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University of Anbar

Dental Faculty

Prosthodontics Unit

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5th Grad / Lec. No. 1

2023-2024

DIAGNOSIS AND SYSTEMIC DISEASES RELATED TO PROSTHODONTIC AND COMPLETE DENTURE CASE SHEET

Diagnosis:- Determination of nature of the disease.

Treatment Planning:- Sequence of procedures planned for the treatment of a patient after diagnosis and explained to the patient in a simple and straight forward manner including all of the factors that might complicate the treatment .

Essential diagnostic data obtained from patient interview, definitive oral examination , consultation with medical and dental specialist, radiographs and mounted diagnostic casts should be carefully evaluated during treatment planning.

Complete Denture Work Sheet to facilitate and manage diagnosis and write treatment plan in correct logical and technical manner and implement in correct sequence.

1- patient Evaluation:-


1. Name:- Obtaining the name of the patient not only helps in maintaining records but also helps in creating a more personal and ambient atmosphere for the patient in the dental clinic.

2. Age:- is an indicator of the patient's ability to wear and use a prosthesis. Through the fourth decade of life, tissues heal rapidly and are resilient. Beyond fifth decade healing is not rapid.

3. Sex:- Generally appearance is a higher priority for women than for men. Woman facing the physiologic and psychological problems often present as exacting or hysterical patients who are very conscious about esthetics. Men are pre-occupied and present as indifferent patients who are concerned more with comfort or function.

4. Occupation :- A patient's job & social training often determine the values he or she places on oral health, as well as the esthetics and other qualities desired in a denture.

5- Address . Addressing the patient by his/her name gives a rather personal touch to the dentist patient relationship.

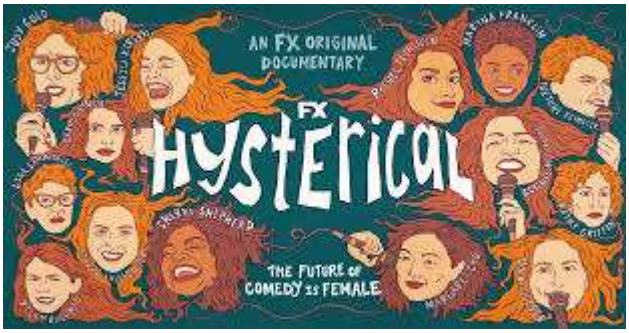
2- Psychological Evaluation of the Patient:-

1- **Philosophical:-** **Well motivated, cooperative, mentally well-adjusted and well-motivated confidence of the dentist. These patients have excellent prognosis.**

2- **Exacting (Critical):-** **likes each step in detail, makes alternative treatment for dentist, makes sever demands. Do not have confidence in the dentist, very difficult to satisfy them. But once satisfied they become the dentist, s greatest supporter.**

3- **Indifferent:-** **Not very interested in treatment, blames the dentist for any problem, not follow instructions, been coerced to come by friend, relative, uncooperative. They will not maintain the dentures properly and do not appreciate the efforts and skill of the dentist.**

4- **Hysterical:-** **Those in bad health with long neglected pathologic mouth conditions and who are positive in their minds that they can never wear dentures, easily excited, highly apprehensive, unrealistic expectation. They show poor prognosis.**



Chief Complaint

The questioned regarding his or her chief complaint such as

1. **Inability to chew.** 2. **Impaired speech.** 3. **Poor appearance.** 4. **Others**

- ## Medical History

A good medical history questionnaire combined with verbal qualification by the patient is essential to any dental treatment plan. Uncontrolled diabetics , patient with cardiovascular disease and subsequent treatment with blood thinners & immune-compromised patients may be excellent denture patient but might not be

considered good surgical risks and therefore, preprosthetic surgery may be contraindicated.

The following medical conditions should be ruled out before beginning the prosthetic treatment:-

1- Debilitating Diseases:-

Complete denture patients, most of whom are geriatric, are bound to be suffering from debilitating diseases like diabetes, blood dyscrasias & tuberculosis. These patients require specific instructions on denture / tissue care. They also require special follow-up appointments to observe the response of the soft tissues to the denture.

2- Diseases of the Joints:

The most common disease of the joint in old age is osteoarthritis. Complete denture patients with this disease, it will affect TMJ . With limited mouth opening and painful movements of the jaw, it becomes necessary to use special impression trays. It may also become necessary to repeat jaw relations and make post insertion occlusal adjustments due to changes in the joint.

3- Cardiovascular Diseases:-

It is always advisable to consult the patients cardiologist before starting the treatment. Cardiac patients will require shorter appointments.

4- Neurological Disorders:-

Diseases such as Bell's palsy and Parkinson's disease can influence denture retention and jaw relation records &USING NON ANATOMIC TEETH. Patients should understand the difficulty in denture fabrication and usage.

5- Oral Malignancies:-

After taking radiation , the tissues having bronze color and loss of tonicity and patient suffering from Xerostomia is not suitable for denture support.

In radiation therapy patient :

A- Avoid impression material that dry tissue (impression plaster) or heavily flavored materials (ZOE).
B- Consider non anatomic teeth.
C- Teeth should set in neutral zone.

- **Dental History**

We should ask the patient about history of tooth loss

A- Cause: poor ridges can be expected if teeth were lost due to periodontal disease.
B- Time:- teeth lost at different time intervals would result in different ridge levels.

1- Reason for tooth extraction.
2- When was the last tooth extracted .
3- Reasons for constructing a denture.
4- Any previous complete denture?

A-Why do you want to make a new denture?

B-Regarding the old denture how is?

1-Retention 2-Stability 3-Centric 4-Vertical 5-Apperance 6-Comfort

Clinical Examination of the Patient

- **Extra Oral Examination**

1- General appearance.
2- Facial symmetry.
3- Skin color.
4- Palpation of the head & neck (lymph nodes & muscles).
5- Muscle tonus. According to House Classification CL I, CLII, CLIII.
6- Neuro muscular coordination.
7- TMJ examination.

