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Can Fovea Palatinae Be Used to Determine Posterior Border of Maxillary Complete Denture? – An Invivo Study (Research Article)

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KEYWORDS
Types of Soft Palate, Hard Palate, Posterior Vibrating Line, Fovea Palatinae.

ABSTRACT:

INTRODUCTION**:** - For proper success of maxillary complete denture, proper retention is necessary. It is largely dependent upon proper posterior extension of the denture base and incorporation of properly made post-dam.

To locate posterior border and position of post-dam, we are to identify anatomical landmarks which can be displaced safely to some extent within physiological limit.

AIM: - Frequently, fovea palatinae is used to determine the posterior border of the denture. But the position of the fovea palatinae varies from races to races and from one individual to another.

So the aim of the study is to identify the relationship between fovea palatinae and posterior vibrating line in Bengali Population. This will help in making post-dam arbitrarily on the master cast also.

MATERIALS AND METHODS: - 120 edentulous patients having maxillary complete denture were selected. The fovea palatinae and posterior vibrating line were marked with indelible pencil and the distance between them were measured with a divider and Vernier Caliper. Then the results were assessed and analyzed statistically.

RESULTS: - The fovea palatinae is placed anterior to the posterior vibrating line in all the cases. But the distance between them varies accordingly to the type of soft palate. In Class I cases the distance is 4-5mm. In Class II cases it varies from 1.5-3.5 mm which is the commonest type of palate. In Class III type the distance is minimum which varies from 0.5-1.5mm.

CONCLUSION: - Placing posterior border of the upper complete denture on the fovea palatinae is not accurate in most of the cases. Only for Class III type of soft palate, we can make post-dam close to fovea palatinae. For other classes, post–dam should be placed more posterior to the fovea palatinae.

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1. INTRODUCTION

To achieve retention in upper complete denture, border seal plays important role. Border seal is achieved easily in the labial and buccal sulcus by the limiting structures, lips and cheeks. In the posterior region, there is no such limiting structure. So the border seal is hampered when soft palate moves up and down during speech and deglutition[2]. According to Hardy and Kapur[3], adhesion, cohesion and interfacial surface tension can resist only perpendicular force but horizontal forces can be restricted only by adequate border seal.

According to the "Glossary of Prosthodontic Terms 9th edition posterior palatal seal area: the soft tissue area limited posteriorly by the distal demarcation of the movable and non-movable tissues of the soft palate and anteriorly by the junction of the hard and soft palates on which pressure, within physiologic limits, can be placed; this seal can be applied by a removable complete denture to aid in its retention."[4]

Other functions of the posterior palatal seal are:-

i. Reduce gag reflex.
ii. Reduce food accumulation under denture base.
iii. Reduce patient discomfort.
iv. Compensate volumetric shrinkage of polymerization.

The posterior palatal seal is divided into two areas:-

i. Post Palatal Seal
ii. Pterygomaxillary seal

Proper placement of both the parts will help in proper retention of upper complete denture.

For proper placement of post-dam, identification of vibrating lines is necessary. It is generally accepted that the maxillary denture should terminate posteriorly at the vibrating line.

There are two concepts:-

i. One vibrating line concept
ii. Two vibrating line concept.

According to Zarb Bolender[6], the distal border of the maxillary denture should be extended at least to vibrating line and in most instances, it should end 1-2mm posterior to the vibrating line. Rashedi et al[7] says that 95% American dental schools believe in one vibrating line concept.

However Winkler[2] proposed 'two vibrating line concept' which is followed in India mostly. He proposed that there are two vibrating lines, anterior and posterior. The post dam should be placed in between these anterior and posterior vibrating lines.

The anterior vibrating line is an imaginary line located at the junction of the attached tissues overlying the hard palate and the movable tissues of the immediately adjacent soft palate.

The posterior vibrating line is an imaginary line at the junction of the aponeurosis of the tenser veli palatini muscle and the muscular portion of the soft palate.

The fovea palatini are clinically visible pits in the palate which are the ductal openings of the clusters of minor salivary glands. They may not be constantly present and sometimes it can't be identified clinically. Sometimes a single pit can be seen.

There are several established techniques for the placement of palatal seal i.e.

i. Conventional approach.
ii. Fluid wax technique.
iii. Arbitrary scraping of the master cast.

But there are many variations of these recognised methods. The conventional approach is dependent upon the assessment of the operator which can vary from one person to another. In fluid wax technique, handling of the material is difficult and this method is technique sensitive. So position of the post-dam will vary for different operators.

In this situation, we can take help of some anatomical landmarks such as fovea palatinae and hamular notches for identification of the posterior border of the maxillary complete denture [8,9]. It is easier and commonly practised method.

