

USE OF LINGUAL FRENUM IN DETERMINING THE OCCLUSAL VERTICAL DIMENSION

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ABSTRACT

The objective of the present study was to evaluate the use of anterior attachment of lingual frenum as a pre-extraction record to determine the occlusal vertical dimension in the edentulous patients. It was a cross sectional study carried out in six months duration from July 2018 to January 2019.

A total of 30 dentate subjects fulfilling the inclusion criteria were selected from the department of Prosthodontics, Lahore Medical and Dental College, Lahore. Non-probability purposive sampling was used for the selection of the subjects. Informed consent was taken.

Irreversible hydrocolloid impressions were taken, mandibular casts were fabricated with dental stone. Anterior attachment of lingual frenum was marked with a carbon marker. With the help of divider and scale the distance from the anterior attachment of lingual frenum and the mandibular central incisor edge was measured.

The statistical analysis of the data was carried out by using student t test. The statistical results of this study has shown that the difference between the males and the females regarding the distance from the edge of the mandibular central incisor and the anterior attachment of the lingual frenum was insignificant ($p < 0.05$). The distance between the anterior attachment of the lingual frenum and the edge of mandibular central incisor may be used as reliable land mark to determine the occlusal vertical dimension in edentulous patients.

Key Words: Anterior teeth measurements, Complete denture fabrication, Occlusal vertical dimension, Lingual frenum.

INTRODUCTION

Recording occlusal vertical dimension of the edentulous patient is an important step of denture fabrication.^{1,2} The vertical dimension is defined as the amount of separation between maxilla and mandible in frontal plane.³ By another definition the vertical dimension of occlusion is the distance measured between two points when the occluding members are in contact.^{4,5} Accurate recording of vertical dimension is important as it influences the esthetics, phonetics and the other functions of an edentulous patient.⁴

There are various methods documented in the Dental literature for the recording of occlusal vertical dimension.⁶⁻⁸ These methods include swallowing method, Niswonger's method, phonetics, closest speaking space, cephalometric method and many more.⁹

Pre extraction records of an edentulous patient have also been suggested for recording accurate occlusal vertical dimension.¹⁰ All the objectives of fabricating a good denture are difficult to achieve when pre extraction records are not available.¹⁰

In maxillary arch incisive papilla is considered as a stable landmark used to determine the vertical dimension of an edentulous patient as well as the position of the anterior teeth.¹¹ However in case of mandible there is no stable and reliable landmark available for recording occlusal vertical dimension.¹¹ Lingual frenum however can be considered as a stable landmark and can be recorded accurately.¹² Its function is to attach the tongue to the floor of the mouth. Lingual frenum is very prominent that it can easily be recorded during function.¹¹ The anterior attachment of the lingual frenum and its distance from the incisal edge of the mandibular central incisor has been used as a

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pre extraction record for measuring accurate vertical dimension in edentulous patients.^{12,13}

Many studies that had been carried out to in the past, found that the lingual frenum is a stable landmark for recording accurate occlusal vertical dimension.¹⁰⁻¹³

The aim of the present study was to evaluate the reliability of the measurement of the distance between the anterior attachment of the lingual frenum and the incisal edge of the mandibular central incisor in the Pakistani population. If the measurement will be reliable than this method can be used as one of the reliable pre extraction records methods that can be used for recording accurate occlusal vertical dimension of the edentulous patients.

MATERIAL AND METHODS

A total of 30 dentate subjects were selected from the department of Prosthodontics, Lahore Medical and Dental College, Lahore. The study was carried out in 6 months duration from July 2018 till December 2018. Demographic information like age and sex was recorded. The age ranged from 21 to 30 years. The selection of the subjects was on the clinical basis. The individuals with Angle's class I molar and canine relationships, intact incisal teeth edges were included. All those subjects with history of orthodontic treatment, extractions, malalignment, ankyloglossia and attrition of the teeth were excluded from the study. Subjects having any restoration crowns, bridge, fillings present in mandibular anterior segment were also not included in the study. The informed consent was taken from all the subjects for using their data in research.

Three casts were made for every subject by taking 3 separate impressions to avoid error caused by single cast. Irreversible hydro collide impression material was used in stock trays for taking the impressions of lingual frenum in functional form. Impressions were poured in dental stone to fabricate the dental casts respectively.

All the subjects were instructed to raised the tongue and touch the vermilion border of upper lip while taking impression. During impression fabrication impression trays movement was prevented by putting index fingers in first premolar region. Impression material was mixed according to manufacturer's instructions.

Two pencil marks were placed on the casts. Top mark on the mesial edge of mandibular central incisor of the forth quadrant and the bottom mark on the anterior attachment of the lingual frenum. The distance between the two marks was measured using divider. The divider marks were transferred on a carbon paper and the distance was measured using scale. The mean value for the measurements were calculated. Student t test was used to statistically analyzed the data.

The data was entered and analyzed in statistical software (SPSS version 20) a computer based software program. Quantitative variable like distance between anterior attachment of lingual frenum and edge of mandibular central incisor was presented as mean and \pm standard deviation. A qualitative variable like sex was presented as frequency percentages. P-value ≤ 0.05 was considered for significance.

RESULTS

A total of 30 dentate subjects 15 males and 15 females were included in this study to evaluate the use of anterior attachment of lingual frenum as a pre-extraction record to determine the occlusal vertical dimension in edentulous patients. The mean age of the females was 25.53 and males subjects was 25.67 years. Mean and standard deviation were obtained using descriptive statistics tool by mean of SPSS software version 20.