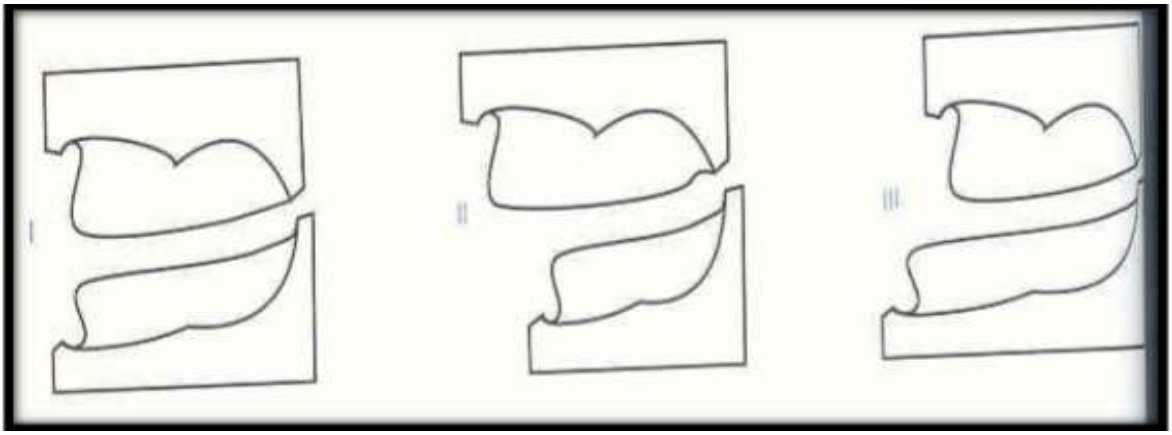
- **Intra Oral Examination**

Some complete denture patients refuse to remove or clean their prostheses for prolonged period and as a result might have extremely irritated and traumatized tissue. These patients are much more susceptible to fungal overgrowth and colonization of the prostheses and subsequent inflammatory papillary hyperplasia-especially in the palate and called (denture stomatitis). Areas of redundant tissue adjacent to denture borders, called (epulis fissuratum) are usually quite painful and are caused by excessive denture flange length, these areas should also be noted and appointed for surgical excision if the condition does not resolve following the removal of the overextended denture border.

The saliva should be evaluated both amount and consistency. A normal amount and thickness of saliva is paramount in the ability of most patient to comfortably wear dentures. The saliva acts as a lubricant and also serves as the interface between the denture base and the tissue allowing for denture retention. A patient with Xerostomia or excessive saliva containing much mucous can have difficulty obtaining an adequate seal.

- **Ridge Relation:-** **Described as an anterio posterior position of the mandibular ridge relative to the maxillary residual ridge when the jaws are in centric relation. Arch size amount of basal seat available for denture formation. The greater size; greater support, larger the contact surface, greater the retention.**

CL. I (NORMAL), CL. II (RETROGNATHIC) and CL. III (PROGNATHIC)



Arch Contour / Form Residual

1- **U SHAPE (good prognosis).**
2- **V SHAPE (favorable prognosis).**
3- **FLAT…… Flat residual ridge is the most difficult for restoration by the prosthodontics.**

Arch Form

- **Tongue:-** **Favorable tongue is average sized, move freely covered by healthy mucosa. Normally, it should rest in a relaxed position on lingual flanges, this will retain denture and contributes to denture stability by controlling it during speech , mastication and swallowing.**

Tongue Size: **1-Normal** **2- large**

- **According to House : -**
- Class I – normal in size, development, & function.
- Class II – teeth have been absent for long time .permits change in form & function.
- Class III – excessively large tongue.all teeth have been absent for a long time, allowing for abnormal development of the size of the tongue.

➢ Frenal Attachment:- Classification

Class I: Sulcal or low attachment.

Class II: Midway between. sulcus & crest of ridge).

Class III: Crestal attachment (Frenectomy).

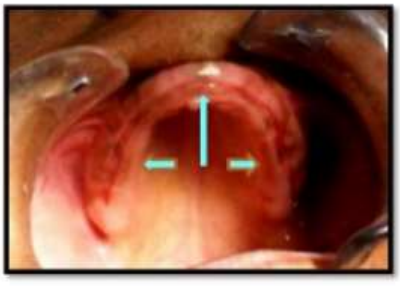
➢ Tori

- Torus palatinus & lingual tori frequently present.
- Torus palatinus: range from a small prominence in the midline to one that covers the entire hard palate.
- Adequate relief must be planned.
- Lingual tori: interfere with denture construction & unless very small should be surgically removed.

➢ Color of Mucosa

- Ranges healthy pink to angry red.
- Redness indicative of inflammation: related to ill fitting denture, underlying infection, systemic disease or chronic smoking.
- Pigmented spots or lesions.
- White patches → keratotic areas caused by denture irritation.

- Mucosa condition according to House
- Class I: Healthy
- Class II: Irritated
- Class III: Pathologic



➢ Inter Maxillary Space:

This is the space between the maxillary and the mandibular arches . Normally it should be obtain to 20mm; if the space is less than 20mm it is difficult stability of the denture base.


➢ Maxillary Tuberosity:

If enlarged the posterior occlusal plane may be placed too low, no enough space to set all molar. Surgical removal may need.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PhD- Maxillofacial Prostheses

MSD - Fixed and Removable Prosthodontics

BDS - Oral and Dental Surgery

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Retention, Stability & Support of Complete Denture

Outcome of complete denture treatment depends largely, on the degree of retention and stability and support of the dentures. Good retention causes the denture to remain in place when the jaws are apart, as in laughing and speaking. Good stability prevents the dentures from skidding when the jaws are brought together, as in chewing or swallowing. Good support prevents the dentures from sinking toward the tissue under load of mastication.

Retention: Is the quality of a denture that resists movement away from the tissue.

It is checked by firmly seating the denture in the mouth and trying to displace it with force at right angle to its occlusal surface, if the denture resist displacement it is said that it has retention.

There are three principal surfaces concerned in retention and stability of the denture:

1. Occlussal surface: that surface of a denture which makes contact or near contact with the corresponding surface of the opposing denture or dentition.

2. Polished surface: that portion of the surface of a denture which extends in an occlussal direction from the border of the denture and which includes the palatal surface. It is that part of the denture base which is usually polished, includes the

buccal and lingual surfaces of the teeth, and is in contact with the lips, cheeks and tongue.

