

THE RELIABILITY OF FOVEAE PALATINAE IN DETERMINING THE LOCATION OF VIBRATING LINE IN EDENTULOUS PATIENTS

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ABSTRACT

The objective of this cross-sectional study was to determine the reliability of foveae palatinae for locating the position of the vibrating line in edentulous patients. The study was conducted in a tertiary care dental hospital in Islamabad, Pakistan on a sample of 150 completely edentulous patients. Clinical examination of the soft palate area was conducted to assess for the location of the vibrating line, whether it was at, anterior to or posterior to the foveae. Interestingly, foveae were not present in 27.2% of the sample. When present, 32.5% patients had foveae present at the level of vibrating line, 31.1% had vibrating line posterior to foveae palatinae, while only 8.6% presented with vibrating line anterior to fovea palatinae. Within the limitations of the present study, it was concluded that foveae palatinae are not a reliable anatomical landmark for determining the position of the vibrating line.

Key Words: *Vibrating line, Foveae palatinae, Reliability.*

INTRODUCTION

Foveae palatinae, commonly written as fovea palatine or palatine fovea, are two small pits or depressions in the posterior aspect of the palatal mucosa, one on each side of the midline, at or near the attachment of the soft palate to the hard palate.¹ They are at border of the maxillary complete dentures.² They are located in close proximity to the vibrating line and are always in the soft palate mucosa. Therefore, they have been traditionally considered to be a useful guide in locating the vibrating line, which in itself is an imaginary line running across the soft palate from one hamular notch to the other.³ Both vibrating line and foveae palatinae are used to clinically establish the posterior extent of the maxillary complete dentures.⁴

Existing literature points to a variable location of the foveae in relation to the vibrating line. It has been reported that position of the foveae may either be at, posterior to or anterior to the vibrating line.^{5,6} Al-Alousi⁷ found that vibrating line was at the level of fovea in about 50.9% of the patients. However, earlier studies by Chen⁸ and Lye⁹ found this value to be 25% and 17% respectively. Lye⁹ also found that foveae were absent in about 8% where as it was found to be 30% in the study conducted by Chen.⁸ Hence, the usefulness of foveae palatinae in determining the position of the vibrating line still remains questionable.

With this background in mind, the present study was planned to determine the reliability of using foveae palatinae for approximating the location of the vibrating line in our local population. Local data in this regard is already lacking. Therefore, it is all the more important to study this anatomic landmark and try to reliably establish its usefulness in approximating the position of the vibrating line. It is hoped that this information will be extremely valuable in a clinical setting to anatomically locate the position of the vibrating line instead of vaguely judging it inside the mouth.

METHODOLOGY

This cross-sectional survey was conducted in the Department of Prosthodontics at Islamic International Dental College Islamabad from May 2016 till October 2016 after the approval from ethical committee of the college. A convenience non-probability sampling technique was used to include 150 completely edentulous

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patients who could pronounce the “Ahh” sound repeatedly with the mouth open. Patients were excluded if they presented with any pathological changes to the palatal mucosa, any history of surgery in the palatal area, or any patient who failed to understand the given instructions.

Informed consent was obtained from all the patients before including in the study. All patients were seated on a dental chair in normal relaxed position. Dental unit light was turned on for proper illumination inside the oral cavity. Patients were instructed to open their mouths wide. The palatal mucosa was dried with the help of gauze prior to any evaluation. Initially, it was determined whether the foveae palatinae were present or not in the soft palate mucosa. If present, then their position was marked with an indelible pencil. Afterwards, their relation with the vibrating line was recorded. For this purpose, the vibrating line was also marked across the soft palate by asking the patient to say “Ahh” repeatedly with the mouth open. In the end, the relationship of the vibrating line with the foveae palatinae was identified and recorded into three groups: foveae present on the vibrating line; foveae present posterior to the vibrating line; and foveae present anterior to the vibrating line.

All assessments were made by two house officers independently on every patient. Afterwards, their recorded positions were compared. If both had recorded the same position, the recording was deemed completed. If however both house officers recorded different position of the vibrating line in relation to foveae palatinae, the observations were repeated once again by them to confirm either one of the two positions. If still there was a disagreement between both house officers, the case was referred to consultant/supervisor for final verdict. All records were entered into respective proformas along with patient’s demographic details.

The data were analyzed using SPSS version 19 software. Quantitative variable i.e. age was to be presented as a mean while the qualitative variables i.e. gender and location of the vibrating line with reference to foveae palatine was to be presented as frequency percentages.