The mean SD of the distance between anterior attachment of lingual frenum and mandibular central incisal edge among 30 subjects was 13.88mm. Mean SD ± 1.22 .

In males it is 13.66 mm with mean SD ± 1.322 , however in females 14.11mm mean SD 1.123 respectively (Table 1). Gender has no effect on the measurement of the distance. The mean of three casts was calculated and student t test was employed for statistical analysis. The difference between the 3 cast readings were statistically insignificant (Table 1). The anterior attachment of lingual frenum was relatively stable during function.

DISCUSSION

Accurate registration of occlusal vertical dimension is very important for the fabrication of complete denture.¹ Increased or decreased vertical can result in aesthetic problems, speech difficulties, muscular discomfort and temporomandibular joints problems.¹⁴ Many techniques of recording occlusal vertical dimension has been documented in dental literature but unfortunately none is accurate.¹⁵⁻²²

The present study was carried out on the relatively stable landmarks to the find out an accurate method of recording occlusal vertical dimension in edentulous subjects.

In the present study we selected 30 dentate subjects 15 males and 15 females, age ranged 21 to 30 years. Rahman HA¹⁰ and co workers carried out a similar study to evaluate relationship of occlusal vertical dimension with the anterior attachment of the lingual frenum and its distance from mandibular central incisor. The same study was carried out by B.k Parmimala¹¹ and D.R Prithviraj in April 2011, in which they studied the mandibular central incisor relation to the lingual

TABLE 1: MEAN AND SD OF THE DISTANCE FROM THE ANTERIOR ATTACHMENT OF LINGUAL FRENUM TO MANDIBULAR CENTRAL INCISOR RELATED TO THREE CAST READINGS

Male	N	Minimum	Maximum	Mean	Std. Deviation
Cast	15	12	16	14.20	1.265
cast2	15	11	16	14.00	1.195
cast3	15	12	16	14.13	1.246
Valid N (listwise)	15				
Female					
Cast	15	11	16	13.40	1.549
cast2	15	11	16	13.67	1.543
cast3	15	11	15	13.93	1.163
Valid N (listwise)	15				

MEAN AND SD OF THE DISTANCE FROM THE ANTERIOR ATTACHMENT OF LINGUAL FRENUM TO MANDIBULAR CENTRAL INCISOR RELATED TO GENDER.

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Mean cast	Male	15	13.6660	1.32240	.34144
	Female	15	14.1113	1.12351	.29009

frenum in the natural dentition. Similarly Krishna Raj and coworkers¹⁸ carried out a similar study in India and used the measurement to establish the mandibular occlusal plan. The age ranged in their study was 21 to 28 yrs and was carried out on 100 dentate subjects. Another similar study was carried out by Bissasu¹² in Syrian population on nine males and nine females.

In the present study the irreversible hydrocolloid impressions were used to fabricate casts and functional form of the lingual frenum was recorded as was recorded by Hanan A Rahman et al¹⁰, BK Parimala¹¹, Krishna Raj¹⁸ and Bissasu¹² in their respective studies. The results of the present study showed that the SD± of the distance between the anterior attachment of the lingual frenum and the mandibular central incisor among 30 subjects was 13.88mm, mean ±SD 0.22. However Bissasu¹² found this distance 10.9mm in Iraqi females.

In Indian population, Parimala and Prithviraj¹¹ carried out a similar study on 100 subjects. They found mean vertical distance between anterior superior most point on the lingual frenum and the mandibular central incisor about 12.3 mm. They further recommended that this average vertical distance of 12.3 mm can be used to established mandibular occlusal plan in completely edentulous patients, if other pre extractions records are not available. Similarly Balasubramanian R¹⁸ et al found Mean and SD± about 14.50± 2.2245.

In the present study the distance between the anterior attachment of the lingual frenum and the mandibular central incisor in male was 13.66mm Mean SD± 1.322, however in female it was 14.11 mm

Mean± SD1,1235 respectively. The distance between male and female was statically insignificant. Parimala BK and Prithviraj D R¹¹ just like present study, also found insignificant distance among dentulous subjects with respect to age and gender. Similarly insignificant difference was reported by Rahman HA¹⁰ and coworkers with respect to gender. Swarti Gupta¹³ et al found this distance in male ranged from 7.3 to 8.9 mm, mean SD±8.290±.36 while in female 7.1 to 9.00 mm with mean SD±8.21±0.38 mm. They found out 10.7mm in male and 10.9 mm in female respectively. However Rahman¹⁰ found this distance about 10.9 mm in females and 10.7mm in males.

The present study indicated that the distance between the anterior attachment of the lingual frenum and the mandibular central incisor can be used as reliable landmark when frenum is recorded during function. This distance can be used as pre extraction dentulous casts as record for determining the accurate vertical dimension. The result of the present study strongly correlates with the previous studies of Bissasu¹², Rahman¹⁰, Parimala BK¹¹ Prithviraj¹¹ and Balasubramanian R¹⁸ et al.

CONCLUSION

From the results of this study, the following conclusions were drawn:

- 1 This study showed that the distance between the anterior attachment of the lingual frenum and the mandibular central incisor edge can be used on pre extraction diagnostic casts as a pre extraction

record for determining the occlusal vertical relation record.

- 2 The measurement of the distance between the anterior attachment of lingual frenum and the mandibular central incisor is reliable, when frenum is recorded during function.
- 3 The position of the anterior attachment of the lingual frenum is a relatively stable landmark.

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| 2 Gotam Das: | Literature Search. |
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| 4 Amir Ghafoor: | Data Collection/methodology. |
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