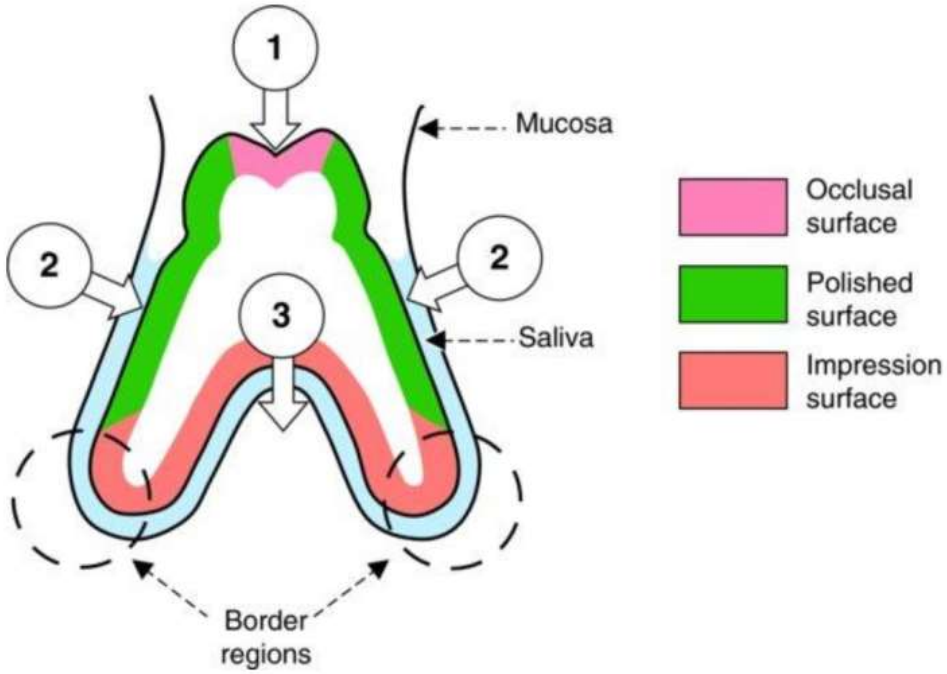
3. Impression surface: that portion of the surface of a denture that had its shape determined by the impression. It includes the borders of the denture and extends to the polished surface.

Retaining forces acting on a denture:

(1) Force of the muscles of mastication acting through the occlussal surface.

(2) Muscular forces of lips, cheeks and tongue acting through the polished surface.

(3) Physical forces acting through the impression surface.



Factors effect on retention:

I. Muscular factor: These forces are exerted by the muscles of the lips, cheeks and tongue upon the polished surface of the denture and by the muscles of mastication indirectly through the occlusal surface. *The successful muscular control of dentures depends on two factors:*

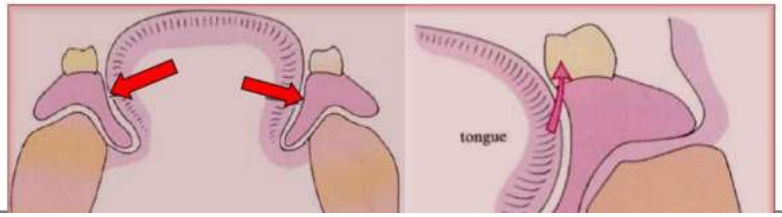
a. The design of the dentures: The oral and facial musculature supply supplementary retentive forces, provided:

1. *The denture bases* must be properly extended to cover the maximum area possible, without interfering in the health and function of the structures that surround the denture.

2. *The polished surfaces* of the dentures are properly shaped. The buccal flanges of the maxillary denture slope up and out from the occlusal surfaces of the teeth and the buccal flanges of the mandibular denture slope down and out from the occlusal plane, the contraction of the buccinators will tend to seat both dentures on their basal seats. The lingual surfaces of the lingual flanges should slope toward the center of the mouth so the tongue can fit against them and perfect the border seal on the lingual side of the denture. For Orbicularis oris muscle if we did not give the lower labial flange the correct thickness and shape (concave) to receive this muscle, it will try to dislodge the denture.

3. *Occlusal plane* is the average plane established by the incisal and occlusal surfaces of the teeth; it is not a plane but represents the planar mean of the curvature of the surfaces. The occlusal plane must be at the correct level; externally should it be with the relaxed lower lip level or with commissures of lips and internally with the lateral border of the tongue and slightly below the superior portion of the tongue. The position of occlusal plane in denture wearers should be as close as possible to the plane, which was previously occupied by the natural teeth. Such position of the occlusal plane provides normal function of the tongue and cheek muscles, thus enhancing the denture stability

4. *The arch form* of the teeth must be in the "neutral zone" between the tongue internally and the cheeks and lips externally. Conversely an incorrectly shaped denture results in the muscular force dislodging that denture. In short, the muscles can either help or hinder denture stability and retention.



b. Patient's skill: The patient's ability to acquire the necessary skills to control new dentures is related to biological age. In general, the older the patient, the longer the learning period. In the extreme case, the elderly or senile patient may not be able to acquire this skill at all and so new dentures may fail even though they are technically satisfactory. It is for this reason that replacement dentures for an older patient should be constructed in such a way that the patient's skill in controlling the previous denture shapes can be transferred directly to the replacements. This is achieved by *copying the old dentures* as closely as possible. When dentures are first fitted, muscular control takes some time to develop and is therefore likely to be inefficient. Thus, it is during this initial learning period that the physical forces of retention are particularly important.

II. Physical factor:

1. Interfacial force: is the resistance to separation of two parallel surfaces that is imparted by a film of liquid between them. These forces act to keep the denture inside the patient's mouth because of thin film of saliva between the denture and mucosa. Interfacial forces depends on:

a. Interfacial surface tension: is the tension or resistance to separation possessed by the film of liquid between two well adapted surfaces. This acts with the air-liquid interface acting between two surfaces where a thin film of liquid holds the surfaces on the either sides. Thin film of saliva resists the displacing forces, and this aids in retention.

It is dependent on the ability of the fluid to "wet" the rigid surrounding material. For retention to happen effectively, there needs to be a thin film of saliva, and as there is excess saliva in the borders of a mandibular denture, there is minimal interfacial surface tension seen.

Wettability: Wetting is the ability of a liquid to maintain contact with a solid surface, resulting from intermolecular interactions when the two are brought together. If the surrounding material has low surface tension, as oral mucosa does, fluid will maximize its contact with the material, so wetting it readily and spreading out in a thin film. If the material has high surface tension, fluid will minimize its contact with the material, with the result that it will form beads on the material's surface. Most denture base materials have higher surface tension than oral mucosa, but once coated by salivary pellicle they display low surface tension that promotes maximizing the surface area between liquid and base.

- The wetting characteristics may be described in terms of contact angle (high contact angle indicate poor wetting).

