on 220 subjects in coastal Andhra. Occlusal vertical dimension by Niswanger and Thomson method (two pinpoint markings were placed on the tattoo stickers of the tip of the nose and the most prominent point on the chin) was measured, and then the length of thumb finger (The proximal point on the radial side of the proximal crease over the first metacarpophalangeal joint and the distal point in the dactylion, the distal-most part of the thumb) was measured with a vernier calliper. The sample size was measured using G power 3.1.9.2 with Zα 0.05, Power 80% and the effect is 0.6, and the sample size obtained was 220**. Results:** Pearson correlation test was used to analyze the data. The thumb length was significantly correlated (0.001) with strong and positive values (Pearson's coefficient =0.662 in the whole population). Regression analysis that thumb length was significantly related to the vertical dimension of occlusion. **Conclusion:** Considering the limitations of the study, the result implies that thumb length can be used as an alternative for establishing O.V.D. in the edentulous patients.
Keywords: Thumb, the vertical dimension of occlusion (O.V.D), Pearson coefficient, edentulous patients.

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INTRODUCTION:
The occlusal vertical dimension (O.V.D.) is defined as the distance between two selected anatomic points (usually one point on the tip of the nose and the other on the chin) when in the maximal intercuspal position. It is important for the functional, esthetic, physiological and psychological roles of the patient who loss their teeth and wants rehabilitation. [1]
So, the establishment of proper occlusal vertical dimension (O.V.D.) is one of the important tasks for successful prosthodontic therapy.
There are several methods to determine the vertical dimension of occlusion, but each method has its own limitations because they were either tedious, time-consuming, require special instrument/equipment, or expose patients to radiation. So at least 2 or 3 methods should be done on the patient to accurately determine the V.D.O. of that particular patient.
Few studies shows that V.D.O. can be correlated clinically with anthropometric measurements, and they can simple and precise method for estimating occlusal vertical dimension.[2] The aim of the study was to evaluate the Correlation between the O.V.D. and the length of the thumb.

MATERIALS & METHODS:

(a) SOURCE OF DATA:
The present study will be conducted on 220 subjects in coastal Andhra Pradesh.

(b) STUDY DESIGN:
Occlusal vertical dimension was measured by Niswanger and Thomson method (two pinpoint markings were placed on the tattoo piece on tip of the nose and the most prominent point on the chin) and then the length of thumb finger (The proximal point on the radial side of the proximal crease over the first metacarpophalangeal joint and the distal point in the

dactylion, the distal-most part of the thumb) was measured.

(c) METHOD OF COLLECTION OF DATA:
The patients are selected according to the following criteria

Inclusion criteria: subjects with

- Full natural dentition (third molar not taken into account)
- Straight profile on visual examination

Exclusion criteria: Any history

- Orthodontic/surgical treatment,
- Presence of large carious lesions
- Abnormality or absence of thumb/s
- Hormonal abnormalities (e.g., gigantism, acromegaly)
- Open bite or deep bite cases
- Teeth anomalies
- Attrition
- Trauma

EVALUATION CRITERIA:

CLINICAL PARAMETERS:

- Occlusal vertical dimension was measured by Niswanger and Thomson method (two pinpoint markings were placed on the tattoo piece on the tip of the nose and the most prominent point on the chin)
- Length of thumb (The proximal point on the radial side of the proximal crease over the first metacarpophalangeal joint and the distal point in the dactylion, the distal-most part of the thumb)

Potential Risks and Benefits:
NIL

STUDY FLOW CHART

For occlusal vertical dimension-

Subjects should be seated comfortably in the dental chair in a fully upright position.

↓

A head-rest was used to support the head with the camper's line of the subject in a horizontal position.

↓

The subject was made to occlude the total teeth in maximum intercuspation.

↓

Then two markings were placed on the tattoo marks on tip of the nose and the most prominent point on the chin, and the distance between them was measured with a vernier calliper.

For length of the thumb-

Each subject should be asked to place his or her hand on a graph paper keeping the fingers separated and the thumb placed comfortably

↓

The proximal point of first meta carpophalangeal joint and the distal point in the dactylion, the distal-most part of the thumb, were to be marked.

↓

The ends of the calliper were to be placed over these two landmarks, and the distance between them gives the maximum length of thumb

↓

Data will be analysing using using G power 3.1.9.2 software.

PROCEDURE:

Each volunteer was asked to place his or her hand on a graph paper with the palm facing downward and the fingers separated and the thumb placed comfortably. A sliding caliper was used to calculate the length of the thumb (Figure 1), as in the method used by Kumar et al. The proximal point on the radial side of the proximal crease over the first metacarpophalangeal joint and the distal point in the dactylion, the distal-most part of the thumb, were marked.

Figure 1: Measurement of thumb length.

The ends of the caliper were placed over those two landmarks of the subject, and the length between them measured the maximum length of thumb.

To measure the O.V.D., routinely used methods in the Department of Prosthodontics, Sibar Institute of Dental Sciences were employed (Figure 2). The subject was positioned comfortably in the dental chair in a fully upright position. A headrest was used to give support the head with the camper's line of the subject in a horizontal position. The subject was made to occlude the teeth in maximum intercuspation. Then two markings were placed on the tattoo points of tip of the nose and the most prominent point on the chin. The distance between them was calculated with a sliding caliper.

