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Relationship of fovea palatine to anterior vibrating line as a reliable guide in determining the posterior limit of maxillary denture.

Dental Science

KEYWORDS: Fovea palatinae, Anterior vibrating line, Posterior palatal seal, Valsalva Maneuver, Palpatory method

Rimsha Ahmed — Post Graduate Student, Department of Prosthodontics and Crown & Bridge Kothiwal dental college and research center, Moradabad, India

Rachna Maheshwari — Reader, Department of Prosthodontics and Crown & Bridge Kothiwal dental college and research center, Moradabad, India

Swatantra Agarwal — Professor and Head of Department Department of Prosthodontics and Crown & Bridge Kothiwal dental college and research center, Moradabad, India

Tanushree Negi — Post Graduate Student Department of Prosthodontics and Crown & Bridge Kothiwal dental college and research center, Moradabad, India

ABSTRACT

The role of Posterior Palatal Seal area in retention of maxillary denture is well established. There is a lot of variation in results of studies when it comes to relating the anatomic landmarks like Fovea Palatine to the posterior extent of the maxillary denture. This study was carried out with the aim of reaching to a concrete conclusion whether fovea palatinae can be used as a reliable guide in determining the posterior limit of maxilllary denture or not. Anterior vibrating line was marked with indelible pencil using two different methods. Relationship between anterior vibrating line and fovea palatinae was analysed with a metal calliper and metallic scale. There was a mean distance of 1.041 mm and 0.5mm between Anterior Vibrating Line and fovea palatinae when palpatory method and valsalva maneuver were used respectively. Using paired t test it was concluded that there is statistically significant difference between the lines marked by these two methods.

1. INTRODUCTION

Edentulism is a debilitating disease and an irreversible condition described as the ULTIMATE MARKER OF THE DISEASE BURDEN FOR ORAL HEALTH[1]. Although a lot of newer options are available to rehabilitate the loss of teeth, complete denture therapy still remains the treatment of choice. Complete dentures can restore function, improve esthetics and enhance self esteem2. The role of posterior palatal seal in the retention of the maxillary complete denture is well established as it contributes significantly to the retention of the maxillary complete denture. Correctly incorporated Posterior Palatal Seal into the prosthesis also helps in reduction of gag reflex, reduces food accumulation beneath the posterior aspect of the denture as well as patients' discomfort when contact occurs between the dorsum of the tongue and the posterior end of the denture and the thickened area provides added strength across the denture.

Locating the posterior palatal seal area after thorough understanding of the anatomic and physiologic boundaries of this dynamic region greatly enhances the border seal. Anatomic landmarks like fovea palatine can play an important role in determining the posterior extent of the denture.

According to Nagle and Sears, the foveae mark the posterior limit of the hard palate; while Swenson concluded that the vibrating line passes about 2 mm in front of the fovea palatine3. Silverman expressed the view that the posterior palatal seal could be extended further back (dorsally) than the Vibrating line by about 8.2 mm to substantially aid in the retention and stability of the upper denture. 4 However, reliability of fovea palatini still remains a point of debate and needs to be studied extensively further to arrive at more substantial outcomes. This study was conducted to relate to location of anterior vibrating line to fovea palatine so that its reliability as a landmark in determining the posterior extent of the denture can be established. Therefore, before embarking on the study, a null hypothesis was formulated that the anterior vibrating line lies anterior to fovea palatinae and maxillary posterior denture border should extend till fovea.

OBJECTIVES

[1] To evaluate the correlation between fovea palatinae and anterior vibrating line.

[2] To analyse the difference in the distance between fovea and anterior vibrating line measured by two different methods i.e Valsalva Maneuver and Palpatory method.

2. MATERIALS & METHOD

Before commencing the study, an approval from Institutional Ethics and Review Board (IERB) of Kothiwal Dental College and research centre, Moradabad, India was obtained. All the patients dentulous as well as edentulous were included in the study except the patients with large palatal torus hampering the visbility. One hundred thirty six subjects were screened.

The palate of each subject was examined for:
(1) Visibility in the posterior part of the palate
(2) Number and location of the fovea palatine

Of 136 subjects fovea was not visible in 14 patients. The clinical study was conducted on a total of 100 subjects selected randomly after obtaining an informed consent.

Posterior Palatal Seal area was dried with guaze of 2*2 inches. After ascertaining the location of Anterior Vibrating line with two different methods, it was marked using an indelible pencil3. The two methods used were:

- Valsalva Maneuver
- Plapatory method

When Valsalva Maneuver was used, the subject's nose was pinched and asked to attempt to blow air through the nose which accentuated the fovea palatini and the vibrating line was marked3. After the vibrating line was marked, the nose-blowing action was repeated to verify the accuracy of the markings. The distance between it and the fovea palatine was measured using a metal calliper.

Also, anterior vibrating line was marked using palpatory method using a mouth mirror to differentiate between hard and soft palate. The distance between vibrating line and fovea was again marked and measured.

The measurements made by the compass were then compared directly to the calibrations on a stainless steel metric rule and were recorded in millimetres.

Fig 1

Fig 2

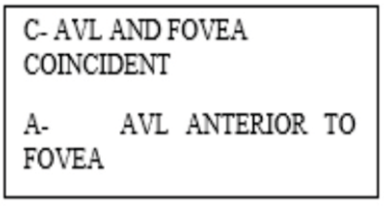
Fig 3

3. RESULTS

Anterior Vibrating line was marked using both the methods. Using Valsalva maneuver, it was found that Anterior vibrating line coincided with fovea in 53% subjects while in about 27% cases it was anterior to Fovea palatinae. In about 20% of cases Anterior vibrating line was behind the fovea palatinae.

