



UPPER COMPLETE DENTURE; LOCATION OF VIBRATING LINE WITH REFERENCE TO FOVEA PALATINAE IN DETERMINING POSTERIOR BORDER

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ABSTRACT... Objectives: Retention of maxillary denture is obtained by many factors including physical and physiological factors. Effective seal is obtained easily at buccal and labial borders of maxillary. However, it is difficult to obtain peripheral seal at posterior border of upper denture as there is no soft tissue draping. Fovea palatinae which has been considered as reliable anatomical guide in unmutated mouth. Fovea palatinae are close to vibrating line and are in soft tissue making them useful as reference points for posterior limit of the denture. Our aim to identify the relative position of vibrating line with reference to the fovea palatinae for determining posterior border of the upper complete denture. **Setting:** Department of Prosthodontics, Lahore Medical and Dental College, Lahore. **Method:** 160 subjects were included in this study. The patients fulfilling the inclusion criteria, Fovea palatinae was located and marked with the indelible pencil in the soft palate. Subjects were instructed to rehearse the "ah" sound in normal, unexaggerated way. Location of the vibrating line was marked with same indelible pencil. The position of the vibrating line whether in front, at or behind the fovea palatinae was noted. **Results:** Our study results shows in 72(45%) subjects vibrating line lies in front, 81(50.6%) subjects it lies at and 7(4.4%) subjects lies behind the fovea palatinae. **Conclusion:** Seal must be situated just anterior to the vibrating line and distal to hard palate at compressible tissue of soft palate.

Key words: Fovea Palatinae, Vibrating Line, Posterior Palatal Seal or Postdam.

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INTRODUCTION

Human teeth play a crucial part in maintenance of an affirmative personality. Dentures are artificial means of replacement of teeth loss along with associated tissues.¹ These must be in harmony with normal neuromuscular functions.² Oral functions such as speech, mastication, swallowing, and laughing involve the synergistic actions of tongue, lips, cheeks and floor of the mouth. These functions are very complex and highly individual.^{2,3} Dentures must have three inherent qualities to meet these challenges; these are retention, stability and support.² Therefore dentures are fabricated by considering various biological, physical, physiological, surgical, mechanical and psychological factors to achieve these qualities.³

Dentures will be retentive and stable if borders

of the denture flange are limited to functional sulcus depth which is governed by physiological movements of surrounding tissues.^{4,5} Support of the denture will increase if the denture base is extended to the physiological limits.^{5,6} Beyond these physiological limits, borders of denture will encroach surrounding tissues attachment.⁵ This will cause instability of denture and eventually loss of retention.⁷

A harmonious contact of denture borders with surrounding tissues creates a seal known as peripheral seal.⁹ Effective peripheral seal is obtained easily at facial borders of the maxillary dentures.⁸ Seal at posterior border of maxillary denture is termed as posterior palatal seal.⁹ If posterior palatal seal is deficient either in length or depth than maxillary denture may suffer lack of retention.⁸ Besides denture qualities, posterior

palatal seal serves as barrier and prevents food accumulation beneath the denture.^{10,15} It maintains contact with the moving soft palate, reduces the patient awareness and thus reduces the gag reflex. It compensates for the curing shrinkage of acrylic denture base. It also reduces tongue irritation.^{10,11,22}

Past studies suggested anatomic relation between vibrating line and fovea palatinae in determining the posterior limit of the denture.¹⁷ According to glossary of Prosthodontic terms Vibrating line is defined as “ an imaginary area rather than line at the junction of immovable and movable tissue across the posterior part of the palate.^{12,19} Two vibrating lines are also proposed and the area between these two lines is termed as posterior palatal seal area.¹³ Fovea palatinae are the two anatomical small pits or depressions in the posterior aspect of the palate, one on each side of the midline, at or near the attachment of the soft palate to the hard palate.¹⁶

Studies conducted by Alousi, Iye, Fenn, Boucher and kim suggested fovea palatinae as reliable anatomical landmark in locating vibrating line.^{11,13} While some studies such as study conducted by Ming-sheh suggested it as unreliable anatomical landmark.¹⁷ Alousi reported 44.5% patients had vibrating line located in front and 50.9% patients had vibrating located at the fovea palatinae.^{1,21} Ming-sheh reported 25% patient had vibrating line located at fovea palatinae and 75% patient had vibrating line located posterior to fovea palatinae.^{17,25}

MATERIAL AND METHODS

Sample size of 160 cases is calculated with 95% confidence level with 08% margin of error and taking expected percentage of vibrating line i.e. 49.1% behind the fovea palatine.

Edentulous patients were selected from the department of Prosthodontics, Lahore medical and dental college, Lahore. Informed consent was taken.

After completion of history and examination from the patients fulfilling the inclusion criteria, subject

was instructed properly to open his or her mouth. Palatal area was dried with 2×2 cm gauze pack. Indelible pencil was sharpened in order to mark vibrating line precisely. Fovea palatinae was located and marked with the indelible pencil. Subjects were instructed to rehearse the “ah” sound in normal, unexaggerated way. In each patient location of the vibrating line were marked with same indelible pencil. The position of the vibrating line whether in front, at or behind the fovea palatinae was noted.