Capillary action, or capillarity: is the ability of a liquid to flow against gravity where liquid spontaneously rises in a narrow space such as a thin tube, or in porous materials such as paper. Is the penetration of liquids into narrow crevices, is what causes a liquid to rise in a capillary tube, because in this physical setting the liquid will maximize its contact with the walls of the capillary tube. When the adaptation of the denture base to the mucosa on which it rests is sufficiently close, the space filled with a thin film of saliva acts like a capillary tube in that the liquid seeks to increase its contact with both the denture and the mucosal surface in this way, capillarity will help to retain the denture. Surface tension at the periphery of the saliva film will produce a slight negative pressure beneath the denture.

b. Interfacial viscous tension: refers to the force holding two parallel plates together that is due to the viscosity of the interposed liquid. The viscous force increases proportionally to increases in the viscosity of the interposed fluid, and decreases as the distance between the plates (i.e., the thickness of the interposed medium) increases.

The interfacial viscous tension depends on saliva viscosity. Thick, high-mucin saliva is more viscous than thin watery saliva—but do not result in increased retention for the watery serous saliva can be interposed in a thinner film than the more cohesive mucin secretions.

- To obtain maximum interfacial surface tension: 1. Saliva should be thin and even 2. Perfect adaptation should be present between the tissues and denture 3. The denture base should cover a large area.

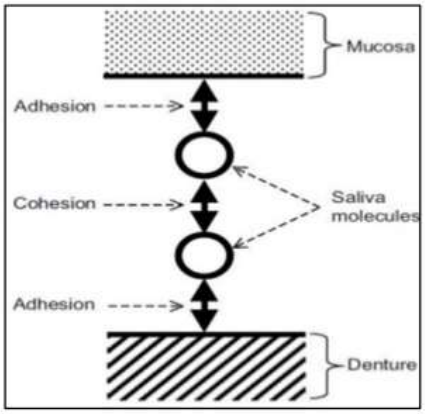
2. Adhesion: is the physical attraction of unlike molecules for each other. Adhesion of saliva to the mucous membrane and the denture base is achieved through ionic forces between charged salivary glycoproteins and surface epithelium or acrylic resin. By promoting the contact of saliva to both oral tissue and denture base, adhesion works to enhance further the retentive force of interfacial surface tension.

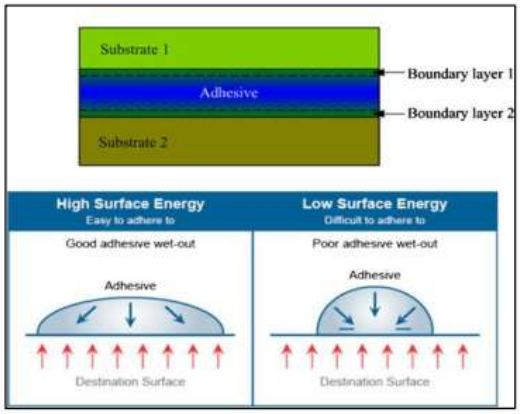
The most adhesive saliva is thin serous but contains some mucous components. Thick and ropy saliva is very adhesive but tends to build up so that it is too thick in palatal area and interferes with oral adaptation, in this situation patient should rinse out ropy saliva every two or three hours.

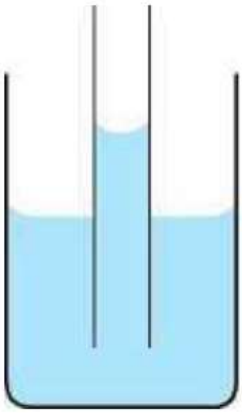
- The amount of retention provided by adhesion is depend on: Close adaptation of the denture base, type of saliva (viscosity and wet ability) and Area cover by the denture.

3. Cohesion: is the force of attraction between like molecules, which maintains the integrity of the saliva film. It occurs within the layer of fluid (usually saliva). That is present between the denture base and the mucosa, and works to maintain the integrity of the interposed fluid. Normal saliva is not very cohesive, so that most of the retentive force of the denture-mucosa interface comes from adhesive and interfacial factors unless the interposed saliva is modified as it can be with the use of denture adhesive.

- Factor affecting cohesion: Area covered by the denture, Thickness of the salivary film, Adaptation to denture base to mucosa, Interfacial surface tension.

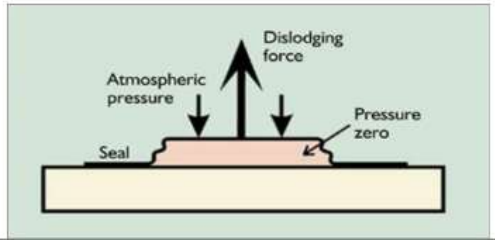






4. Atmospheric pressure: can act to resist dislodging forces applied to dentures, if the dentures have an effective seal around their borders. This resistance force has been called "**suction**". When a perpendicular force is exerted on a properly extended complete denture to dislodge it, pressure between the prosthesis and mucosa drops below the outside pressure thus resisting displacement. Retention due to atmospheric pressure is directly proportionate to the area covered by the denture base. For atmospheric pressure to be effective, the denture must have a perfect seal around its entire border. Proper border molding with physiological, selective pressure techniques is essential for taking advantage of this retentive mechanism.

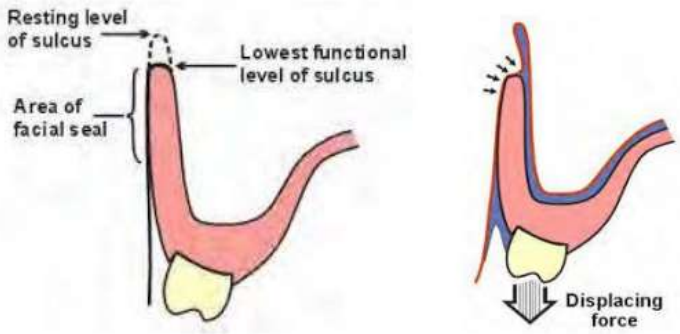
- In general, the retention force directly proportional to the surface area of the surfaces and inversely proportional to the distance or space between the surfaces.



The aspects of complete dentures that influence amount of physical retention obtained are:

a. Border seal: For optimum retention, the denture border should be shaped so that the channel between it and the sulcus tissues is as small as possible. It is not possible to maintain a close approximation between the border of a denture and the mucosal reflection in the sulcus at all times because the depth of the sulcus varies during function. The denture has to be constructed so that the border conforms to the shallowest point that the sulcus reflection reaches during normal function. This means that for some of the time when the patient is at rest the denture will be slightly underextended. If the denture were extended further in an attempt to produce a more consistent seal in this area, displacement might occur when the sulcus tissues moved during function.

