



INVESTIGATION OF THE RELATIONSHIP BETWEEN THE MESIO DISTAL WIDTH OF UPPER ANTERIOR TEETH AND INNER CANTHAL DISTANCE BY EYE-RIMA ORIS DISTANCE IN THE POPULATION RESIDING IN HYDERABAD SINDH

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Abstract:

Dimension of occlusion (VDO) indicates face length. Increased VDO may cause pain in muscles and joint, difficulty in phonation and swallowing, sensitivity in tooth because of traumatogenic forces, abnormal wearing of teeth, tired facial expression an, and elongated face. To determine the vertical dimension of occlusion by eye-Rima Oris distance and its relation to measurements of nasal to gnathion and subnasal to menton. Cross Sectional Study was done. The Department of Prosthodontics, Institute of Dentistry, LUMHS, Jamshoro. From April 2018-February 2019. Total 115 were enrolled in to the study. Dots were placed on nose tip (N) and chin tip (Gn) and observation were recorded. The gap between Me and Sn was also noted. Tounge blade was used for achieving parallelism between under chin and nasal septum. Distance from outer eye to mouth corner was measure to record outcomes variable (eye-RO). Relationship was determined using Pearson correlation. Statistical significance was considered for $p \leq 0.05$. Mean Nasion-gnathion, subnasal-menton and Eye-rimaoris was 66.36 ± 2.58 , 53.98 ± 3.43 and 64.39 ± 3.66 respectively. The results show positive and negligible correlation between Eye-rimaoris and Nasion-gnathion. While low positive correlation was found for as Eye-rimaoris with subnasal-menton. The results also showed significant mean difference of Eye-

rimaoris with Nasion-gnathion and Eye-rimaoris with subnasal-menton. Eye-Rima Oris distance is a consistent approach for prediction of the Vertical Dimension of Occlusion.

Keywords: Vertical Dimension Of Occlusion, Eye-Rima Oris Distance, Nasal To Gnathion, Subnasal To Menton

1. INTRODUCTION

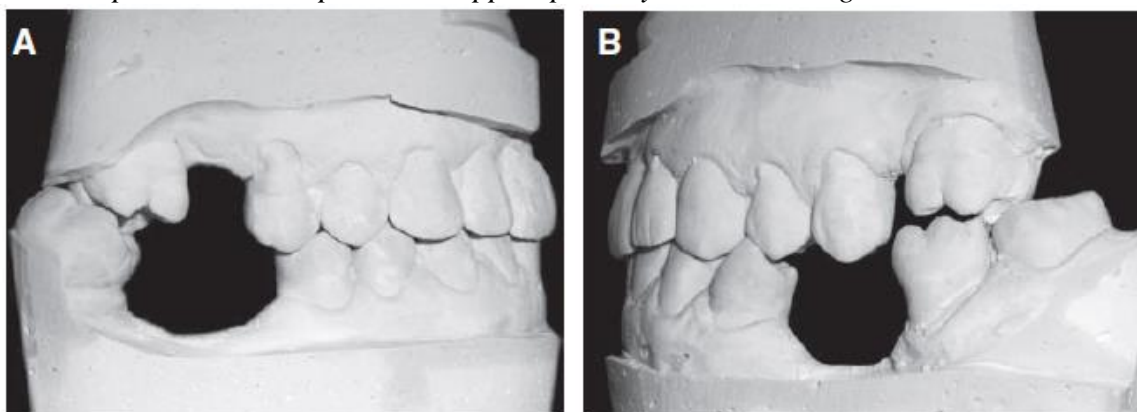
Vertical dimension is the facial length observed by magnitude of separation of the jaws. Vertical dimension has two types; -vertical dimension of rest (VDR) and vertical dimension of occlusion (VDO). VDR refers to the facial length at moment of separated teeth and mandible is in a position of physiologic.¹ On the other hand, VDO indicates face length when teeth are positioned either in centric or non-centric inter-cuspal.² Teeth loss leads to VDR and VDO.³ The life-long edentulous patients manifest with vertical dimension loss and changes in soft tissues profile.⁴ It has been observed by multiple researchers that premolars extraction because of orthodontic reasons leads to forward movement of posterior teeth that ultimately causes mandible overclosure and hence vertical dimension loss.⁵

