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POSTERIOR PALATAL SEAL AREA

A graduation project submitted to

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Fulfillment of the requirement for a degree of B.D.S.

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Declaration

This is to certify that the organization and preparation of this project have been made by the graduate student Alaa Ahmed Jassim under my supervision at the College of Dentistry/ University of Baghdad in partial fulfillment of the requirement for the degree of B.D.S.

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B.D.S., M.Sc.

Dedication

I dedicate my project work to my family. A special feeling of gratitude to my loving mother whose words of encouragement and push for tenacity ring in my ears.

To my beloved friends, , , and

Acknowledgment

First of all, I thank **God Almighty**, who has blessed me with wisdom, patience, and willpower to reach this level in my life.

I would like to thank ***Professor Dr. Raghad Al Hashimi***, the dean of the College of the Dentistry, University of Baghdad for providing me the opportunity to complete my work.

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PPS	Posterior palatal seal

INTRODUCTION

The diagnostic evaluation and placement of the posterior palatal seal are often given only minor attention in complete denture construction. The proper placement of the posterior palatal seal begins with the initial oral examination. The morphologic contours of the hard and soft palate, hamular notch regions, as well as the integrity and displaceability of the mucosa and underlying glandular tissues, should be evaluated and noted. Observation and palpation are essential elements in formulating the proper diagnosis and treatment plan ***(Winkler, 2015).***

The peripheral seal of the maxillary denture is the area of contact between the mucosa and the peripheral polished surfaces of the denture base, the seal prevents the passage of air between the denture and the tissues. This seal depends upon the proper extension of the denture borders, both in width and height, so that they fill the mucobuccal space and contact the cheek tissues laterally. At the posterior aspect of the denture, in the area of the soft palate, there are no cheek tissues to seal the denture border. Therefore; the proper placement of the posterior palatal seal commands a definite clinical procedural protocol if one is to create an optimally retentive complete maxillary prosthesis ***(Winkler, 2015).***

Complete dentures may suffer from a lack of proper border extension, but most important of all is the posterior palatal extension on maxillary complete dentures. The posterior border terminates on a surface that is movable in varying degrees and not at a turn of tissue as are the other denture borders ***(Soratur, 2006).***

Locating and designing the posterior palatal seal after a thorough understanding of the anatomic and physiological boundaries of this dynamic region greatly enhances the border seal and increases maxillary complete denture retention **(Soratur, 2006).**

Patients expect a good prosthesis that can work efficiently during speech and mastication and are well-retained in the mouth for a long duration. Therefore, the importance of the extension of complete dentures has been well-established for various reasons. The posterior palatal seal functions to provide retention and stability of a well-adapted denture through forces of adhesion, cohesion, and interfacial surface tension by providing a proper seal, preventing food accumulation between the posterior border of the denture and soft palate, to reduce the tendency of gag ***(Bindhoo et al., 2011).***

Many dentures have failed due to improper establishment of distal limit and improper recording of the posterior palatal seal. Recording the posterior palatal seal without reference to the anatomical landmarks of the mouth may result in an error in location and preparation on the master cast ***(Bindhoo et al., 2011).***

Aims of the review

This review aimed to clarified approaches that may be used for recording the posterior palatal seal area.

REVIEW OF LITERATURES

Posterior palatal seal area .1

The soft tissue area is 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 as in (figure 1.1). This is the area of the soft palate that contacts the posterior surfaces of the denture base. It prevents air entry between the denture base and soft palate. It is the area between the anterior and posterior vibrating lines, within physiologic limits, can be placed this seal can be applied by a removable complete denture to aid in its retention ***(V Rangarajan and Padmanabhan, 2017).***

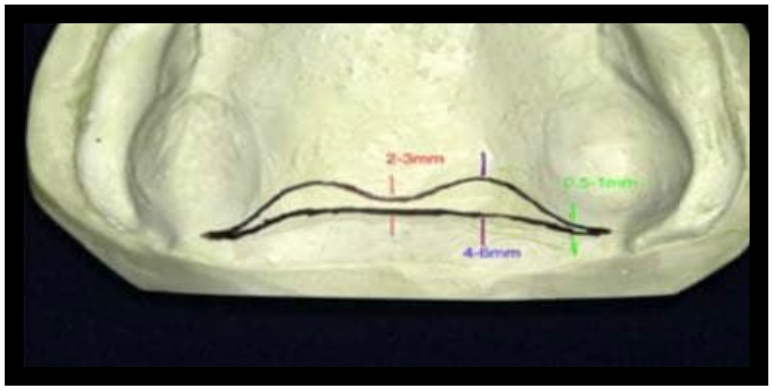


Figure (1.1): posterior palatal seal area ***(V Rangarajan and Padmanabhan, .2017)***

1.2. Functions of the Posterior Palatal Seal

The primary function is that of completing the peripheral seal and enhancing the retention of the complete denture. The other purposes served by the PPS are as follows:

- Maintains contact of denture with soft tissue during functional movements of the stomatognathic system, which decreases gag reflex.
- Decreases food accumulation with adequate tissue compressibility.
- Decrease patient discomfort of the tongue with the posterior part of the denture.
- Compensation for volumetric shrinkage that occurs during the
- polymerization of PMMA
- Increases retention and stability by creating a partial vacuum.
- Increased strength of maxillary denture base.
- Adds confidence and comfort to the patient by enhancing retention.