The problem of achieving a constant border seal is overcome by extending the flanges of the denture laterally so that they contact and slightly displace the buccal and labial mucosa to produce a facial seal. Along the posterior border of the upper denture as it crosses the palate, another approach to creating the smallest possible space between denture and mucosa is adopted. A groove known as a post-dam is cut into the working cast so that the posterior border of the finished denture has a raised lip which becomes embedded a little way into the palatal mucosa. However, although an enhanced posterior seal is achieved with a post-dam it differs from the facial seal against the flanges in that even a small downwards movement of the posterior border of the denture is likely to break the seal with a resultant loss of retention. If the post-dam has width as well as depth the basic retention of the denture will be improved.



b. Area of impression surface: The degree of physical retention is proportional to the area of the impression surface. It is important therefore to ensure maximum extension of the dentures so that the optimum retention for a particular patient may be obtained.

c. Accuracy of fit: The thinner the saliva film between the denture and underlying mucosa, the greater the forces of retention; therefore it is important that the fit of the dentures is as accurate as possible. A poor fit will increase the thickness of the saliva film and increase the likelihood of air bubbles occurring within the film. These bubbles will further reduce the retention of the denture. In addition, as the pressure of the saliva film drops due to displacing forces acting on the denture, the air bubbles will expand and may extend to the border area, resulting in a breaking of the border seal.

5. Gravity: acts as retentive forces for the mandibular denture and displacement for the maxillary denture when patient is in upright posture.

Heavy maxillary prosthesis unseat if the other retentive forces are suboptimal.

Increasing the weight of the mandibular denture- beneficial when other retentive factors are marginal

6. Surface roughness:

Insofar as increasing roughness would increase the interfacial area for adhesion between saliva and denture, the strength of that union would be improved. However, since, as stated above, failure does not occur at this site in this way, roughness is irrelevant and can be discounted.

Denture-base material	Processing	Surface roughness (μm)
Acrylic resin	Finished	0.29 ± 0.03*
	Finished + Polished	0.15 ± 0.05

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III. Anatomical factors:

1. Arch size: Retention increase with increase in size of denture bearing area. The size of maxillary denture bearing area is about (24 cm^2) & that of mandible is about (14 cm^2).

2. Ridge form: 1) High and flat crest and well formed in recent extraction. The problem only is no space for setting of teeth.

2) Flat one difficult and no retention and stability so in taking the impression try to extend it beyond mylohoid area to gain more stability and retention.

3) Ridge with undercut more common in upper (bilateral maxillary tuberosity) so we do surgery in one side and block out the other and we have to change the path of insertion.

Modest undercuts are very helpful in the retention of complete denture especially in the upper anterior region, less severe undercuts of the lateral tuberosities, maxillary premolar areas and lower distolingual areas, can be extremely helpful to the retention of the prosthesis.

4) Knife ridge difficult and cause lacerations and pain so we do relief.

5) Flabby ridge fibrous tissue and movable, no good seal so we either modified in the impression technique or do surgical correction.

6) Parallel wall prominent alveolar ridges with parallel buccal and lingual walls provide significant retention.

3. Volt Form: 1) - U shaped >>> good in retention and stability.

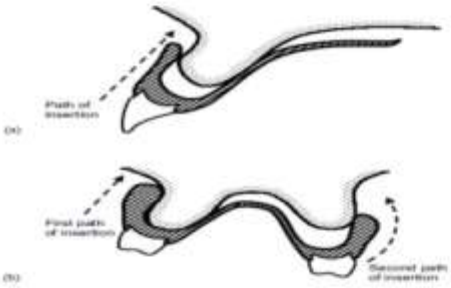
2) - V shaped >>> have retention but no stability and any pressure on it could break the seal.
3- Flat shaped no enough depth, so no retention and stability.

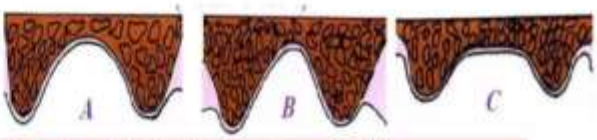
4. Arch Form: Squared, ovoid, tapered and the best one is the squared. This is because of:- 1-there is 4 point of contact with denture. 2- Resistant the lateral forces.

5. Arch relationship: Most of edentulous patient have class III >>> because of the pattern of bone resorption of the ridges. So the limited in movement only opening and closing. (No protrusive movement). Some have class II and it isn't favorable because it have small surface area, and difficult to get the upper and lower in contact.

6. Interach distance: Small interarch space more retention

7. Tongue: If too big > it could interfere with denture, so dislodging of the lower and upper.
8. Mucosa: We need it Firm, compressible and even thickness. Not to be thick and flabby.





A: U-shape: Ideal for both retention and stability.
B: V-shape: Retention is less.
C: Flat shape: Reduced resistance to lateral and rotatory forces.

IV. Mechanical factors:

1- Engagement of undercut: Unilateral undercuts aids in retention while bilateral undercuts will interfere with denture insertion and require surgical correction. If bony undercuts exist, retention may be enhanced by designing a denture that utilizes these undercut areas. In order to achieve this without traumatizing the mucosa" on insertion and removal of the denture, special care is required in planning the path of insertion.

2- Mucosal implant: Intramucosal implant aid in increase retention of highly resorbed ridge.

Recently not used because pain and chronic trauma to patient.

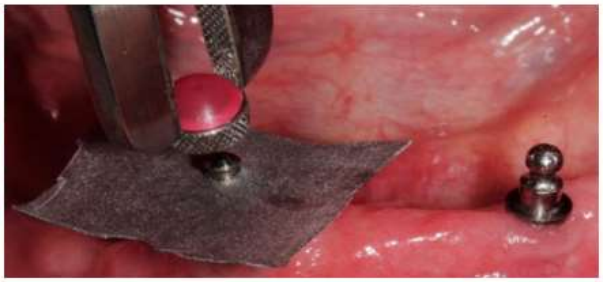
3- Vacuum device: -It's like a suction chamber, alternative name is rubber disk or palatal window in the past suction chamber in the maxillary dentures were used to aid in retention by create an area of negative pressure which increase retention . They are avoided now due to their potency for creating palatal hyperplasia.

4- Springe: It is made up of coiled stainless steel or gold plated base metal. Ends of springs are attached to shrivel in the premolar region on both sides of upper and lower dentures. Thus, they are permanently attached to each other and are held in occlusion for insertion into the mouth. As soon as they are released the dentures are forced apart by the action of springs, which causes the denture to seat in place.