Data is analyzed by using SPSS version 17, a computer based software program. Qualitative variables [i.e. gender and location of the vibrating line with reference to foveae palatinae are presented as frequency percentage. Quantitative variables like age are presented as mean ± standard deviation. Data is stratified for age and gender. Chi-square test is used. Post-stratification with p-value ≤ 0.05 considered as significant.

RESULTS

The study was carried out over a period of six months from Aug 5, 2014 to Feb 5, 2015. One hundred and sixty complete edentulous patients were included. There were 56 patients (35%) in age group 35-50 years, 78 patients (48.8%) in age group 51-64 years and 26 patients (16.3%) in age group 66-80 years. The mean±SD age was 56.79±8.96 years (Table-I).

Age (years)	No.	%
35 – 50	56	35.0
51 – 65	78	48.8
66 -80	26	16.3
Mean±SD	56.79±8.96	

Table-I. Frequency and percentage of the patients according to age (n = 160)

There were 69 (43.1%) males and 91 (56.9%) females respectively. Male to female ratio was 1:1.3 (Table-II).

Gender	No.	%
Male	69	43.1
Female	91	56.9
Male to female ratio	1:1.3	

Table-II. Frequency and percentage of the patients according to genders (n = 160)

Vibrating line lies in front in 72 patients (45%), in 81 patients (50.6%) lies at and in 7 patients (4.4%) it lies behind the fovea palatinae (Table-III).

Vibrating line	No.	%
Infront	72	45.0
At	81	50.6
Behind	7	4.4

Table-III. Frequency and percentage of the patients according to vibrating line to fovea palatinae (n = 160)

When the data was stratified according to age and gender, statistically the difference between age and gender with vibrating to fovea palatinae are not significant (Tables-IV&V).

Age (years)	Infront	At	Behind
35 – 50	25	31	-
51 – 65	35	38	5
66 – 80	12	12	2

Table-IV. Stratification of vibrating line according to age

$$\chi^2 = 4.25$$

$$df = 4$$

$$P = 0.372$$

Gender	In front	At	Behind
Male	27	38	4
Female	45	43	3

Table-V. Stratification of vibrating line according to gender

$$\chi^2 = 1.96$$

$$df = 2$$

$$P = 0.375$$

DISCUSSION

Fovea palatinae is very important landmark for location of vibrating line. Previous studies discussed the anatomical relationship between the fovea palatinae and limit of posterior border of the maxillary denture.²³ Many studies in the literature considered fovea palatinae as reliable anatomical landmarks in determining posterior limit of maxillary denture by locating vibrating line.²⁴ While few considers it as unreliable reference points.²⁰

In current study results reveal that vibrating line lies in front, at and behind the fovea palatinae in 72(45%), 81(50.6%) and 7(4.4%) subjects respectively. Similar results were obtained in another study conducted, at prosthetic department in the college of dentistry, Baghdad University; by Alousi.¹ In this study location of vibrating line was reported 44.5% in front, 50.9% at and 6.4% behind in relation to fovea palatinae.¹

These results were in agreement with results of study conducted by Iye¹⁴, according to this fovea palatinae were located on the average 1.31mm (mean of 100 subjects) anterior to the vibrating line.¹⁴ In his study the foveae palatinae were located by both Radiographically and histologically in soft tissue covering of the hard palate in all specimens.¹⁴ This makes the fovea palatinae reliable landmarks in determining vibrating line.^{14,18}

Another study carried out by kyung, kim and jung in yonsei university.⁷ Results of their study suggest that fovea palatinae could be reliable landmarks or reference points in locating vibrating line and posterior limit of the maxillary denture. Their study also suggested a wider posterior palatal seal area in patients having gentle palatal contour at the junction of hard and soft palate.⁷

However in contrary to the results of our finding, Ming-sheh reported 25% patient had vibrating line laying directly on the foveae palatinae.² 75% had vibrating line located posterior to fovea palatinae where as in our study in only 4.4% subjects it lies posterior to the fovea palatinae.² In addition, because the vibrating line is imaginary line that is more akin to an area than a clear line.² So the Location can vary depending on the area of vibrating line selected as the standard with reference to fovea palatinae.^{1,2,3}

Ming-Sheh in his study concluded that the fovea palatinae are unreliable anatomical landmarks for determining centre portion of posterior border of maxillary denture.² while in our study the results shows that fovea palatinae may be considered as reliable guides. These results are similar to the results of study of Alousi, Iye, fenn and boucher.^{1,2,3}

CONCLUSION

- There should be adequate posterior palatal seal along with posterior border of maxillary complete denture in order to obtain good retention.
- Seal must be situated just anterior to the vibrating line and distal to hard palate at compressible tissue of soft palate.
- Fovea palatinae are reliable anatomical landmarks to locate posterior vibrating line and to determine posterior limit of complete denture.
- Fovea palatinae are very close to vibrating line and are always in soft tissues. This makes them an ideal guide in unmutated mouth for location of vibrating line and determining the posterior limit of the denture.