RESULTS

A total of 150 completely edentulous patients were examined for relative position of vibrating line and

palatine fovea. Out of them, 85 (57%) were males and 65 (43%) were females. The mean age of the study sample was 62.01 ± 10.21 years. Out of 150 patients included in the study, foveae palatinae were present in only 109 (72.7%) patients. In the remaining 41 (27.3%) patients, palatine fovea could not be identified by both house officers as well as the supervisor concerned. Overall, the location of the vibrating line in relation to the foveae palatinae is presented in Table 1.

DISCUSSION

The present study found that palatine foveae was present in about 73% of the study sample only. In the remaining 27% of the subjects, the presence of fovea could not be confirmed by the investigators. Many researchers have also reported not finding foveae in their study samples. For instance, work reported by Lye⁹ did not find foveae palatinae in 8% of the study sample.

Kyung and colleagues⁴ have reported the location of anterior and posterior vibrating lines in relation to the foveae palatinae. They used the Valsalva maneuver for locating the anterior vibrating line and the phonation method to locate the posterior vibrating line. However, in the present study, no demarcation was made between both lines and only one line was marked intra-orally as the vibrating line by the phonation method.¹⁰

Earlier work by Keng and Ow¹¹ revealed variations in the number, location and size of the palatine fovea within their study sample of 168 edentulous patients. More than 68% patients had presented with two foveae palatinae which were not symmetrically arranged around the midline. They also found vibrating line to be present upto 4mm anterior to the foveae in a large majority (79%) of the cases. In the present study, patients presenting with only one visible fovea were excluded altogether, and no attempt was made in determining the relative position of both foveae to each other or their distance from the vibrating line. These aspects may be taken up in future research on the topic.

Classically, there is not a single scientific method in reported literature that helps in identifying the location of the foveae palatinae. On the contrary, there are a few methods available to accurately demarcate the imaginary vibrating line. One of the easiest, straightforward and perhaps the most commonly used

TABLE 1: LOCATION OF VIBRATING LINE WITH REFERENCE TO FOVEAE PALATINAE

| Location of vibrating line in relation to foveae palatinae | Frequency of occurrence | Percentage of occurrence in patients presenting with identifiable foveae palatinae (n=109) | Percentage of occurrence in the entire study sample (n=150) |
|--|-------------------------|--|---|
| At the fovea | 49 | 44.9% | 32.7% |
| Behind the fovea | 47 | 43.1% | 31.3% |
| In front of fovea | 13 | 11.9% | 8.7% |

method was adopted in the present study.¹⁰ In the 27% patients in whom the presence of foveae could not be confirmed, they all still demonstrated a clearly discernible vibrating line. This finding may indicate that attempting to locate the foveae palatinae may not be a very reliable method for determining the position of the vibrating line, for which the Valsalva maneuver and the phonation methods seem to be more reliable.

In the present study, more than 32% of the sample had their vibrating line coinciding with the position of the palatine fovea i.e. they were at the same level. Previous work by Al-Alousi⁷ has reported this trend in about 49% of her subjects whereas Chen⁸ found the fovea and vibrating line to be at the same level in only 25% of the subjects. Earlier work by Lye⁹ reported this trend in only 17% of the sample.

It was also found that more than 31% patients exhibited vibrating line lying posterior to the foveae palatinae. In the previous studies, this trend has also been quite variable. Al-Alousi⁷ reported this trend in only 6.4% subjects while Lye⁹ found vibrating line behind the fovea in upto 69% patients. It is interesting to know that Chen⁸ did not report any patient who presented the fovea located anterior to the vibrating line, which is contrary to our own finding.

In the current study sample, only 8.7% subjects had their vibrating line located anterior to the palatine fovea. This tendency was presented in 13% of patients in the study by Lye.⁹ However, studies by Al-Alousi⁷ and Chen⁸ reported this trend in 44.5% and 75% subjects respectively, which is a huge difference from the present study. This may have been caused due to ethnic or genetic variations among the respective study samples, an aspect beyond the scope of the present study but an aspect that may be researched upon in future.

Ability of the rather inexperienced house officers in clearly identifying the presence of foveae palatinae and location of the vibrating line could have been a confounding variable but this was controlled by including a more experienced clinician/faculty member who was always present in the department to facilitate them in every case and to reconfirm their originally identified position of the involved structures.

CONCLUSION

Within the limitations of the present study, it can be concluded that foveae palatinae occupy a highly variable relation with the vibrating line. If present, they may be located either at, posterior to or anterior to the vibrating line. Hence, foveae palatinae cannot be considered a very reliable landmark for determining the position of the vibrating line in order to judge the posterior extent of the maxillary complete dentures.

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