Disadvantages

- Restricted lateral movement
- Soreness of cheek mucosa resulting in irritation
- Increased alveolar ridge resorption

5- Implant and over denture attachment: Attachments are small mechanical devices, they are incorporated to provide retention and support, one part is connected to a root, tooth or implant (male part) and other part to a prosthesis (female part). Implant a prosthetic device implanted into the oral tissue beneath the mucosal or/and periosteal layer and/ or in the bone to provide retention and support for the prosthesis.



V. Surgical factors: Usually we use these factors to increase the retention of the dentures through various procedures, like vestiobuloplasty, ridge augmentation, frenectomy & dental implants.

VI. Psychological factors: The role of psychological factor on denture retention depends on several considerations related to the patient himself which include :

1. Intelligence. 2. Expectations. 3. Apprehension.
4. Gagging reflex . 5. Previous denture experience.

VII. Physiological factors: Saliva is clear fluid secreted by salivary glands, which are: serous secretions by the parotid gland, mixed but mostly serous secretion by the submandibular glands, mixed but mostly mucous secretions by the sublingual glands. Some other smaller glands are located in the mucosa of the tongue, lips and palate.

Viscosity of saliva determined retention, thick ropy saliva can cause some problems:

1. Very thick saliva can force the dentures out of their correct position.

2. Complicates impression making by forming voids in the impression surface while the impression material sets.

3. Causing the patients to gag while impression are made and after the new denture are installed.

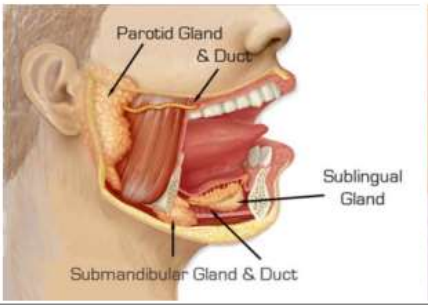
On the other hand a lack of saliva (xerostomia) causes some problem:

1. Reduced retention of denture.

2. Sticking of cheeks and lips to the denture base in an uncomfortable manner.

3. Formation of sore spot under the denture which is very annoying to the patient.

4. Lack of oral hygiene.



VIII. Denture adhesive (Adjunctive factor): : is a material used to adhere a denture to the oral mucosa. A commercially available, nontoxic, soluble material (powder, liquid or cream) that is applied to the tissue surface of the denture to enhance denture retention, stability, and performance.

There are two main types of denture adhesives:

1. The old generation : which is vegetable gums based adhesives such as(e.g. karaya, xanthan, and acacia) that display modest, non-ionic adhesion to both denture and mucosa and possessed very little cohesive strength ,in addition, gum based adhesives are highly water soluble particularly in hot liquids such as coffee, tea and soups, therefore wash out readily from beneath dentures. Allergic reactions have been reported to karayia, and formulations with karayia impart a marked odor indicative of acetic acid. Overall, the adhesive performance of vegetable gum-based materials is short-lived and relatively unsatisfactory.

2. The new generation which is a synthetic materials, the most popular product consist of mixtures of the salts of short acting Carboxy Methyl Cellulose (CMC) and long acting polymers(polyvinyl methyl ether maleate or gantrez). In the presence of water, Carboxy methyl cellulose hydrated and displays quick onset ionic adherences to both denture and mucosa, the original fluid increases its viscosity and carboxymethyl cellulose increases in volum, thereby eliminating voids between prosthesis and its basal seat. These two actions markedly enhance the interfacial forces acting on the denture. The long acting polymers (gantrez salts) are less soluble, it also displays molecular cross- linking resulting in a measurable increase in cohesive behaviour.

Indications:

1- Denture adhesives are indicated when well-made complete dentures do not satisfy a patient's perceived retention and stability expectations.

2- Patients who suffer from xerostomia.

3- Neurological diseases like stroke and Orofacial dyskinesia

4- Patients who have undergone extensive surgery for removal of Oral Neoplasia.

Contraindication:

1-Denture adhesive should not be used for patient with ill-fitting dentures

2- It should not be used with patient with worn out denture.

3- t- It should not be used as a substitute to a relining or tissue conditioner.

4-it should not be used for patient with physical inability to clean dentures.

5- Not be used in patient with temporary or immediate dentures where infections could result.

6- It should not be used in patient allergic to adhesive

Mode of action of adhesives: its enhance retention through the optimizing interfacial forces by: 1. Increasing the adhesive and cohesive properties and viscosity of the interposed medium

2. Eliminating the voids between denture base and its basal seat

3. Increases viscosity of saliva

4. Hydrated material swells up in the presence of saliva /water

5. Hydrated material formed by adhesives stick readily to the tissue surface and the mucosal surface of the denture

Forms of denture adhesive: A- Powder form Start its action immediately with maximum effectiveness &decrease with time.

B- Cream form Starts its action immediately with accepted effectiveness which increases to maximum within Time

Side effect of denture adhesive:

- High or Elevated Zinc Blood Levels.
- Symptoms of Nerve Damage.
- Numbness or Tingling in the Arms and Legs Paresthesia.
- Anemia.
- Bone Marrow Failure.

Stability

That quality of maintaining a constant position in the presence of forces that threaten it; the quality of a denture to be firm, stable or constant and to resist displacement by functional horizontal or rotational stresses & not to be subject to change of position when forces are applied.

There is a very interdependent relation between retention and stability because the factors that affect retention are also involved in the stability.

A stable denture is one that moves little in relation to the underlying bone during function. It is perhaps surprising that dentures stay in place at all, as they simply rest on mucous membrane and lie within a very active muscular environment.

The various factors that affecting the stability are:

Width of the occlusal table must be less than normal teeth to get god stability and retention.

1) Vertical height of the residual ridge: the residual ridge should have sufficient vertical height to obtain good stability .Highly resorbed ridges offer the least stability.

2) Quality of the impression: An impression should be as accurate as possible. The impression surface should be smooth and duplicate all the details accurately. It should be devoid of voids and any rough surfaces. The impression should not warp on removal. The impression should be dimensionally stable and the cast should be poured as soon as possible. An accurate impression has maximum coverage increase stability. Impressions should recorded the stress- bearing areas under stress and relief with no or minimum pressure.

3) Occlusal plane: should be oriented parallel to the ridge .if the occlusal plane is inclined then the sliding force may act on reduce its stability. The occlusal plane should divide the inter arch space equally.