The peripheral seal of the maxillary denture is an area of contact between the mucosa and the peripheral polished surface of the denture base, the seal prevents the passage of air between the denture and tissue ***(Alqattan and Alalawi, 2016)*.**

Retention of a denture is achieved from adhesion, cohesion & interfacial surface tension that resists the dislodging forces that act perpendicular to the denture base ***(Banerjee et al., 2009)*.**

The posterior palatal seal is placed in the maxillary complete denture because the acrylic will distort slightly and pull away from the posterior palatal area of the maxillary cast. The acrylic will shrink toward the areas of greatest bulk,

which are the areas over the ridge where the teeth are placed. The posterior palatal seal provides a vacuum seal between the denture and the soft palate that holds the maxillary complete denture securely in place. The adequate PPS resists the horizontal and lateral forces acting on the maxillary denture base as the denture border terminates on soft resilient tissue and thereby maintains a proper denture seal ***(Mccracken, Carr and Brown, 2016).***

A well-fitting and retentive complete denture requires a well-fitting tissue surface, a peripheral border compatible with the muscles and tissues which make up the mucobuccal and mucolabial spaces so that a peripheral seal is created by the soft tissue draping over them. It is usually obtained by a labial and buccal seal. In the posterior region, it is mainly by the posterior palatal seal. At the posterior extension of the maxillary denture, where the tissues are less compliant, special attention is required to make the seal effective ***(Modi et al., 2016).***

1.3. Anatomical Considerations for PPS

The posterior palatal seal area can be divided into two regions based on anatomical landmarks, namely: the Pterygomaxillary seal and the Postpalatal seal ***(Michaud, 2021).***

1.3.1. Pterygomaxillary seal:

This is the part of the posterior palatal seal that extends across the hamular notch and it extends 3 to 4 mm anterolaterally to end in the mucogingival junction on the posterior part of the maxillary ridge. The hamular notch is located between the maxillary tuberosity and the hamular process of the sphenoid bone. It contains loose connective tissue and a few fibers of Tensor VeliPalatini muscle covered by a thin layer of the mucous membrane. The position of this membrane changes with mouth opening hence it should be

recorded accurately during impression making. The posterior extent of the denture in this region should end in the hamular notch and not extend over the hamular process as this can lead to severe pain during denture wear figure (1.2) ***(Michaud, 2021).***

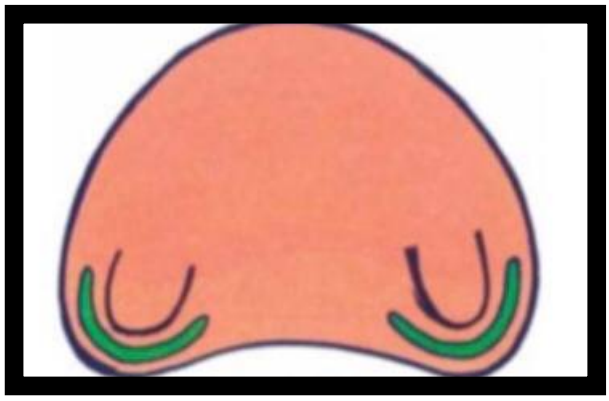
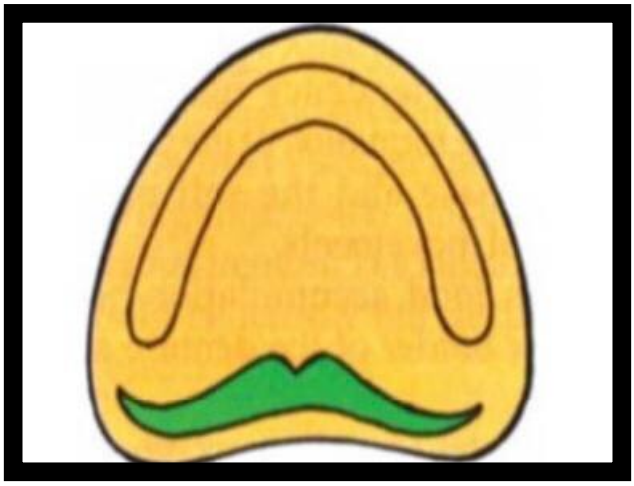