According to Chenn MS[10] there are great variations regarding the position of fovea palatinae in relation to vibrating lines. The position varies in different class of soft palate[11] i.e. Class I, Class II and Class III.

More than 52 publications are there which evaluated techniques for determining posterior border of the maxillary complete denture[12]. But no such study on Bengali population is available. Shourie et al in 1961 have reported that soft tissue profile and soft tissue

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landmark can vary from one race to another in most instances the above mentioned techniques can't be applied strictly to all patients.

2. OBJECTIVES

In this study we will try to relate the location of fovea palatinae to posterior vibrating line in all the three classes of soft palate so that it can be used to locate the posterior vibrating line as well as posterior limit of the maxillary denture in Bengali population.

3. METHODS

This study was conducted only on the Bengali patients who attended the Department of Prosthodontics of Dr. R Ahmed Dental College & Hospital, Kolkata. 120 old denture wearers were selected out of which 68 were male and 52 were female, they attended OPD for post-insertion complication. Informed consent was taken from all the patients.

Each patient was seated on the Dental chair in upright position with head erect and the light was focused so that the palatal part was clearly visible when the patient opens his/her mouth widely.

First we identified the type of soft palate (class I, class II, class III) according to Lye Ti. Then we marked fovea palatinae with an indelible pencil (Fig 1). Then the patient is asked to say "ah" in short bursts in an unexaggerated fashion to identify the posterior vibrating line. This line was again marked with indelible pencil. Now the distance between posterior vibrating line and fovea palatinae was measured with a divider and a Vernier Calliper.

Now we assessed the old denture whether the posterior border was placed properly in relation to the vibrating line or not.

The recorded data were tabulated and analysed statistically to obtain correlation.

Figure 1

4. RESULTS

In this study out of 120 complete denture wearers 68 were male and 52 were female. (Table 1)

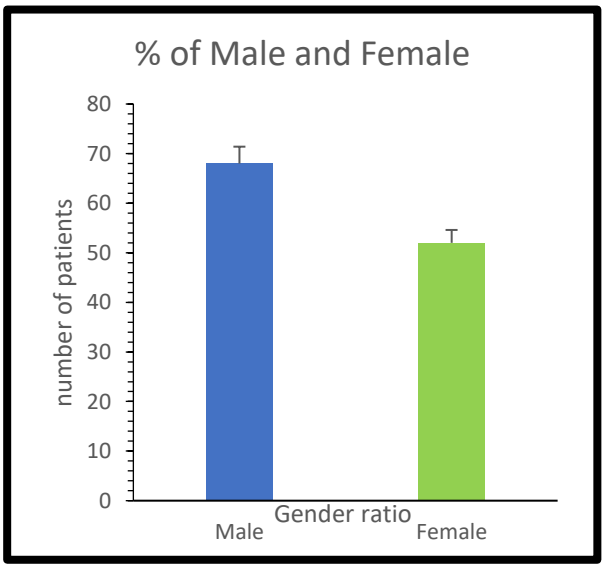

Table 1

According to types of palate, class III was 30%, class II was 53% and class I was 17% of the total participants. There was no female in class I type. (Table 2)

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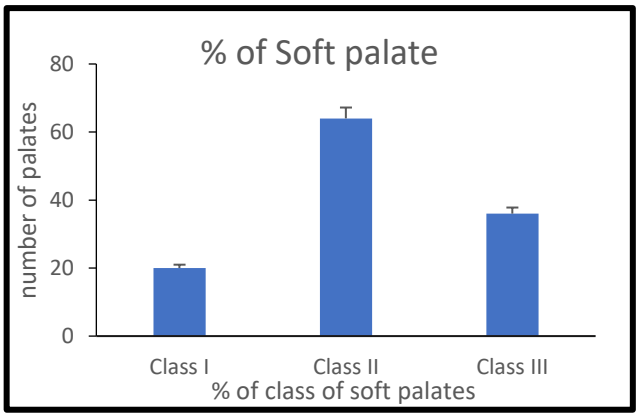

Table 2

In all the cases, the posterior vibrating line was situated posterior to the fovea palatinae but the distance varies according to type of soft palate and gender.

Class III - Male – 0.5-1.5mm
Female – 0.5-1mm

Class II - Male – 2.5-3.5mm
Female – 1.5-2.5mm

Class I- Male – 4-5mm

The mean distance from the fovea palatinae to the posterior vibrating line was 2.8mm (2-3mm) (Table 3). Two way ANOVA test was conducted and from the result we can conclude that between categories of male and female patients the position of the Fovea Palatini was found statistically significant. All the *p* values are <0.05.