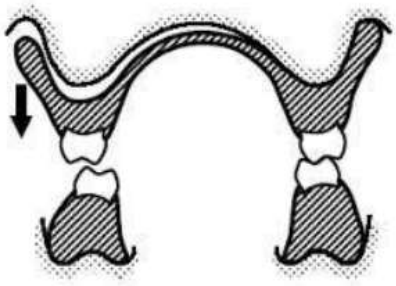
The occlusal plane should be the same as that present before the loss of natural teeth in the resting position the occlusal plane of teeth should be with the level of the lateral border of the tongue which is determined by the junction of the specialized and non-specialized mucosa.

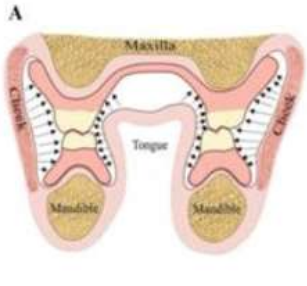
If the occlusal plane is higher than that level of the tongue it will interfere with the stability at the denture because the tongue will move too far high to bring the bullous of food between the teeth from the lingual vestibule which lead to dislodgment of the denture.

In this situation the tongue will need a big amount of movement in upward and forward direction to get freedom during speech or eating which result in elevation of the floor of the mouth (alveolingual sulcus) and finally displacement of the denture.

4) Teeth arrangement (balanced occlusion and neutral zone): The position of the teeth and their occlusion play an important role in the stability of the denture .Balanced occlusion facilitates the even distribution of force across the denture. Absence of the balanced occlusion may produce unbalanced lever type of force of any one side of the denture leading to loss of stability. The teeth in the denture should arrange in the neutral zone.

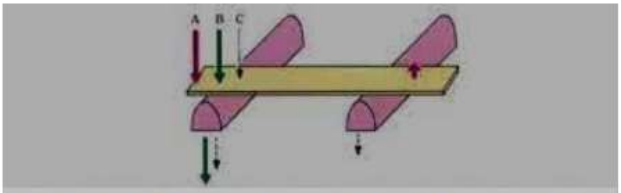
Neutral zone: the potential space between the lips and cheeks on one side and the tongue on the other. Natural or artificial teeth in this neutral zone are subjected to equal and opposite force from the surrounding musculature.





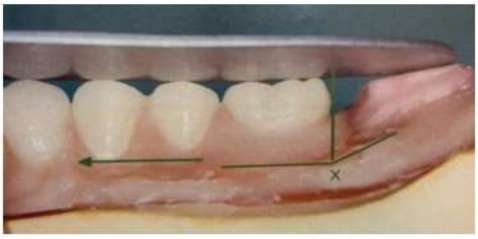
Although the natural teeth were situated in the center of the alveolar ridge, following their loos much bone resorption occurs and the position of the crest of the residual ridge may bear little relation to that of the original alveolar ridge. It is suggested that optimum denture stability is obtained when the artificial teeth are placed on, or lingual to the residual ridge.

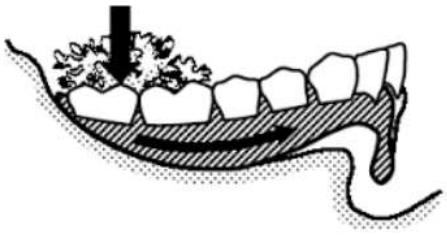
As a general guide to (lower) complete denture stability, the palatal cusps of the maxillary premolar and molar teeth should lie over the mandibular ridge, the central fossae of the lower posterior teeth should overlie the crest of residual ridge.



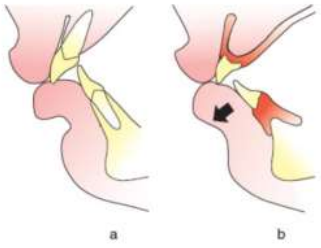
If the artificial teeth are arranged on A, the occlussal load placed on A will serve as the tilting force with a fulcrum on the ridge crest. I f arranged on B or C, the occlussal load will serve to place the denture in position leading to stability of the denture.

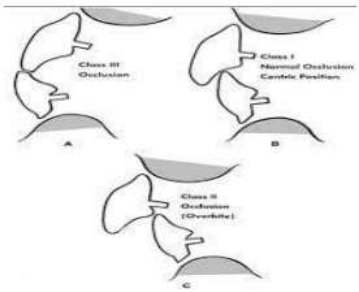
Stability of the lower denture can be improved by careful consideration of the posterior extension of the occlusal table. If that table extends to the steeply sloping part of the ridge posteriorly, pressure from the bolus will cause the denture to slide forwards. Therefore the occlusal table should terminate on the relatively horizontal part of the ridge where effective support is available and displacement prevented. It may be necessary to use smaller teeth or reduce the number of posterior teeth to achieve this aim.

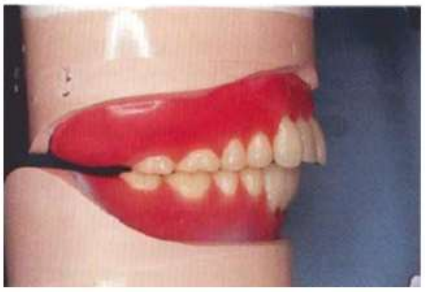




Occasionally, the problem of occlusal displacement can create a conflict of interests between the requirements of optimum appearance and denture stability. Upper anterior teeth placed close to the crest of the ridge where strong incising forces can be applied with minimal leverage effects, despite the fact that lip support and appearance would be compromised. No matter what skeletal relationship exists, the labial surface of the mandibular incisors should not protrude beyond the labial vestibule. This horizontal limit applies even in a sever Class II jaw relationship with large overjet of the maxilla, unless, of course, the patient insists that the aesthetics advantages of protruding incisors are more valuable than the stability of the lower denture.







Thus patients are instructed about the above mentioned mechanism and told not to bite with the anterior teeth, cutting food into smaller pieces before inserting them into the mouth, chewing on both sides of the dental arch simultaneously and starting with softer 'easier' foods before progressing to more challenging morsels. Sticky foods tend to move the dentures away from the mucosa.

5) Contour of the polished surface: The polish surface of the denture should be harmonious with the oral structures. They should not interfere with the action of the oral musculature.

The area which is situated laterally and slightly above the corner of the mouth known as the **muscular node or the (modiolus)**, which is a concentration of many fibers of this group of muscles. Here the labial flange of the maxillary denture should be reduced in thickness, so as not to effect the stability of the upper denture. At times, the mandibular first premolar should be arranged properly on the crest of residual ridge to avoid interference with this modiolus.