When palpatory method was used Anterior vibrating line coincided with fovea in 35% subjects while in about 12% cases it was anterior to Fovea palatinae. In about 53% of cases Anterior vibrating line was behind the fovea palatinae.

METHOD	AVL AND FOVEA COINCIDENT	AVL ANTERIOR TO FOVEA	AVL POSTERIOR TO FOVEA
VALSALVA MANEUVER	53	27	20
PALPATORY	35	12	53

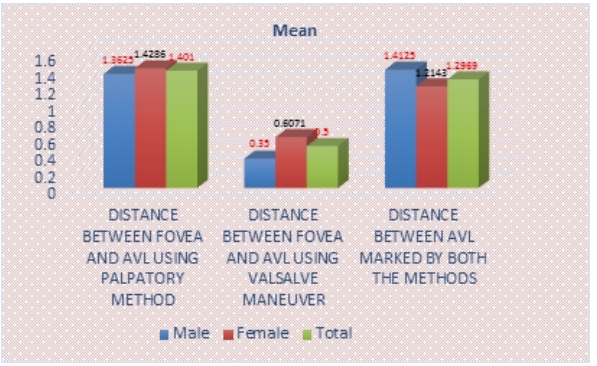


Using Valsalva Maneuver, C>A>P

Using Palpatory method, P>C>A

The mean distance between AVL and fovea palatinae using palpatory method and valsalva maneuver was 1.041 mm and 0.5mm respectively.

	Mean	N	Std. Deviation	Mean Difference	t-value	p-value
DISTANCE BETWEEN FOVEA AND AVL USING PALPATORY METHOD	1.401	100	2.12828	0.901	3.97	<0.001
DISTANCE BETWEEN FOVEA AND AVL USING VALSALVA MANEUVER	0.5	100	1.59109			



When a comparison of distances between both the methods was done, it was found that a statistically significant difference was found when AVL was recorded using these two methods.

4. DISCUSSION

For adequate retention of the maxillary complete denture an adequate seal must be obtained along the anterior and posterior borders. The seal must be situated in the region of compressible tissue just distal to the hard palate in case of posterior border, but it must be anterior to the posterior vibrating line from which visible movement of soft palate takes place, and this is of great importance [6].

In the Glossary of Prosthodontic Terms, the vibrating line is defined as an imaginary line at the posterior part of the palate marking the division between the movable and immovable tissues of the soft palate [7]. Zarb et al also described the vibrating line as an imaginary line that appears as an area of soft palatal tissue when the patient begins to verbalize an 'ah' sound and stated that this line must not be confused with the junction between the hard and soft palate 2. Silverman proposed two vibrating lines [4]. He described the posterior palatal seal (PPS) as the tissue zone between the anterior flexion and posterior flexion lines; the former could be marked as the patient vocalized the sound 'ah' with abrupt vigorous bursts, and the latter could be identified in a brief burst of soft speech.

Although a lot of publications since 1920 have described or evaluated techniques relating to the location of the posterior border of the maxillary denture, most of these articles discussed the displacement of the soft tissues as the critical factor in the posterior palatal seal technique, while only a few articles discussed the anatomic relationship between the fovea palatini and the posterior border of the maxillary denture.

According to the results of the current study, the null hypothesis was rejected and the study concluded that the anterior vibrating line lies about 0.5 mm to 1.4 mm posterior to fovea palatinae.

The results of this study showed that anterior vibrating line is located behind fovea palatini which is in accordance with the studies conducted by Lye[6]. After clinically, histologically and radiologically analysing the relation of fovea and anterior vibrating line he concluded that fovea lies anterior to anterior vibrating line. According to Chen[5] the fovea palatini lies behind the anterior vibrating line. When present, the fovea palatini of 25% of the subjects lies directly on the vibrating line. In 7% of the subjects the fovea palatini were located within 1 to 2 mm posterior to the vibrating line, in 18.8% between 2 to 3 mm, in 27.1% between 3 to 4 mm, in 16% between 4 to 5 mm, in 4.9% between 5 to 6 mm and in 1.4% more than 6 mm posterior to the vibrating line. According to Boucher, vibrating line is located slightly anterior to fovea palatini. It may lie on or slightly behind fovea. Variation in difference between the distances obtained may be attributed to two factors. 1) Different methods are used to identify vibrating lines. 2) Marking the vibrating lines precisely is difficult.

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Anterior Vibrating Line is an imaginary line that is more akin to an area than a clear line, the measurement can vary depending on the area of the vibrating line selected as the standard for measuring the distance to the foveae palatinae. The average distance between the foveae palatinae and the anterior vibrating line marked using palpatory method and valsava maneuver was about 1.4 mm and 0.5mm respectively.

This indicates that anterior vibrating line lies beyond fovea palatini and it may serve as point of reference for establishing the posterior boundaries of dentures when the vibrating lines are not clearly visible.

4. CONCLUSION:

- Using Valsalva maneuver, it was found that Anterior vibrating line coincided with fovea in 53% subjects while in about 27% cases it was anterior to Fovea palatinae. In about 20% of cases Anterior vibrating line was behind the fovea palatinae.

- When palpatory method was used Anterior vibrating line coincided with fovea in 35% subjects while in about 12% cases it was anterior to Fovea. In about 53% of cases Anterior vibrating line was behind the fovea palatinae.

- There is statistically significant difference between distances measured by both the methods.

- The results of the study indicate that fovea palatini should only be used as a guideline to the placement of posterior palatal seal.

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