Figure (1.2): Pterygomaxillary seal ***(Michaud, 2021).***

1.3.2. Post Palatal Seal Area

This is a part of the posterior palatal seal that extends between the two maxillary tuberosities as in figure (1.3). The post palatal seal is extending from one tuberosity to the other. Pterygomaxillary seal extends through pterygoid maxillary notch continuing for 3- 4 mm anterolaterally approximation the mucogingival junction. It also occupies the entire width of the pterygomaxillary notch. The notch is covered by the pterygomaxillary fold (extend from the posterior aspect of tuberosity to the retromolar pad). This fold influences the posterior border seal if the mouth is wide open during the final impression procedure ***(L, Hussain and Uthkarsh, 2007).***



.Figure (1.3): Post palatal seal ***(L, Hussain and Uthkarsh, 2007)***

1.3.3. Fovea palatine.

Are two glandular openings within the tissue posterior of the hard palate lying on either side of the midline should be used only as a guideline for the placement of the posterior palatal seal ***(Johnson, 2011).***

1.3.4. Medial palatal raphe

Which overlies medial palatal suture contains little or no submucosa and will tolerate little or no compression. The seal area narrows down in the mid palatine area due to the scarcity of connective tissue and the prominence of the posterior nasal spine. Frequently formed at the junction of the aponeurosis and the posterior nasal spine is a narrow bundle similar to a ligament. The posterior palatal seal is not placed over this narrow area. If the tours palatini extends to the bony limit of the palate leaving little or no room to place the PPS then its removable is indicated ***(Johnson, 2011).***

1.4. Physiological Considerations

1.4.1. Saliva

The presence of thick ropy saliva can create hydrostatic pressure in the area anterior to the posterior palatal seal, resulting in a downward dislodging force exerted upon the denture base. To alleviate this potential problem, a fine line or Cupid's bow can be scribed on the master cast, anterior to the cluster of palatal mucous glands and distal to any torus that is present. Watt and MacGregor in 1976 feel that this extension of the posterior palatal seal line will contain the thick mucus in the posterior part of the denture to provide a seal even if the posterior portion of the denture base is slightly out of contact with the palatal tissues ***(Wiens et al., 2018).***

1.5. Vibrating line

It is defined as "The imaginary line across the posterior part of the palate marking the division between the movable and immovable tissues of the soft palate which can be identified when the movable tissues are moving".

• It is an imaginary line drawn across the palate that marks the beginning of motion in the soft palate when the individual says "ah."

• It extends from one hamular notch to the other.

•It passes about 2 mm in front of the fovea palatina. The fovea is formed by coalescence of the ducts of several mucous glands. This acts as a guide to locating the posterior border of the denture.

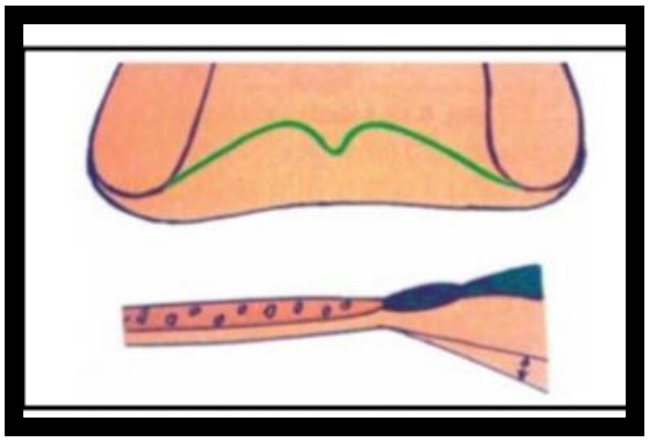
• This line should lie on the soft palate.

• The distal end of the denture must cover the tuberosities and extend into the hamular notches. It should end 1-2 mm posterior to the vibrating line. Another

school of thought considers the presence of two vibrating lines namely: An anterior vibrating line and a Posterior vibrating line ***(Tharakan et al., 2020).***

2.5.1. Anterior Vibrating Line

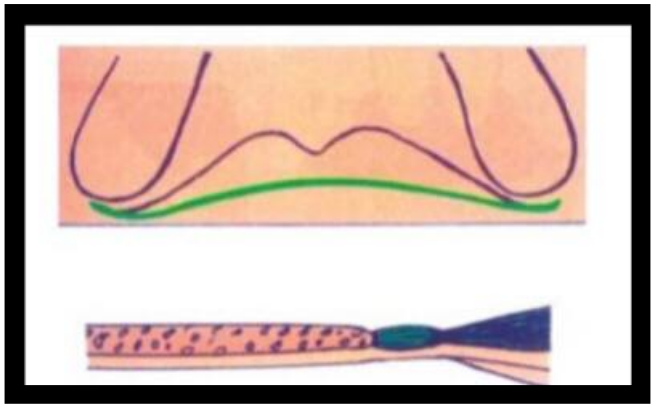
It is an imaginary line lying at the junction between the immovable tissues over the hard palate and the slightly movable tissues of the soft palate. It can be located by asking the patient to perform the “Valsalva” maneuver. It can also be measured by asking the patient to say “ah” in short vigorous bursts. The anterior vibrating line is cupid’s bow-shaped as shown in Figure (1.4) ***(Tharakan et al., 2020).***