Reduced VDO may promote the lesions development like angular cheilitis, disharmony of facial esthetics whereas increased VDO may cause pain in muscles and joint, difficulty in phonation and swallowing, sensitivity in tooth because of traumatogenic forces, abnormal wearing of the teeth, tired facial expression and, and elongated face.² The accurate determination of the vertical jaw relation is extremely important in achieving successful prosthodontic outcome for masticatory function, speech, esthetics, and comfort to the edentulous patients.⁶

According to Alonso et al., changes in vertical dimension of occlusion can suppress or impair the functional freeway space (FFS), which is the differentiation of the vertical dimension of rest position (VDR) from inter cuspal position and must be present in all situations. In edentulous patients, VDO is estimated by subtracting FFS (2-4mm) from the VDR.⁷ Another method is to associate a proportional distance between two anatomical and marks on the face e.g. from nasal tip (nasion[N]) to chin tip (gnathion[Gn]), or from nasal septum (Subnasal[Sn]) to mandible inferior border (menton[Me]) with the help of Willis gauge.⁸ The findings of researchers Nagpal et al.,⁹ Delic et al.,¹⁰ and Basnet et al.,¹¹ were not in agreement to the study conducted by Tina Olaivar et al.¹² in which Olaivar determined the difference of 3cm between N-Gn and eye-RO and most likely this difference was due to their study population which was Mangolian population whereas other investigations were conducted on Caucasian population. The significant difference in distance from nasal tip and chin tip and also from outer eye and lips parting was observed between males and females. Despite of having multiple methods and approaches to determine the vertical dimension, there isn't any scientifically accurate and established method of finding out of this component. Hence, this study is intended to assess the relationship between the space from outer eye can thus to the mouth corner of (rimaoris[RO]) and VDO determined as per the above mentioned two approaches. This will save chair side time in the assessment of vertical dimension of occlusion. This study will be conducted on a sample of dentate patients from Dental OPD of Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan. Vast knowledge of different areas is required for dental good practices like semiotics, periodontics, esthetics, occlusion and dental materials. The development of the correct occlusal pattern has great significance in the planning and management of patients undergoing oral rehabilitation. Before beginning management, treating consultant should take into account all occlusion related physiological factors that include vertical dimension, centric relation and anterior guidance. In phase of oral rehabilitation planning, one of the first parameters that has to be established is VDO; its determination is one of the key treatment phase as inadequate reestablishment causes unsuccessful prosthetic treatments.^{1,14}

VDO is measure by taking as the distance between the arches with the teeth in the centric or noncentric inter cuspal position; it should be observed between 2 points for example, from the nasion to the gnathion.¹⁶ According to Alonso et al variations in VDO may prevent or worsen the functional freeway space (FFS), which is determined by taking difference of VDO from VDR and must exist in all situations. The perspective, that rise in vertical dimension bases for TMD (temporomandibular disorders), originated from the assumption that advancement causes rise in elevator muscle tonicity with muscular pain onset, increase in tooth mobility and ultimately teeth erosion. The ingression causes VDO reduction and reverts to its early value. However, this assumption was not confirmed by Palla.⁶² At times, remission takes place followed by increase in occlusal height, yet it is not consistent, and VDO is not in initial value if it rose in single phase of numerous millimeters. This remission is followed by bone alteration and teeth ingression may not merely be related to the extent of rise and takes place particularly in starting period. A raised VDO does not seem to interrupt chewing ability. It is evident that rise in VD causes relax in closing muscles in majority of patients,⁶⁵ that is clinically determined during routine practice with occlusal splint wear. In view of researchers on VD remission vital determinant to ignore relapse could be functional control as compared to appropriate early VDO variation: rise the VDO: A skeletal open bite type is not a full hindrance to raise VDO, but relaxed closed lip might be a restriction. In circumstance of remission associated with reduced bottom facial height some time later management, there is at the minimum high probability to relate this remission to an unconstrained behavioral factor (such as dental erosion because of bruxism or clenching)? Drop in VDO: in few cases of anterior bite, a drop in VDO should be together with nasal breathing reeducation, rest swallowing and tongue posture.⁵⁹

Figure 1: Impaired occlusal posterior support possibly without damage occlusal vertical dimensi⁸