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REFERENCES

1. Alousi Y. **Reliability of fovea palatinae in determining the posterior palatal seal.** J Bagh Dent. 2009; 21:41-45.
2. Fernandes VA, Chitre V, Aras M. **A study to determine whether the anterior and posterior vibrating lines can be distinguished as two separate lines of flexion by unbiased observers.** Ind J Dent Res. 2008; 19:335-39.
3. Iwanaga J, Kido J, Lipski M, Tomaszewska IM, Tomaszewski KA, Walocha JA, Oskouian RJ, Tubbs RS. **Anatomical study of the palatine aponeurosis: application to posterior palatal seal of the complete maxillary denture.** Surg Radiol Anat 2017; Aug 19.
4. Parithimarkalaignan S. **The post dam: a review.** Ind J Dent 2012; in press.
5. Maller SV, Karthik KS. **A review on posterior palatal seal.** J Indian Acad Dent Sp 2010; 1: 16-21.
6. Bindhoo YA, Thirumurthy VR, Jacob SJ, Anjanakurien, Limson KS. **Posterior palatal sea: a literature review.** Int J Prosthodont 2011; 1:108-14.
7. Pasam N, Hallikerimath RB, Arora A, Gilra S. **Effect of different curing temperatures on the distortion at the posterior peripheral seal: an in vitro study.** Indian J Dent Res 2012; 23:301-4.
8. Kim Y, Michalakakis KX, Hirayama H. **Effect of relining method on dimensional accuracy of posterior palatal seal.** An in vitro study. J Prosthodont 2008; 17:211-8.
9. Oh WS, Saglik B. **Modified record base featuring post palatal seal using silicone bite registration material.** J Prosthodont 2011; 20:491-3.
10. Chen MS. **Reliability of the fovea palatini for determining the posterior border of the maxillary denture.** J Prosth Dent. 1980; 43:133-37.
11. Douglass C, Shih A, Ostry L. **Will there be a need for complete dentures in the United States in 2020?** J Prosth Dent. 2002; 87:5-8.
12. Zarb GA, Bolender CL. **Prosthodontic Treatment for Edentulous Patients.** 12th ed. St. Louis: Mosby; 2004.
13. Alfadda SA, Al Amri MD, Al-Ohali A, Al-Hakami A, Al-Madhi N. **Two-Implant-Supported Mandibular Overdentures: Do Clinical Denture Quality and Inter-Implant Distance Affect Patient Satisfaction?** Int J Prosthodont. 2017; 30(6):519–25.
14. Krysinski ZJ, Prylinski M. **Carving of a master caste to obtain a posterior palatal seal of a complete maxillary denture as performed by four prosthodontics.** J Oral Sc. 2007; 49:129-32.
15. Fenn HRB, Liddelov KP, Gimson's AP. **Clinical Dental Prosthetics 6th edit.** London: Unicorn Press; 2012.
16. Lye TL. **The significance of fovea palatinae in complete denture prosthodontics.** J Prosth Dent. 1975; 33:504-10.
17. Singhal MK. **An excellence towards perfectness in the complete denture prosthesis a clinical approach.** Ind J of Dent Sci. 2010; 2:1-3.
18. Salloum AM. **Evaluation of the conventional method for establishing the posterior palatal seal.** KSU J Dent sci. 2012; 3:61-67.
19. Thalji G, McGraw K, Cooper LF. **Maxillary Complete Denture Outcomes: A Systematic Review of Patient-Based Outcomes.** Int J Oral Maxillofac Implants 2016; 31 Suppl:s169-81.
20. Tandan A, Gupta NK, Dwivedi R, Gupta M. **Simple visual technique for location of anterior vibrating line.** Ind J Pub Health Dev. 2012; 3:1-3.
21. You M, Li X, Wang H, Zhang J, Wu H, Liu Y, et al. **Morphological variety of the soft palate in normal individuals: A digital cephalometric study.** Dent Max Fac Rad. 2008; 37:344-9.
22. Darvel BW, Clark RKF. **The physical mechanism of complete denture retention.** Br Dent J. 2000; 189:248-52.
23. Goiato MC, Filho HG, Santos DM, Barao VAR, Junior

- ACF. **Insertation and follow up of complete denture: A literature review.** Gerd Soc J W S. 2010; 00:1-8.
24. Mojon P, Thomason JM, Walls AW: **The impact of falling rates of edentulism.** Int J Prosth. 2004; 17:434-40.
25. Bhushan P, Aras MA, Chitre V, Mysore AR, Mascarenhas K, Kumar S. **The Hollow Maxillary Complete Denture: A Simple, Precise, Single-Flask Technique Using a Caramel Spacer.** J Prosthodont 2017; Apr 6.

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*A river cuts through rock,
not because of its power,
but because of its persistence.*

– Jim Watkins –

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Shabbir Ahmed	Data collection	
2	Gotam Das	Manuscript writing	
3	M. Haseeb Rana	Proof reading	
4	Reehana	Literature search	