.Figure (1.4): Anterior vibrating line ***(Tharakan et al., 2020)***

1.5.2. Posterior Vibrating Line

It is an imaginary line located at the junction of the soft palate that shows limited movement and the soft palate that shows marked movement. It also represents the junction between the aponeurosis of the tensor velipalatini muscle and the muscular portion of the soft palate. It is recorded by asking the patient to say “ah’ in a short but normal non-vigorous fashion. This line is usually straight as shown in Figure (1.5) ***(Tharakan et al., 2020).***

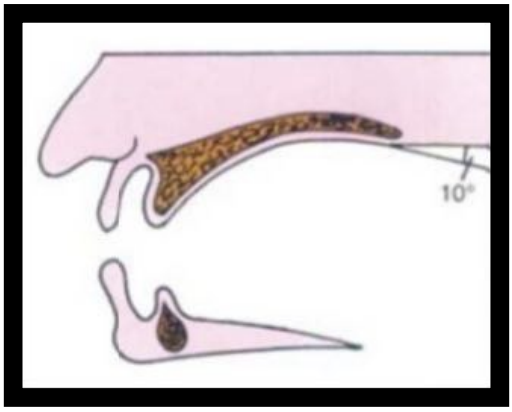


.Figure (1.5): posterior vibrating line ***(Tharakan et al., 2020)***

1.6. Classification of Soft Palate

According to House classification

Class I: Class I indicates a soft palate that is rather horizontal as it extends posteriorly, with minimal muscular activity. When this classification is visualized, by going through the procedures outlined above to locate the vibrating lines, a considerable number of millimeters separate the anterior and posterior vibrating lines. This will allow for a wide posterior palatal seal, but one that is not very deep. Class I palates are considered the most favorable configuration, since more tissue surface can be covered, yielding a potentially more retentive denture base, as in Figure (1.6) ***(Al-Abdulla, Ibrahim and Abdul Khafoor, 2013).***

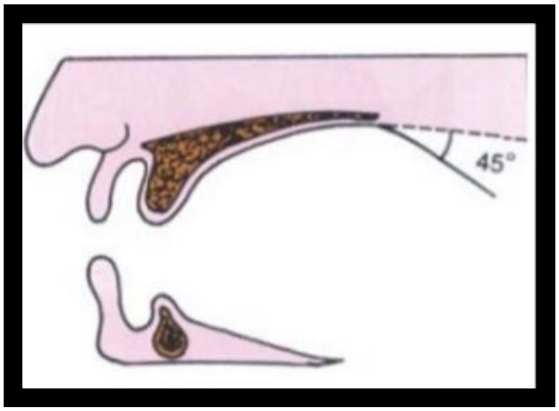


.Figure (1.6): Class I soft palate ***(Al-Abdulla, Ibrahim and Abdul Khafoor, 2013)***

Class II: Class II designates those palatal contours that lie somewhere between class I and class III extent (Soft palate makes a 45° angle to the hard palate.

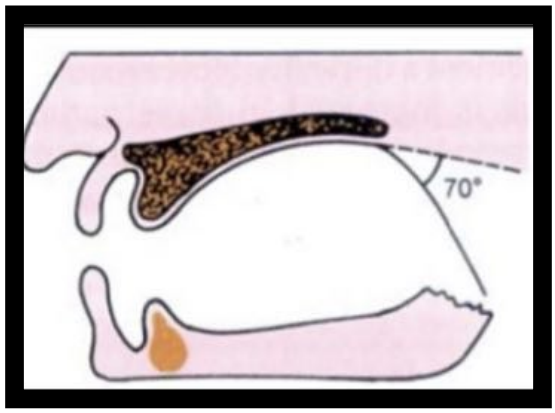
Tissue coverage for posterior palatal seal is less than that of a class I condition).

Palatal contour lies between class I and class III as in figure (1.7) ***(Lee, 2021).***



.Figure (1.7): Class II soft palate ***(Lee, 2021)***

Class III: Class III indicates the most acute contour concerning the hard palate, necessitating marked elevation of the musculature to create velopharyngeal closure. It is usually seen in conjunction with a high V-shaped palatal vault. As there is a greater elevation of the soft palatal musculature in function, fewer millimeters separate the anterior and posterior vibrating lines. This results in a smaller area for the posterior palatal seal than for a class I configuration. In addition to being smaller, it is usually deeper than with the class I palate (Soft palate makes a 70° angle to the hard palate. Tissue coverage for posterior palatal seal is minimum) as in figure (1.8) ***(Goyal et al., 2014).***



.Figure (1.8): Class III soft palate ***(Lee, 2021)***

The above classifications of soft palates are determined when the patient is in an upright position with the head held erect. It is felt that positional changes of the head and physiologic functioning of the tongue can influence soft palatal placement.