A: ICP right lateral view

B: ICP left lateral view

A drop in VD is entirely unlike to the impaired posterior occlusal support from mechanical and geometrical point of view. The VDO parallel to the rotation boundary of mandibular elevation simply indicates that alterations parallel to the condition of vertical occlusal stop of mandibular elevation rotation indicating that VDO changing is passed out about mandibular hinge axis, characterizing rotation angle. Therefore, it is unusual to express regarding posterior and anterior vertical dimension. Possibly the expressions anterior and posterior dental space or existing prosthetic height should be used. There is just a single vertical dimension for mandible and its alterations are linked with angular rotation with respect to the mandibular hinge axis. Contrarily, impaired posterior occlusal support parallel to a posterior mandibular rotation about frontal dental point of support, this scenario might be severe for TMJ.⁶⁹ Moreover, usually dental laceration does not indicate VDO loss. According to Niswonger⁷⁰, abraded teeth occurrence doesn't denote VD reduction, as a compensation is commonly noted particularly in anterior teeth. Occurrence of anterior dental migration along with latest diastemas, related to the succeeding impaired posterior support appears to be palpable clinical condition. The curative VDO aims at proportional facial manifestation with amusing manifestation of

lower facial height. Anthropometric measurement obtained through photography permit evaluation and contrast to early documents but they exclude introspective visual examination. Ravon⁶³ and McGee³ investigated height observations for lower face in relationship with distances Nasion-Gnathion, Glabella- Nasion, inter papillary, line bi-pupillary-cleft lip. This may be done to estimate VDO which is more accurate as compared to value obtained through proportional analysis as ratio of lower facial height and Wilie between middle. But there is low effect of vertical change of 1-2mm with respect to facial aesthetics, however it is essential from occlusal or mechanical perspective.⁷⁹Dental surgeon may make alterations in VDO in accordance with aesthetic, mechanical or biological necessities. The study conducted on mechanical hinged device is unique in terms of directly evaluating the VDO variations effects on anterior and posterior accessible prosthetic heights and back, and on the relations of anterior occlusal (overjet and overbite). The earlier standard of decision has no equal role in perspective of decision.⁵⁹Every step in procedure is highly essential and should be precisely performed to effectively design artificial denture. Any phase performed unscientifically would be resulted in failure. Procedure to obtain VD is rarely included in denture technique presentation. This elimination is generally taken care of in phrase: "Now you achieve vertical dimension". It is well known fact that every time exact centric relation should be included in dentures, for it is to this position that entire purposeful motion of mandible must be restored. This position truly has three dimensions; intermanillary distance or vertical dimension must be in consideration and anteroposterior and lateral associations also. It is essential not to use arbitrary procedure to achieve this relation, for difference occurred will certainly impact the attainment of final dentures. This point has been emphasized by various investigators.³The ease with which immediate dentures are worn, when the natural vertical dimension is accurately copied, is proof of the wisdom of avoiding bite-opening procedure beyond that permitted by the natural functioning length of the muscles of mastication as related to the resistance of the alveolar bone to muscle tension in function for a given individual. In those cases in which the patient is able to tolerate an abnormal overopening, the muscle pull will return the mandible to its correct position at the expense of the supporting tissues. Therefore it becomes apparent that some exacting method must be used to develop the accurate vertical dimension for each individual patient prior to the obtaining of centric relation.^{3,5}There are, of course, two vertical dimensions: one when the teeth are in occlusion, and the other when the teeth are detached with the physiologic rest position of mandible. Although the first, the occluded position, causes change as consequence of teeth loss, nature makes a great effort to maintain this position. Many elderly patients with their natural teeth still present, but definitely abraded, have been found to have maintained their original functional vertical dimension. The continued elongation or eruption of the teeth could account for this condition.³ It could also influence the diagnosis in older patients when roentgenograms show an even vertical atrophy of the supporting tissues. The second, the physiologic rest position, remains the unchanged all over the life irrespective teeth existence or absenteeism. Brodie's cephalometric studies on the growth of the head show that the muscles alone are responsible for the position of the mandible, and it is probable that any forced change would have an undesirable result. At the College of Dentistry, University of Illinois, ninety cephalometric examinations were made.

2. MEASUREMENTS

For centric occlusion, Two different measurements of the OVD were observed through different facial landmarks (N, Gn, Sn, and Me). Two dots through indelible pen were marked; one on the nasal tip (N) and the other on the chin tip (Gn), the distance of dots was documented. The parallelism between the nasal septum and the area below the chin was attained with a tongue blade and the participants were advised to have light grip on it on chin inferior border. The outcome variable (eye-RO) was achieved by means of determining the space between the eye outer canthus and mouth corner.

