

# A semi-functional impression technique to develop posterior palatal seal and a method to visualize and confirm it by addition of heat-polymerized clear acrylic resin at the posterior border of the denture base

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The philosophy of developing posterior palatal seal at the posterior border of the maxillary complete denture prosthesis varies greatly, and the dental literature shows that it was developed as early as the final maxillary impression or as late as final processing of the denture. A scientific and simple, yet predictable, procedure for the development of posterior palatal seal is described. The technique involves the development of posterior palatal seal during secondary impression stage and its confirmation and correction during the jaw relation stage. Further, an innovative method to visualize the posterior border and confirm the posterior palatal seal during the final denture insertion stage is proposed. References to other studies are made to review various terminologies and related philosophies.

**Key words:** Anterior vibrating line, clear acrylic resin, posterior palatal seal, posterior vibrating line

## INTRODUCTION

Providing a posterior palatal seal for a maxillary complete denture prosthesis has been practiced almost universally for so long that its origin is not discernible in dental history.<sup>[1]</sup> Different terminologies, such as post palatal seal, posterior border seal,<sup>[2]</sup> posterior peripheral seal,<sup>[3]</sup> posterior valvular seal,<sup>[4]</sup> post dam<sup>[5]</sup> and so on, have been used almost synonymous with posterior palatal seal in the dental literature. Silverman<sup>[6]</sup> suggested the following: terminologies "posterior vibrating line," which separates the posterior segment of the soft palate that rapidly elevates from an anterior segment that merely vibrates during function but does not substantially elevate and "anterior vibrating line," near the hard and soft palate junction. Winkler<sup>[7]</sup> explained the posterior palatal seal area to be an area that lies between the anterior and posterior vibrating lines. In his survey, Welker<sup>[8]</sup> found that 75% of dental schools taught that there is one vibrating line in an individual. The posterior flexion line was related to the distal termination of the maxillary denture by dental schools that teach the concept of two vibrating lines and most dental schools (93.9%) take the compressibility of palatal tissue into consideration while carving the depth of

posterior palatal seal in the maxillary master cast. Chenn<sup>[8]</sup> cited three techniques for determining the location of the vibrating lines namely: (1) phonation of the "ah" sound, (2) the swallowing method and (3) the nose-blowing method.

The authors agree with Chenn<sup>[9]</sup> in that the nose-blowing method, also known as "Valsalva maneuver," as explained by Winkler was found to be an accurate method for locating the anterior vibrating line. It is noted that in very few patients who cannot perform "Valsalva maneuver" that requires both the nostrils be held firmly while the patient blows gently through the nose, delineation of anterior vibrating line is difficult; intraoral palpation with a blunt instrument like "T" burnisher<sup>[10]</sup> is the most reliable method to locate the anterior limit of the proposed posterior palatal seal area. Phonation of "ah" sound in short bursts in an unexaggerated fashion is found to be very effective in locating the posterior vibrating line. The authors have like-minded philosophy as that of Kolb:<sup>[11]</sup> an effective posterior palatal seal can usually be achieved

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by displacement of the 2-5 mm wide ribbon of the soft palate mucosa, which lies between the junction of the hard and soft palates (anterior vibrating line) and the posterior vibrating line. Additional seal may be obtained in front of the junction of the hard and soft palates by displacement of an area, shaped as the Cupid's bow, of mucosa overlying the bilateral glandular masses. Thus, the posterior palatal seal contacts both the masticatory mucosa of the hard palate and the lining mucosa of the soft palate. In a survey, Winland<sup>[12]</sup> found that various shapes of carving the posterior palatal seal area on the master cast include single bead, double bead, bead with anterior extension on to the bilateral glandular masses, cupid bow and according to House's classification of the soft palate.

Ettinger *et al.*<sup>[13]</sup> cited three methods to develop the posterior palatal seal, and they include the following: (1) scraping the cast, (2) selective loading impression technique and (3) physiological impression technique. Hardy and Kapur<sup>[2]</sup> suggested that the establishment of the distal length of the basal seat and the development of posterior palatal seal is one of the most important steps in maxillary complete denture construction. Out of the three techniques, namely, (1) functional, (2) semi functional and (3) empirical, he explained the later technique of scraping the cast.

The purpose of this article is to explain a semi-functional selective loading impression technique to develop a predictable posterior palatal seal. The customized tray for creating the secondary impression was designed depending on the oral anatomy and clinical judgment with regard to the displaceable tissues along the junction between hard palate and soft palate. Dental impression wax (Beeswax; The Hygenic Corp/Akron, Ohio 44310, USA) with flow properties at mouth temperature was used to mold the posterior palatal seal. The design of the tray facilitated the selective loading of the posterior palatal seal area. The mouth temperature wax enabled the functional recording of the area. Conventionally, the effectiveness of the posterior palatal seal is verified by checking the retentive quality of the prosthesis; any over-extension in the posterior border is checked by asking the patient to say "ah." Over-post damming cannot be effectively verified during the denture insertion appointment and is usually noticed as a pressure point during the post insertion check up appointment. In this article, the authors suggest a technique to visualize and evaluate the posterior palatal seal area during the secondary impression stage, jaw relation record stage and try-in stage. This is made possible by using chemically polymerized clear acrylic resin to fabricate the customized tray and record base. The article also explains an innovative method of adding heat polymerized clear acrylic resin at the