Class I: easiest to tolerate, broadest range, hardest to locate. Class II: most common

Class III: easiest to locate, hardest to tolerate ***(Goyal et al., 2014).***

1.7. Designs of the Posterior Palatal Seal

Winland and Young surveyed the commonly employed posterior palatal seal designs and summarized them as follows:

A bead posterior palatal seal. -

A double bead posterior palatal seal. -

A butterfly posterior palatal seal. -

A butterfly posterior palatal seal with a bead on the posterior limit. -

A butterfly posterior palatal seal with the hamular notch area cut to half the depth of a no. 9 bur. -

A posterior palatal seal constructed about House's classification of palatal forms:

Class I: A butterfly-shaped posterior palatal seal with3-4 mm wide.

Class II: Posterior palatal seal is narrow with 2-3 mm of width.

Class III: A single beading made on the posterior vibrating line ***(Farhan, 2013).***

1.8. Techniques of Recording PPS

Various methods and materials to record posterior palatal seal and reproduce it in the maxillary denture have been introduced:

1.8.1. Conventional approach:

After the special tray is fabricated there are certain instructions given to the patients:

- Rinse with an astringent mouth wash that is to remove the stringy saliva that might prevent clear transfer marking.
- Location of the pterygomaxillary notch is done by moving the T burnisher along the posterior angle of the maxillary tuberosity until it drops into the pterygo- maxillary notch. This is necessary as there are times when a small depression in the residual ridge may resemble a pterygo- maxillary notch.
- Identification of posterior vibrating line, the patient asked to say “AH” in a normal unexaggerated fashion.
- Identification of the anterior vibration line. This is done by asking the patient to say “AH” in short vigorous bursts ***(Stig Karlsson, Krister Nilner and Dahl, 2000).***

1.8.1.1. Procedure

- A line is placed with an indelible pencil through the pterygo maxillary notch and extended 3-4 mm anterolaterally to the tuberosity area approximating the mucogingival junction; the same is done on the opposite side. This completes the outlining of the pterygoid maxillary seal.
- The posterior vibrating line is marked with an indelible pencil by connecting the line through the pterygomaxillary seal with the line just drown demarcation of the post palatal seal.
- The resin or shellac tray is inserted into the mouth and seated firmly to place so that upon removal from the mouth the indelible lines will be transferred to the tray.

- Sometimes it is necessary to redefine transfer marking. The tray is returned to the master cast to complete the transfer of the complete posterior border.
- The tray is trimmed until the posterior vibration line so that it decides the posterior extent of the denture border ***(Stig Karlsson, Krister Nilner and Dahl, 2000).***
- Returning to the mouth the palatal fissure is palpated with the 'T' burnisher or mouth mirror to determine their compressibility in width and depth.
- The termination of glandular tissue usually coincides with the anterior vibrating line.
- The anterior vibrating line is now marked and transferred to the master cast. This will complete the transferring of the outline of the posterior palatal seal area.
- The visual outline is in the shape of a cupid bow, the area between the anterior-posterior vibrating lines is usually the narrowest in the mid palatal region because of the projection of the posterior nasal spine.
- Carving of the master cast is done using a Kingsley scraper. The deepest areas are located on either side of the midline, one-third the distance anteriorly from the PVL, depth of 1-1.5 mm is carved. The tissues covering the Mid-palatal raphe are scored to a depth of 0.5-1 mm because they contain little submucosa and cannot withstand the same compressive force as the tissue lateral to it. As the seal approaches the anterior vibrating line there is just a slight

scraping of the cast. Just posterior to the deepest portion of the seal, it is tapered again towards the PVL. Failure to taper the seal posteriorly led to tissue irritation ***(Stig Karlsson, Krister Nilner and Dahl, 2000).***

1.8.1.2. Advantages

- The trail base will be more retentive.
- This can produce more accurate maxillomandibular records.
- Patients will be able to experience the retentive qualities of the trial base, giving them the psychological security of knowing that retention will not be a problem in the completed prosthesis.
- The practitioner will be able to determine the retentive qualities of the finished denture.
- The new denture wearer will be able to realize the posterior extent of the denture which may ease the adjustment periods ***(Stig Karlsson, Krister Nilner and Dahl, 2000).***

1.8.1.3Disadvantages

- It is not a physiologic technique and therefore depends upon accurate transfer of the vibrating lines and careful scraping of the cast.
- The potential for over-compression of the tissue is great ***(Wicks, Ahuja and Jain, 2014).***