Figure 4: Measurement of space in between nasal tip and chin tip⁸



Figure 5: Measurement of space in between nasal septum and area below of the chin⁸



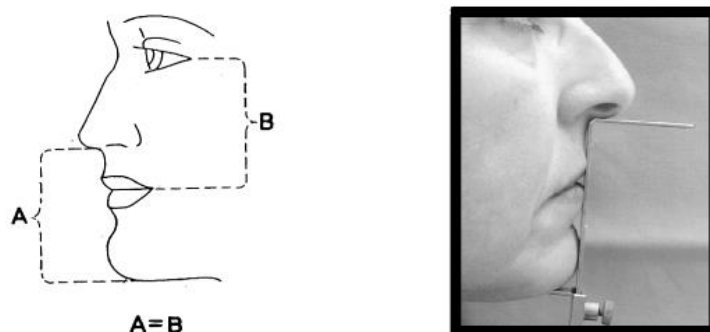
Figure 6: Measurement of space in between eye outer canthus of the eye and rima oris⁸



Despite of unreliability of many devices used for pre-extraction recording, few are reliable for evaluating occlusal vertical dimension as compared to many post extraction devices. The dakometer is presumed as high accuracy measuring instrument. Willis gauge is a device that allows the approximate angle. Using the same angle it is put on the face to be replicated in dental plate creation. Most consistent technique is to observe the difference between top and bottom labial freniarea with dividers and centric occlusion of teeth. Turner introduced a “cut-out method” through a simple pantograph. Olsen dyed a stripe of plaster of Paris beneath the face midline at which threshold is marked. Swenson defined the formation of a clear resin mask for the bottom face. All these

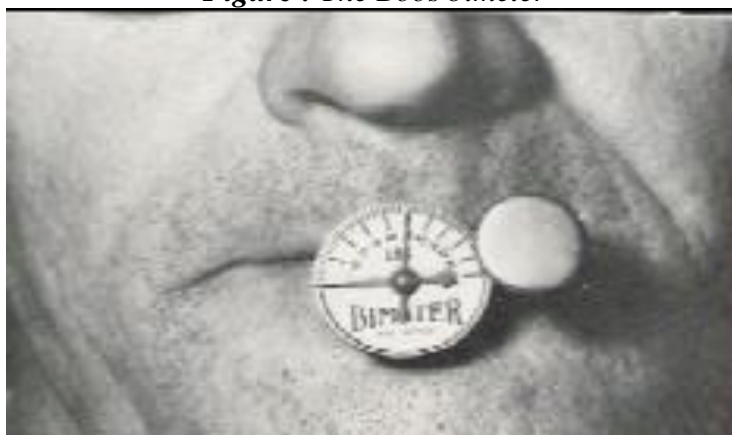
approaches move the skin afterwards of the cut-out and when it is put on face. There could be imprecision of at least 2 mm.

Figure 7: *The accuracy of facial measurements through the Willis Gauge⁵*



Thompson related deviations in rest position to hypo or hyper tonicity of the musculature and defined short and long-term deviations. Tallgren summarized that the rest position vertical dimension adjusted to modifications in the occlusal vertical dimension in both dentulous and edentulous patients. Atwood claimed that rest position is a dynamic instead of a static concept and it differs from individual to individual and within each individual. He specified that the vertical zone of suppressed electromyographic action determined by Jarabak was in support of the postural range concept. Atwood recommended that a cinefluoroscopy method together with electronics might be better in providing vision into the rest position variability. Coccaro verified the accurateness of three approaches in forming the rest position vertical dimension through cephalometry on individuals having standard dentitions. Fatiguing the phonetics, jaw musculature, and no command technique of mental and physical relaxation. Cephalometric imaging presented no statistically significant change on comparison with three approaches. Carlsson and Ericson observed that the technique of phonetic showed a larger vertical distance reading as compared to method of relaxation. Atwood adopted a blend of phonetics and swallowing in cephalometric investigations of rest position. He observed relaxation through facial expression. Relaxation is crucial for all of these methods. The philosophy bases on principle of extreme forces that may be applied while the mandible is at the vertical dimension of rest position. A force meter is fixed to bottom and upper base plates and registers. The stress that patient may apply as the vertical dimension is diverse. Smith specified that the Boos bimeter was the better method to a simple consistent instrument for finding the vertical dimension related to rest position.