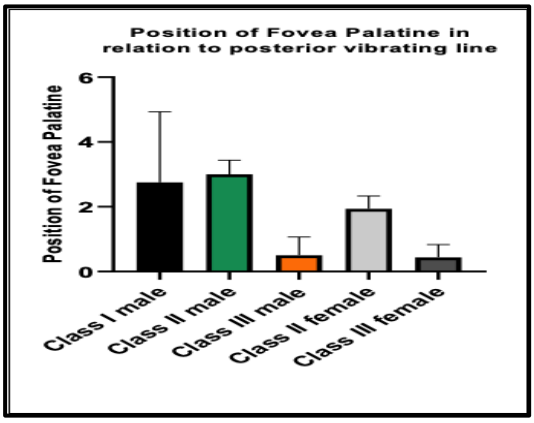

Table 3

In 70% cases, the posterior border of the upper complete denture was properly placed but in 26% cases it was placed more anteriorly and retention of the denture was compromised. 4% patients were having posterior border beyond vibrating line. (Table 4)

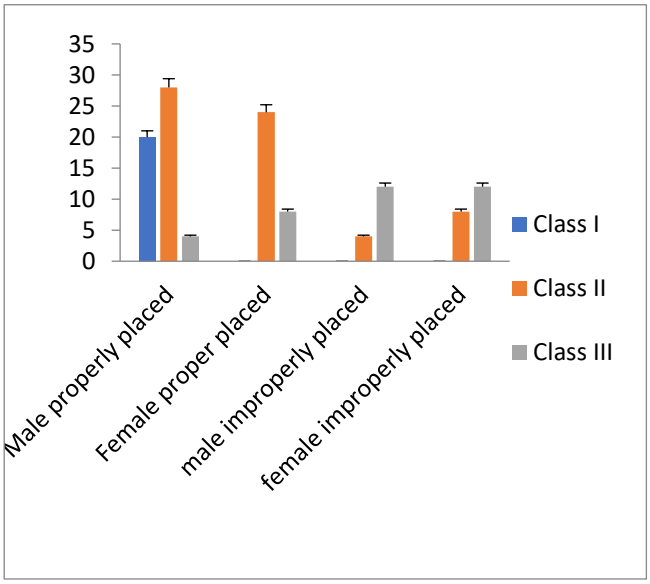

Table 4

5. DISCUSSION

For good retention of maxillary complete denture, properly placed posterior border with adequate palatal seal must be obtained.

There are two schools of thought about the vibrating line. Zarb and others believed in single vibrating line concept whereas Winkler and Silverman proposed two vibrating line concept. In India, two vibrating line concept is mostly followed.

However all the authors have agreed that the distal border of the maxillary complete denture should be placed near the posterior vibrating line. Because if the posterior border ends in the hard palate, the seal will be inadequate due incompressible tissue. However if it extends more posteriorly beyond vibrating line, seal will not be maintained due to movement of soft palate during swallowing and speech. Moreover the posterior border will irritate the posterior portion of dorsum of the tongue and the patient will experience nausea and discomfort.

Determining of posterior vibrating line is very much crucial for the success of maxillary complete denture. Locating vibrating line by conventional

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approach or fluid wax technique is dependent upon the skill of the operator. In this study we have tried to find out the correlation between the vibrating line and the fovea palatinae so that we can locate the posterior vibrating line more accurately.

Advantage of this research:-

i. Sometimes the posterior vibrating line cannot be identified properly by the operator. This research will help them to determine the posterior border of the denture.
ii. Sometimes the lab technicians make post-dam arbitrarily by scraping on the master cast but frequently it is improper. This research will guide him to place post-dam more accurately.
iii. Posterior vibrating line marked by conventional method can be re-checked by the position of fovea palatinae.

Disadvantage of this research:-

i. Position of fovea palatinae changes from races to races and from one individual to another.
ii. Sometimes, fovea is poorly identified in the mouth.
iii. Fovea will not help in identifying the anterior vibrating line. (Two line concept.)
iv. As scraping is done arbitrarily on the cast, there is a chance of tissue compression.

6. CONCLUSION:-

Posterior vibrating line is present posterior to the fovea palatinae in all the cases but the distance varies according to the type of soft palate.

In class III type of soft palate, vibrating line is closest to the fovea palatinae where it can be a reliable guide for placement of the posterior border of the maxillary denture.

In class II & class I cases, the distance increases gradually and it is better to place posterior border by locating posterior vibrating line saying ‘ah’.

Moreover, in this research we have noticed that in majority of cases loss of retention of upper denture was due to improper position of the post-dam. We have also identified that improper placement of post-dam beyond vibrating line is the main cause of discomfort and nausea of the patients.

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