1.8.2. Fluid wax Technique (functional technique or physiological technique)

This technique is done immediately after making the wash impression and before pouring the mater cast. Zinc oxide eugenol and impression plaster are suitable impression materials for this technique as fluid wax adhere well to them. The anterior and posterior vibrating lines are marked as described in the conventional technique. These lines are marked in the patient's mouth immediately after making the wash impression. The markings are transferred to the secondary or wash impression by reseating the impression in the mouth. The wash impression is painted with fluid wax. Commonly used waxes are

- Iowa wax white.
- Adaptor green wax.
- Korecta wax no. 4 (orange).
- K.L physiologic paste (yellow-white) ***(Wicks, Ahuja and Jain, 2014).***

The wax should be painted only within the margins of the palatal seal marked on the impression. Usually, it is applied in excess and cooled below mouth temperature so that it gains resistance to flow. These waxes soften at mouth temperature and flow intraorally during impression making the patient's head should be positioned such that the Frankfort's horizontal plane is 30 degrees below the horizontal plane. It is only at this position that the soft palate is at its maximal downward and forward functional position ***(Sivakumar et al., 2013).***

Flexion of the head also helps to prevent aspiration of the impression material and saliva. The patient's tongue should be positioned such that it is at the level of the mandibular anterior. This action helps to pull the palatoglossus anteriorly ***(Sivakumar et al., 2013).***

In completely edentulous patients, the handle of the maxillary custom tray should be designed such that it acts like the lower anterior to guide the tongue during impression making.

After positioning the head and the tongue, the impression tray is inserted into the mouth and the patient is asked to make rotational movements of his head without altering the plane to record the functional movements of the palate. The impression is removed after 4-6 minutes and examined. In contrast to the green stick compound, glossy areas, show tissue contact. Dull areas show areas that were not in contact with the tissues ***(KIM, CHOE and SON, 2014).***

The impression should show uniform tissue contact. Areas that appear dull are added with more wax and the procedure is repeated. Every time the impression is reinserted, the impression should be held for 3-5 minutes under gentle pressure and 2-3 minutes under firm pressure applied in the mid-palatine area. The procedure is repeated till even tissue contact is achieved. After achieving even tissue contact, the impression is removed and reexamined. The wax in the region of the anterior vibrating line should have knife-edge margin Blunt margins indicate improper flow and the impression should be repeated ***(KIM, CHOE and SON, 2014).***

1.8.2.2. Advantages

- It is a physiologic technique displacing tissues within their physiologically acceptable limits.
- Over compression of tissue is avoided.
- Posterior palatal seal is incorporated into the trail denture base for added retention.
- Mechanical scraping of the cast is avoided ***(Tanoue et al., 2013).***

1.8.2.3. Disadvantages

- More time is necessary during the impression appointment.
- Difficulty in handling the materials and added care during the boxing procedure ***(Tanoue et al., 2013).***

1.8.3. Arbitrary scraping of the master cast

This technique is the least accurate and leaves the most to chance at the insertion appointment. It relies upon the dentist's recollection of the palatal configuration and tissue compressibility to "guesstimate" the anterior and posterior vibrating lines and the depth to which the cast should be scraped. This technique is almost as physiologically correct as of the technician's attempts to place the posterior palatal seal at the dentist's request. Each technique has its advantages and disadvantages. Recording the posterior palatal seal is commonly performed by locating the posterior vibrating line in the patient's mouth and transferring it to the master cast. Arbitrary scribing of the master cast is considered to be the least reliable method. For the establishment of the posterior palatal seal at the final impression stage, the fluid wax technique is the technique of choice. Nevertheless, the fluid wax technique comes with a few disadvantages such as more time is required for impression appointments, handling the materials may be difficult, a heating unit is needed for wax conditioning, and the boxing procedure of cast formation requires proper care to prevent ant distortion of the carefully added posterior palatal seal wax ***(Giriyapura et al., 2014).***

1.8.4. Determination PPS on master cast

The second commonly reported technique is locating and transferring the PPS area on the master cast followed by subsequent scrapping. The scraping of the

PPS on the cast allows the seal area to have a convex surface on the denture that slightly displaces the soft palate thereby achieving a peripheral seal. Some of the techniques of scraping and designs of PPS are explained here. All these techniques are done after correctly transferring the PPS area on the master cast ***(Gull, Mushtaq and Maqbool, 2018).***

1.8.4.1. Boucher's Technique

The width of the posterior palatal seal is limited to a bead on the denture that is 1.5 mm deep and 1.5 mm broad at its base with a sharp apex. The resulting design is a beaded posterior palatal seal. The narrow and sharp bead will sink easily into the soft tissue to provide a seal against air being forced under the denture ***(Modi et al., 2016).***

1.8.4.2. Bernard Levin's Technique

For class III soft palate forms: He describes a 'double bead 'technique for class III soft palate. Here, the posterior vibrating line is scrapped 1 mm deep and 1.5 mm wide. An anterior bead line is created about 3 to 4 mm from the posterior border. This is considered the 'rescue bead'. Bernard stated that even though the anterior bead is located on the hard palate, the keratinization of the mucosa can tolerate a small amount of tissue displacement and pressure (Veeraiyan et al.,2017).