Figure : *The Boos bimeter*



From palpable perception, the patient has to identify on reaching the extent of jaw opening which was achieved in presence of natural teeth. A more sophisticated approach has been chosen by Lytle and

Timmer, by means of fixing central bearing instrument to lower and upper occlusion rims. A statement was given by McGee that techniques on which the patient's muscular insight shifting the vertical occlusal dimension from the dentist to the patient, he observed that patients were prone record decreased of occlusal vertical dimension as they felt ease in that point. A survey was conducted on adolescent having natural to study Willis measurements.¹⁰ It was found that there 27 percents adolescent with corresponded lower and upper measurements. Another survey study reported that this percentage was only 9 and mostly subjects had Class I jaw correlation.¹⁰ McGee work on facial measurements had the support of Pound, Paquette and Haryvey.¹⁰²⁻¹⁰⁴ McGee also linked identified occlusal vertical dimension to three facial measurements and stated that they there is no change all over the life

On measuring vertical dimension of rest position within facial triangle tape at rest position, occlusion rims are established till the occlusal vertical dimension become identical to the measurement. There is variation in approaches used as a guide to mandible rest position. Few practitioners go with M sounds in combination with entire relaxation. But it was concluded by researchers that this approach is controversial as dimension in rest position adjusts itself with respect to occlusal vertical dimension.¹⁵ The patient was placed straight with occlusal plane corresponding to floor. A dotted line was drawn on bottom incisor with teeth centric occlusion and in guidance of top incisor edge. Afterwards, second line was drawn over the other when 'yes', 'S' or 'SISS' was said by patient. Distance between these lines is closing speaking space. The space should be similar at try-in if confirmed phonetically and necessary adjustment should be done for occlusal vertical dimension. Swallowing technique was confirmed by Ismail and George through cephalometric imaging to attain occlusion the vertical dimension prior the teeth extraction and then dentures were placed. The swallowing method gave a rise of 0-5 mm (i.e. 2.8 mm) in the occlusion vertical dimension for edentulous group. Furthermore, it was observed that there was direct relation of the rise and number of missing posterior teeth before teeth extraction.

3. PURPOSE OF THE STUDY

The purpose of current study was to determine the vertical dimension of occlusion by eye-rima oris distance and its relation to measurements of nasal to gnathion and subnasal to menton.

4. METHODOLOGY

4.1: Vertical Dimension Of Occlusion (VDO):

Bottom facial height determined when intercuspation of mandibular and maxillary teeth is maximized.

4.2: Centric Occlusion (CO):

Teeth functional relationship or simple the mandibular occlusal position to attain maximum intercuspation refers to centric occlusion.

4.3: Centric Relation (CR):

The mandibular position such that condyle heads rest on menisci inside glenoid fossa sockets irrespective of jaws opening.

4.4: Eye-Rima Oris (EYE-RO):

Space lying between eye corner and mouth corner.

4.5: Nasion (NA):

Where the top of the nose meets the ridge of the forehead

4.6: Gnathion (GN):

The lowest point of the midline of the lower jaw

4.7: Sub-Nasion(SN):

The point of the angle between the septum of the nose and the upper lip

4.8: Menton (M):

The most inferior point on the chin

4.9: SAMPLE SIZE:

The sample size calculated by epi tools online sample size calculator using the Mean₁=67.05, Variance/SD₁= 4.64 (measurement of Subnasal-menton in female gender) Mean₂=65.45, Variance /SD₂= 4.27 (measurement of Nasal-gnathion in female gender) Confidence interval 95% The sample size calculated was 96. To increase the sample size for generalizing the results 20% sample size is included than the total sample size was considered as 115 (taken as reference by Eye-rimaoris space and its link to the occlusal vertical dimension determined through two techniques)⁸

4.10: STUDY SETTING:

The study was conducted at Department of Prosthodontics, Institute of Dentistry Liaquat University of Medical and Health Sciences, Jamshoro.

4.11: STUDY DESIGN:

Cross-sectional Study was done. The inclusion criteria was Patients of both genders with age between 19-28 year and having intact dentate arches with symmetrical face, harmonious and Class I jaw relation. The exclusion criteria was Patients having missing teeth with any degree of Malocclusion ,with Class II or III jaw relation having previous or current orthodontic treatment.