Figure 2: Measurement of O.V.D. with modified Vernier caliper

RESULTS:

The study was conducted among 220 students of the College of Sibar Dental Surgery. Pearson correlation test was used to analyze the data. The mean O.V.D. of the population was 5.58682 mm, and the mean thumb length (T.L.) of the studied population was 6.03000 mm(fig-3). The thumb length was significantly correlated (0.001) with strong and positive values (Pearson's coefficient =0.662 in the whole population) (Fig-4). The graph shows the mean and range of various measurements (Fig-5)

Descriptive Statistics

	Mean	Std. Deviation	N
VDO	5.58682	.553329	220
LT	6.03000	.564886	220

Figure 3: Comparison of mean

Correlations

		V.D.O.	LT
V.D.O.	Pearson Correlation	1	.662**
	Sig. (2-tailed)		.000
	N	220	220
LT	Pearson Correlation	.662**	1
	Sig. (2-tailed)	.000	
	N	220	220

Figure 4.** The Correlation was significant at the 0.01 level (2-tailed).

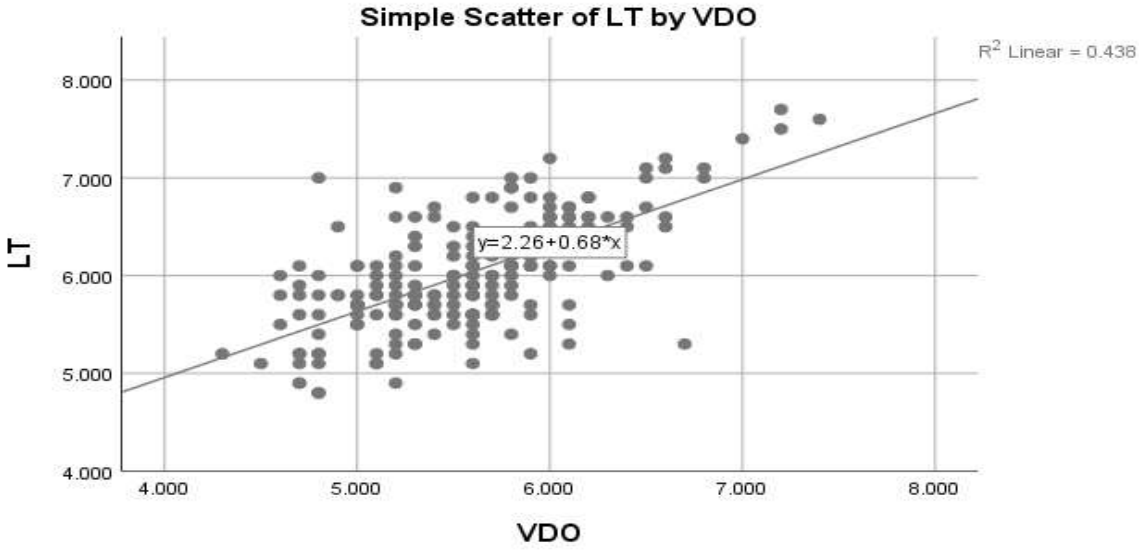

Figure 5: Range of variations in vertical dimension and thumb length

DISCUSSION:

The edentulism results in poor appearance of the lower third of the face. The rehabilitation of correct vertical dimension in those who have lost it should be in harmony with the upper part of the face. Prosthodontists have long been searching for universally accepted method of determining the O.V.D. There were methods like use of anterior teeth measurements[7], closest speaking space[8], swallowing method[9], patient's neuromuscular perception[10], cephalometric radiographs[11,12], intra-oral and extra-oral anatomic landmarks[13] and measurement of fingers[6]. All of these methods have disadvantages. Some methods have errors in measurement, while others are leads to difficult application, higher amount of cost, or longer time period for application. Any change in determining O.V.D. can be detrimental to the esthetics of facial soft tissues, causes difficulties in phonation, and leads to temporomandibular joint dysfunction.

Pre-extraction record is always superior to these methods. But recording the O.V.D. of all patients is not always possible[15]. A pre-extraction records, knowledge of aesthetics, relationship of teeth to the ridges, measurements relative to the lip length, use of phonetics and other methods are employed. This study was taken to investigate the relationship between the O.V.D. and the length of the thumb. The present study gave some idea about the relation between the facial measurement and length of the thumb their use in determining occlusal vertical dimension. The studies between the length of the thumb to the length of the lower facial height can help the clinician to establish the correct O.V.D. in the treatment of patients requiring restorations like the complete denture.

Geerts et al[14] evaluate the correctness of the chin–nose distance measurement. The compressibility of skin cannot be avoided, so there may be some degrees of errors in measurement. Measurement by modified callipers invariably leads to some differences in the different studies. The present study did not compare these procedures of measuring the O.V.D.

LIMITATIONS:

The limitations of this study were errors occurred while measuring dimensions in big sample, and only one ethnic group are considered in the present study, so the findings cannot be extrapolated to other ethnic groups or races.

CONCLUSION:

Correlation of the length of the thumb to the O.V.D. was statistically significant. The Correlation between the length of the thumb and vertical dimension of occlusion was positive and strong in the total population. Within the limitations of this present study, the final result shows that thumb length can be used as an alternative for establishing O.V.D. in the edentulous patients.

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