1.8.4.3. Swenson's Technique

A groove is cut along the posterior line to a depth of 1 to 1.5 mm which will cause the posterior border to stand straight out from the hard palate, turning neither up nor down. From the depth of this posterior cut, the cast is scraped in a tapering manner, so that it tapers up to the anterior line ***(Krysinski and Prylinski, 2007).***

1.8.4.4. Calomeni, Feldman, Kuebker's Technique

A posterior bead line is scraped on the cast to a depth of 1 to 1.5 mm extending bilaterally through the hamular notches. The anterior line is placed 5 or 6 mm anterior to the posterior line. The area between the anterior and posterior lines is scraped with Kingsley Scraper No 1. The depth of the cast scraped should vary from zero at the anterior line to the depth of 1 to 1.5 mm along the posterior border. In the midline, the distance between the anterior and posterior lines should be about 2 to 3 mm ***(Krysinski and Prylinski, 2007).***

1.8.4.5. Pound's Technique

Pound advocates a single bead posterior palatal seal with anterior extensions for additional air seal. A 'V'-shaped groove is carved across the palate from the hamular notch to the hamular notch 1 to 1.5 mm wide and 1 to 1.5 mm deep. This is placed 2 mm anterior to the vibrating line. A loop is carved on either side of the midline to provide an air seal. The depth and width of the anterior loop are determined by palpating the area with a blunt end of the instrument ***(Krysinski and Prylinski, 2007).***

1.8.4.6. Apple Baum-Winkler's Technique

A Kingsley scraper is used to score the cast. The deepest parts of the seal are located on either side of the midline, one-third distance anteriorly from the posterior vibrating line. It is scraped to a depth of 1 to 1.5 mm. Close to the mid- palatine region, the area is scraped to a depth of 0.5 to 1.0 mm as it has little submucosa and cannot withstand the same compressive forces as tissues lateral to it. The scraping is gradually feathered out as it approaches the

anterior vibrating line and is tapered toward the posterior vibrating line. The posterior palatal seal resembles, Cupid's bow ***(Chang and Wright, 2006).***

1.8.4.7. Silverman's Technique

A pencil line is inscribed from hamulus to hamulus midway between the anterior and posterior flexion lines. A shallow scratch mark is placed on the anterior flexion line and the posterior flexion line is scored to a depth of one-half of that of the mid scoreline. The cast is scraped over the entire seal area. The depth of the cast scraping diminishes from the midline to the anterior and posterior vibrating lines. He also suggested that complete maxillary dentures can be extended on an average distance of 8.2 mm dorsally to the vibrating line ***(Wicks, Ahuja and Jain, 2014).***

1.8.2.8. Hardy and Kapur Technique

The depth of the posterior palatal seal area is identified by pressing the ball portion of the T burnisher. The posterior palatal seal is extended 4 mm from the distal border of the denture and narrowed down to 2 mm in width through the hamular notch region. The scraping of the cast is done in such a fashion that the depth of the posterior palatal seal is maximum at the center and tapers to zero toward its anterior and posterior border ***(Jamayet et al., 2017).***

1.9. Troubleshooting in Posterior Palatal Seal

1.9.1. Under extension

It is the most common cause of seal failure. It mainly occurs due to the use of fovea palatine as a guideline for marking anterior and posterior vibrating lines. By doing so, 4-12 mm of tissue coverage loss occurs leading to decreased

retention. Tissues covering the hard palate are firmly attached and the main retention is by adhesion and cohesion, which is least during function. In the case of gaggers who cannot tolerate denture base far behind in palate, they insist on reduction of denture base and dentists unsure of his technique complies patients' request leading with decreased retention. Other related causes are improper recognition of anterior and posterior vibrating lines, and injudicious trimming of denture borders by technicians ***(Ye and Sun, 2016).***

1.9.2. Over extension

It mainly occurs due to overzealous extension of denture base for increased retention by dentists causes a physiological violation of soft palate musculature. It mainly shows symptoms of mucosal ulceration, painful swallowing, physiological violation of soft palate muscle, and sharp pain if pterygoidhamular is covered. It can be managed by selectively relieving the pressure areas and decreasing the distal length ***(Ye and Sun, 2016).***

1.9.3. Under post-damming

It mainly occurs due to improper depth of post damming, use of improper technique, and recording posterior palatal seal in a wide-open position which causes toughening of the pterygomandibular ligament and shortens the pterygomaxillary seal. It can be diagnosed using two tests, (1) Seat dentures in the mouth ask the patient to say ‘‘ah’’ and with mouth mirror view of any gap during the speech, (2) Place wet denture base and press slowly in mid palatal region and bubbles escaping at any point on distal denture border indicates an area of under post damming ***(Gaikwad, Mohite and Nadgere, 2020).***