5. DATA COLLECTION PROCEDURE:

After acquiring synopsis endorsement from institutional ethical review committee, the data was collected. Patients presenting to the Department of Prosthodontics, Institute of Dentistry, LUMHS, Jamshoro were clinically examined and those falling in the inclusion criteria were chosen for this study. A prior written informed consent was sought. A pre-designed Performa was used to document study findings and patient's demographic data; their age and gender.

Each volunteer was asked to sit in a straight position without head support. For establishing centric occlusion, participants were instructed to maintain contact of their teeth with their lips relaxed. Two unlike OVD measurements were performed through various facial landmarks (Gn, N, Me and Sn). Two dots using indelible pen was used to make two dots; one on the nasal tip (N) and the other on the chin tip (Gn), the distance lying between the dots was documented. To record the second measurement, the distance between (Me) and (Sn) was also documented. The parallelism between the nasal septum and the below the chin was achieved by means of a tongue blade and the participants were advised to lightly hold it on the chin inferior border. The outcome variable (eye-RO) was obtained in terms of the distance from the eye outer canthus to the mouth corner. All measurements were determined through a digital caliper (silverline verdier) (accurately measure within ± 0.02 mm/0.001 inch). Measurements were replicated three times by same operator and recorded in study Performa.

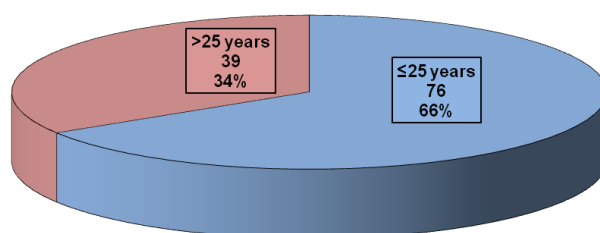
6. DATA ANALYSIS PROCEDURE

Data analysis was performed through statistical package SPSS-version 16. The categorical variables; gender were calculated as frequency and percentage. The continuous variables like age, nasion-gnathion, subnasal-menton and eye-rimaoris were calculated as mean and SD. Correlation coefficient of Pearson was analyzed between the study variables i.e. distances (eye-RO and N-Gn) and (eye-RO and Sn-Me). The p-value was considered as < 0.05 at 95% confidence interval.

7. RESULTS

Total 115 patients of both the gender of age 19-28 years falling into inclusion criteria were examined to determine the vertical dimension of occlusion by eye-rimaoris distance and its relation to measurements of nasal to gnathion and subnasal to menton. Descriptive statistics were calculated through SPSS version 16. Pearson’s formula for correlation was used to find out correlation. Strata were constructed and paired t-test following stratification was applied to observe mean difference. Statistical significance was considered for P value ≤ 0.05 . There were 61.7% males and 38.3% females patients, presented in Table-1. Average age of study participants was 23.56 ± 2.92 years. Summary of descriptive statistics for age is displayed in Table-2. Age-wise two groups were formed. The frequency and percentage of patients among within age groups are displayed in Figure-14. In our study, mean Nasion-gnathion, sub nasal-menton and Eye-rimaoris was 66.36 ± 2.58 , 53.98 ± 3.43 and 64.39 ± 3.66 respectively. The summary of descriptive statistics for Nasion-gnathion, subnasal-menton and Eye-rimaoris are presented. Correlation between Eye-rimaoris and Nasion-gnathion as well as Eye-rimaoris with subnasal-menton was determined through Pearson’s correlation method. Paired t testing was done to see mean difference at 0.05 level. Age-wise and gender-wise stratification was also performed. P-value $\leq 5\%$ significance level was assumed as statistically significant. The results showed weak and direct correlation between Eye-rimaoris and Nasion-gnathion . While positive low positive correlation was found for as Eye-rimaoris with subnasal-menton . Same was done for stratified categories of gender and age. The results demonstrated that there is statistically significant mean difference of Eye-rimaoris with Nasion-gnathion ($p=0.000$) and Eye-rimaoris with sub nasal-menton ($p=0.000$).