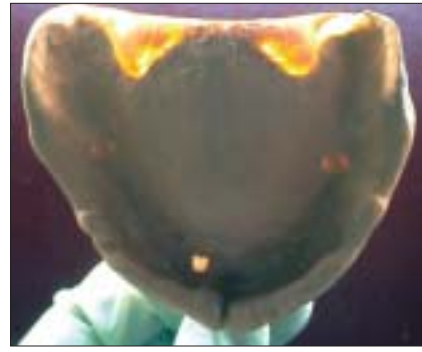
posterior palatal seal area of the prosthesis, which allows the visual evaluation of over-post damming during denture insertion appointment.

### Technique

1. Before making primary impression, palpate the palatal tissues anterior to the proposed posterior border of the prosthesis using a "T" burnisher to determine their compressibility in width and depth.
2. Make primary impression using irreversible hydrocolloid impression material (Tropicalgin; Zhermack; 45021-Badia Polesine, Rovigo, Italy). Delineate the proposed posterior palatal seal area in the mouth using an indelible pencil and transfer it on to the primary cast [Figure 1]. Use "nose blowing method" to determine the anterior vibrating line and "phonation technique" for posterior vibrating line.
3. Fabricate a customized tray by using chemically polymerized clear acrylic resin (DPI-RR cold cure; Dental Products of India; Mumbai, India), with 1.5 mm wax spacer (DPI-modeling wax; Dental Products of India; Mumbai, India) [Figure 2]. Fabricate the tray in such a way that it contacts the displaceable tissues at the proposed posterior palatal seal area [Figure 3].
4. Verify the tray extension intraorally. Modify and correct the tray extension at the proposed posterior palatal seal area by careful inspection through the clear acrylic resin tray.
5. Trim the posterior border to flush with the posterior vibrating line. Perform border molding in the labial and buccal borders using low fusing modeling plastic compound (DPI-Pinnacle tracing stick; Dental Products of India; Mumbai; India) [Figure 4].
6. Mold posterior palatal seal area using dental impression wax. (Beeswax; The Hygenic Corp.) Seat the border-molded special tray in the mouth for not less than 8 min to allow adequate time for the material to flow [Figure 4].
7. Make secondary impression with zinc oxide eugenol impression paste (DPI-Impression paste; Dental products of India, Mumbai, India) [Figure 5].
8. Pour secondary cast using type III dental stone (Kalstone; Kalabhai Karson Pvt. Ltd., Mumbai, India) [Figure 6].
9. Fabricate the record base using chemically polymerized clear acrylic resin (DPI-RR cold cure) Verify the effectiveness of the developed posterior palatal seal during the jaw relation record stage and also during the waxed-up try-in [Figure 7].
10. Do trial packing during final processing stage and remove the excess flash. By using an No. 11 Bard-Parker blade (Lister, Magna marketing, Kanpur,



**Figure 1:** Primary cast with proposed posterior palatal seal area delineated on cast



**Figure 5:** Secondary impression made with zinc oxide eugenol impression paste held against a light source



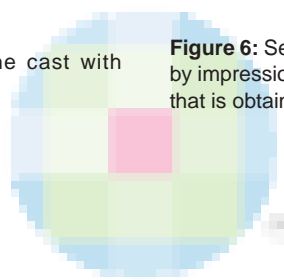
**Figure 2:** Spacer (1.5 mm thick) adapted onto the cast with tripod stops



**Figure 6:** Secondary cast with posterior palatal seal area as recorded by impression material, which shows selective displacement of tissue that is obtained



**Figure 3:** Clear acrylic resin custom tray fabricated so that it is in direct contact with proposed posterior palatal seal area



**Figure 7:** Trial record base made of chemically cured clear acrylic resin, which enables the clinician to visually verify the posterior palatal seal area



**Figure 4:** Border-molded custom tray with posterior palatal seal area recorded using impression wax



**Figure 8:** Post-dam area of processed denture with heat-polymerized clear acrylic resin, which facilitates the visual examination and evaluation of any undue tissue blanching due to over-post damming or any breakage of seal when soft palate is dynamic

India), cut back pink-colored heat-polymerized acrylic resin (Trevalon Hi; Dentsply India Pvt. Ltd; Gurgaon, India) from the posterior palatal seal area. Pack heat-polymerized clear acrylic resin (Trevalon Hi; Dentsply India Pvt. Ltd.) at the posterior palatal seal area. Process the denture according to manufacturer's instructions [Figure 8].

11. During the denture insertion stage, insert the prosthesis and visualize the posterior palatal seal area through the clear acrylic resin in the posterior border. Check for (1) any breakage of posterior palatal seal when the soft palate is dynamic during function and (2) any undue tissue blanching due to over compression in posterior palatal seal area.

## CONCLUSION

A semi-functional impression technique for developing posterior palatal seal using a well-planned customized tray and dental impression wax is explained. An innovative method to visually verify the effectiveness of the developed posterior palatal seal by the virtue of adding heat-polymerized clear acrylic in the posterior palatal seal area of the denture base is proposed.

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