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Brief on posterior palatal seal area

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Abstract---Accurate recording and duplicating of posterior palatal seal is the vital procedure which contributes to the success in denture retention and subsequent treatment of edentulous patient. The responsibility of recording posterior palatal seal lies on the clinician and not the lab technician. Locating and designing of posterior palatal seal after thorough understanding of the anatomic and physiological boundaries of the region. The diagnostic evaluation and placement of posterior seal are often given only minor attention in complete denture construction. The aim of this article is to supply adequate information on posterior palatal seal, problems encountered while recording posterior palatal seal for longevity of complete denture treatment.

Keywords---complete denture retention, border seal, posterior palatal, vibrating line, soft palate, posterior palatal seal.

Introduction

As per GPT-9 postpalatal seal (PPS) area is defined as the soft tissue area at or beyond the junction of the hard and soft palates on which pressure, within physiologic limits, can be applied by a complete denture to aid in its retention. Although posterior palatal seal is an important part of border seal, there are many dentists who perceive delineation of posterior palatal seal as insignificant and frequently render the responsibility to the lab technicians.

Functions of the Posterior Palatal Seal Area

The first and foremost function is that of completing the peripheral seal and enhancing the retention of maxillary complete denture while the other being:

1. Minimizes the gag reflex by making the posterior border indistinguishable to the tongue.
2. Compensates for polymerization shrinkage of acrylic resin
3. Blocks air and food entry beneath the denture base.

Anatomy of Posterior Palatal Seal Area

Posterior palatal seal is divided into separate areas upon anatomic boundaries. The post palatal seal extends medially from one tuberosity to other. The pterygomaxillary seal extends through pterygomaxillary notch (hamular notch) continuing for 3-4mm anterolaterally. It is important to note the exact position of hamular process because this will affect the length and direction of pterygomaxillary seal. As the seal area contains varying thickness of loose connective tissue covered by mucous membrane, it shows differing areas of tissue vibration which are referred to as anterior and posterior vibrating lines with the seal area extending between the lines. These lines are described as follows:

GPT-9 defines vibrating line as an imaginary line across the posterior part of the palate marking the division between the movable and immovable tissues of the soft palate.

Anterior Vibrating Line

It is an imaginary line located at the junction of the attached tissue overlying the hard palate and the movable tissue of the immediately adjacent soft palate, visualized while the patient is instructed to say 'ah' with short vigorous bursts.

Posterior Vibrating Line

It is an imaginary line at the junction of the aponeurosis of the tensor veli palatine muscle and the muscular portion of the soft palate visualized, while the patient is instructed to say 'ah' in short bursts in a normal unexaggerated fashion.

Classification of Soft Palate

In class I, the soft palate is horizontal as it extends posteriorly. This will allow for a wide posterior palatal seal but not very deep, considered as most favourable configuration.

In class III, the soft palate is more acute in relation to the hard palate, usually seen in conjunction with high V shaped palatal vault. In this there is smaller area for post palatal seal than class I.

Class II type of soft palatal contour lies somewhere between

class I and class III classes.

Locating Posterior Palatal Seal Region

As tissues of this area are displaceable, the seal area can be identified when the movable tissues are functioning.

Methods of locating:

1. Palpation method using a 'T' burnisher.
2. Valsalva Maneuver- practiced by closing both the nostrils of the patient and asking him/her to blow gently through the nose.
3. Phonation method—visualizing the vibrating lines as the patient says 'ah'.
4. Anatomical landmark—using fovea palatinae to identify vibrating area.