FIGURE: AGE-WISE FREQUENCY AND PERCENTAGE (n=115)



TABLE; CORRELATION OF EYE-RIMA ORIS WITH NASION-GNATHION (n=115)

	r	P-Value
Eye-Rima Oris With Nasion-Gnathion	0.089	0.343**

TABLE: CORRELATION OF EYE-RIMA ORIS AND NASION-GNATHION FOR MALE AND FEMALE

	r	P-Value
Male	0.133	0.268**
Female	0.022	0.886**

TABLE: CORRELATION OF EYE-RIMA ORIS AND NASION-GNATHION FOR PATIENT WITH AGE ≤ 25 YEARS AND AGE > 25 YEARS

	r	P-Value
≤ 25 years	0.055	0.637**
> 25 years	0.161	0.329**

TABLE: CORRELATION OF EYE-RIMA ORIS AND SUBNASAL-MENTON

	r	P-Value
Eye-Rima Oris With Subnasal-Menton	0.329	0.000*

TABLE : CORRELATION OF EYE-RIMA ORIS AND SUBNASAL-MENTON FOR MALE AND FEMALE

	r	P-Value
Male	0.326	0.006*
Female	0.334	0.027*

TABLE : MEAN COMPARISON OF EYE-RIMA ORIS WITH NASION-GNATHION

	Mean	SD	P-Value
EYE-RIMA ORIS	64.39	3.66	0.000*
NASION-GNATHION	66.36	2.58	

TABLE ; MEAN COMPARISON OF EYE-RIMA ORIS WITH SUBNASAL-MENTON

	Mean	SD	P-Value
EYE-RIMA ORIS	64.39	3.66	0.000*
SUBNASAL-MENTON	53.98	3.43	

8. DISCUSSION

Recreation of occlusal vertical dimension not merely establishes distance between bottom and top ridges to be taken up by imitated teeth but bring improvement in denture prosthesis function and aesthetic looks. Restoration of this essential element must be in agreement with facial dimension without any distress. Non-existence of pre-extraction history for Dimension of occlusion (VOD) produce vertical height measurements for bottom third of face.⁸As no superlative technique for establishing the unique VOD exists, recommendations have been given for using facial proportions as substitute techniques for predicting the missing VOD.

This study was done to find out the vertical dimension of occlusion by eye-rimaoris distance and its relation to measurements of nasal to gnathion and subnasal to menton. These results are in line with other studies that found that the distance between nasal septum and below the chin was lesser as compared other distances.^{8, 11}In present study, Dimension of occlusion (VOD) determined from nasal tip to chin tip was greater as compared to Dimension of occlusion (VOD) determined from nasal septum to below the chin whereas the space lying between outer eye canthus and mouth corner was greater in comparison to them. Nevertheless, the space lying between (Sn-Me) and (eye-RO) was greater than space between (N-Gn) and eye-Ro.⁸

The findings are consistent with findings of other investigations that reported the distance between nasal septum and below the chin was lower as compared to all other distances.^{8, 11-11}Correlation with statistical significance was found between VOD (N-,Gn, Sn-Me) and eye-Ro and documented in previous literature. The correlation between N-Gn and eye-Ro as compared to Sn-Me and eye-Ro was high in magnitude with high level of significance.⁸Though the findings are consistent with various researchers Nagpal *et al.*,⁹ Delic *et al.*,^{10,11} and Basnet *et al.*,¹¹ but in confliction with Tina-Olaivar *et al.*¹²

in which it was reported that the difference of (N-Gn) from (eye-RO) was 3cm, the conflict possible due to fact that their study was conducted out on Mongoloid participants whereasthe current study included only Caucasians.Differences in distance (between lips parting and outer eye canthus) also (from nasal tipto chin tip) amongfemales and males were observed as significant in previous literature.^{8, 9} Conflicting findings also exist and reported in a study amongfemales and males with

regard to the distance from the nasal septum to below the chin. Most likely clarification for this conflict is topography of soft tissues due to which this kind of finding occurred.

9. Limitations of study

The current investigation was a single centre study and having limited sample size, and performed in merely city environment. Thus, the findings could not be generalized to greater set of populations.

10. CONCLUSION

Our study results showed a weak positive correlation between Eye-rima ORIS and Nasion-gnathion. While positive low positive correlation was found for Eye-rima ORIS with subnasal-menton. Further, there is significant mean difference of Eye-rima ORIS with Nasion-gnathion and Eye-rima ORIS with subnasal-menton.

Our study concluded that Eye-Rima ORIS distance is a consistent method for predicting the occlusal vertical dimension. If the observed distance is to be adopted as a method to predict Vertical Dimension of Occlusion, it should be observed in comparison to the distance between nasal tip and chin tip instead of the distance between nasal septum and below the chin.

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