1.9.4. Over postdamming

At the other end of the spectrum, it is not uncommon that the master cast was scraped too aggressively and the posterior palatal seal displaces too much tissue. If significant overpostdamming has taken place, especially in the pterygomaxillary seal area, then upon insertion of the denture the posterior border will be displaced inferiorly. If it is moderately over postdammed, then at the first or second post insertion appointment, tissue irritation will be discernible across the posterior palatal region. Selective reduction of the denture border with a carbide bur, followed by lightly pumicing the area while maintaining its convexity will remedy the problem ***(Resende, Nogueira and Leles, 2019).***

1.10. When to record PPS:

There are two schools of thought as to when to record PPS:

1.10.1. Before Try in

It provides the patient with psychological confidence in the retention of the denture. However, the temporary denture bases may be displaced by the PPS while recording the jaw relation ***(L, Hussain and Uthkarsh, 2007).***

1.10.2. After Try in

Here, the temporary denture bases are not displaced by the PPS and the model is scrapped while processing the denture. These dentures may have lesser occlusal errors. Orally, the area of the vibrating line is recorded by making marks with an indelible transfer stick in the fovea palatine area and the hamular notch areas on both sides of the palate and then connecting them with a solid line as in (Figure 1.9) ***(Kapoor and Miglani, 2015).***

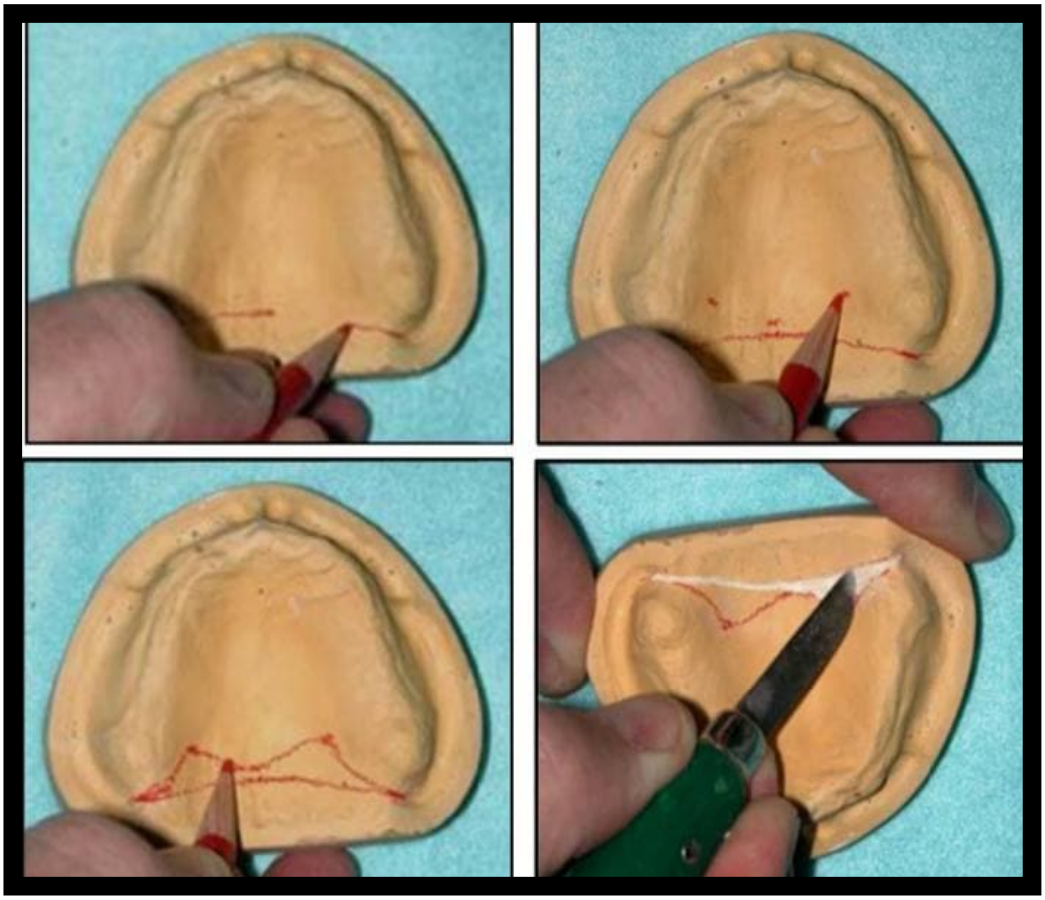


Figure (1.9): Recording posterior palatal seal area on the master cast ***(Kapoor and Miglani, 2015)***

CONCLUSION .2

- The placement of the correct posterior palatal seal area is not a difficult procedure once the anatomy and physiology of the area are understood.
- Careful examination during the diagnostic phase of the treatment and following established techniques for the placement of the border, the seal will ensure a more retentive prosthesis for the patient.

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