Methods to Record Palatal Seal Area

Conventional technique

This technique is done after the secondary impression is made and the master cast is poured. A trial base is constructed by shellac base plate or well adapted autopolymerising resin. Patient is asked to rinse with mouthwash to remove ropy saliva that might interfere with transfer of marking. Then, palpation of hamular process is done with T burnisher or mouth mirror. Full extent of hamular notch is marked with indelible pencil (Dr. Thompson's Sanitary Color Transfer Applicator). The posterior vibrating line is marked by asking the patient to say "ah" in a non-vigorous manner. The marked line connecting hamular notch and posterior vibrating line will form the posterior border of the denture. The trial base is inserted into patient's mouth so that the indelible markings are transferred to the base and subsequently the base is seated on the master cast to transfer the markings marked in the patient's mouth to the cast. The trial base is trimmed to the posterior border. Now, the anterior vibrating line is marked with the methods mentioned earlier and transferred to the master cast. The area between the anterior and posterior vibrating line is scored in the master cast to a depth of approximating 1-1.5 mm on either side of mid palatine raphe. Meanwhile, in the region of mid palatine raphe, it is scraped to the depth of approximating 0.5-1.0 mm because less amount of submucosa that cannot withstand the same compressive force as the tissue lateral to it. The scraped areas should taper progressively shallower both anteriorly and posteriorly ensuring it blends with the palatal tissues. This entire border of the seal area resembles the shape of a Cupid's bow. The shellac trial base should be softened and readapted. If a resin trial base is used, then the cast is coated with cold mold seal and autopolymerizing resin is added to the scored areas. The modified trial base is now placed into patient's mouth and checked for any separation of the base and tissue.

Fluid wax technique

This technique is also known as physiological impression technique that is done immediately after the secondary impression and before pouring master cast. Types of wax that can be utilized for this technique are 1) Iowa wax, 2) Korecta

wax, 3) H-L physiologic paste and 4) Adaptol green. These waxes are mouth temperature impression waxes. They displace soft tissues within their physiological limits. Slight excess amount of melted wax is painted onto the impression surface within the outline of the seal area by using a camel hair brush, and it is then allowed to cool to below mouth temperature, thus increases its consistency. During the insertion of impression, position of the patient's head should be maintained at the position such that the Frankfort's horizontal plane makes 30 degrees below the horizontal plane reason being that in this position soft palate will be in downward and forward position due to attachment of soft palatal tissue to the body of mandible. The patient's tongue should be firmly positioned against mandibular anterior or handle of maxillary custom tray in case of completely edentulous patients. The impression is then inserted to the mouth and removed after 4-6 minutes. Upon removal of impression, glossiness of the surface is checked. Where not glossy more wax is added and the impression is repeated. Later, a sharp blade is used to trim off excess wax till the feather edge margins are obtained. The wax is allowed to air cool and later the impression is boxed and poured with dental stone.

Selective loading impression technique

After the fabrication of custom tray on primary cast, wax relief on relieving areas like undercuts, incisive papilla, mid palatine suture or flabby ridge or tissues is done. Peripheral border moulding and post dam adaptation are done by green stick modelling compound. Escape holes are drilled in relief areas to allow the excess impression material to flow out during secondary impression making.

Arbitrary scraping of cast technique

This technique is the least accurate as it is based upon the guesstimate method, relies on the dentist's recollection of palatal configuration to estimate anterior and posterior vibrating line. The anterior and posterior vibrating lines are visualized by examining the patient's mouth and approximately marked on the master cast. The cast is then scraped to the depth 1-1.5 mm in the posterior palatal seal area using a 'Kingsley Scrapper'.

Conclusion

Careful examination during the diagnostic phase of the treatment can alleviate many potential problems. Following established techniques one can ensure more retentive prosthesis. The most common factor that results in lack of retention of maxillary complete denture is failure to utilize the proper anatomical and physiological landmarks as well as recording the posterior palatal seal area. Some dentures are not adequately extended, while some are extending too far posteriorly. A retentive denture provides patient with maximal comfort, functional efficiency and satisfactory esthetics. The determination of the posterior limit and palatal seal of the maxillary denture is not the technician's obligation, but the responsibility of the dentist. So, this phase of denture fabrication should be given due consideration for the success of the denture.

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