When masseter activated it push the buccinators muscle medially against denture border in the area of the retro molar pad ,so the denture should be contoured to accommodate this interaction between these two muscle. This contour is known as **masseter groove**.

6) Shape of palatal vault: A steep palatal vault may enhance stability by providing greater surfaces area of contact & long inclines approaching .a right angle to the direction of force Hard palate: can be classified as : 1 -U-shaped: ideal for both retention and stability.

2-V-shaped: retention is less as the peripheral seal is easily broken.

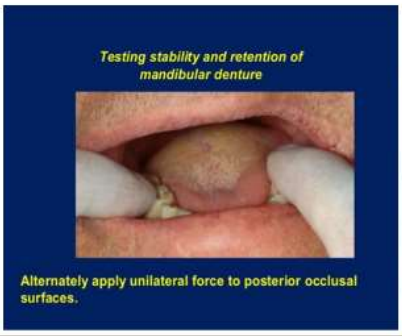
3-round: reduced resistance to lateral and rotator force

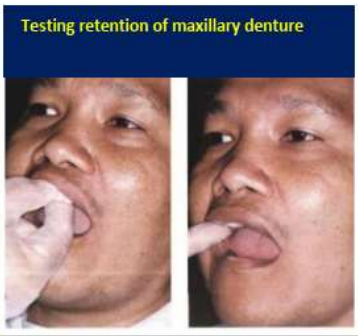
Stability decrease with 1-Loss of vertical height of the ridge,
2- Increase in the movement of flabby tissue.

Checking the stability

Pressure is applied with the ball of finger in premolar and molar region of each side alternatively. Pressure must be at right angle to occlusal surface.

If pressure on one side causes the denture to tilt and raise on other side it indicates that the teeth on the side to which pressure is applied are outside the ridge.





Support

The resistance to the forces of mastication, occlusal forces & other forces applied in a direction towards the denture bearing area.

The resistance to vertical forces of mastication, occlusal forces & other forces applied in a direction towards the denture bearing area.

Initial denture support is achieved by using impression procedure that provide optimal extension & functional loading of the supporting tissue

Nature of the Supporting tissue: The soft tissues should be:

1- In the edentulous person, the mucosa covering the hard palate and the crest of the residual ridge, including the residual attached gingiva, is classified as masticatory mucosa. It is characterized by a well-defined keratinized layer on its outermost surface that is subject to changes in thickness depending on whether dentures are worn and on the clinical acceptability of the dentures.

2-The submucosa is firmly attached to the periosteum of the underlying supporting bone and will usually withstand successfully the pressures of the dentures. (The thickness and consistency of the submucosa are largely responsible for the support that the mucous membrane affords a denture because in most instances, the submucosa makes up the bulk of the mucous membrane. When the submucosal layer is thin, the soft tissues will be no resilient, and the mucous membrane will be easily traumatized. When the submucosal layer is loosely attached to the periosteum or it is inflamed or edematous, the tissue is easily displaceable, and the stability and support of the dentures are adversely affected).

3- Hard tissue should be Relatively resistance to remodeling & resorptive changes. Consideration must be given to the maintenance of alveolar ridge height in the conventional complete denture patient. Minimizing the pressure in those region most susceptible & directing the forces toward those region relatively resistance to resorption can maintain healthy residual ridge. There are two types of osseous tissue that form bones.

Cortical bone: It is harder, stronger and stiffer than cancellous bone.

Cancellous bone: is less dense, softer, weaker, and less stiff. It typically occurs at the ends of long bones.

Mandibular anatomical consideration:

1-Buccal shelf area: The surface of the mandible from the residual alveolar ridge or alveolar ridge to the external oblique line in the region of the lower buccal vestibule. It is covered with cortical bone. Buccal shelf area is the *primary support area* for the mandibular denture because: 1) it's usually covered by mucosa with an intervening sub mucous layer containing glandular connective tissue & buccinators muscle fibers

2) It is parallel to occlusal plan.

3) It lined by cortical bone.

2. Mandibular residual ridge: It is covered by a keratinized layer and is attached by its submucosa to the periosteum of the mandible. The extent of this attachment varies considerably. In some people, the submucosa is loosely attached to the bone over the entire crest of the residual ridge, and the soft tissue is quite movable. In others, the submucosa is firmly attached to the bone on both the crest and the slopes of the lower residual ridge. The ridges are reserved as *secondary support areas*.

1) The lack of the muscle attachment 2) Presence of cancellous bone

3. The retro molar pad is covered by a thin non-kerainized mucosa .It should not be used as support and it should be relieved by taking impression mucostatically in that region.

Maxillary anatomic consideration:

1) Horizontal portion of the hard palate is consider as *primary stress bearing area* -It have keratinized masticator mucosa overlies a distinct Sub mucosa layer everywhere.

2) In the region of the medial palatal suture, the submucosa is extremely thin, with the result that the mucosal layer is practically in contact with the underlying bone. For this reason, the soft tissue covering the medial palatal suture is nonresilient and may need to be *relieved* to avoid trauma from the denture base.

3) In the area of the rugae, the palate is set at an angle to the residual ridge and is rather thinly covered by soft tissue. This area contributes to the *stress-bearing role*, though in a *secondary* capacity.

4) The incisive papilla should usually be relieved because it covers the emerging nasopalatine nerve and vessels.

5) Crest of maxillary ridge: The crest of the edentulous ridge is an important area of support. However, the bone is subject to resorption, which limits its potential for support, unlike the palate, which is resistant to resorption. Because of this, the ridge crest should be looked on as a *secondary supporting area*, rather than a primary supporting area. The inclined facial surface of the maxillary ridge provides little support, Although the peripheral tissues should be contacted to provide a border seal. The configuration of the bone that provides the support for the maxillary denture varies considerably with each patient.

Factors that influence the form and size of the supporting bone include:

(1) Its original size and consistency;

(2) The person's general health;

(3) Forces developed by the surrounding musculature;

(4) The severity and location of periodontal disease (a frequent cause of tooth loss).

(5) Forces accruing from the wearing of dental prostheses.

(6) Surgery at the time of removal of the teeth.

(7) The relative length of time different parts of the jaws has been edentulous. In addition, a number of anatomical features influence the shape of the hard palate and residual ridge.

Methods used for improving the retention stability and support:

a. Dental implants improve the support, retention and stability of a full or partial denture reducing the slip and movement while speaking or eating.

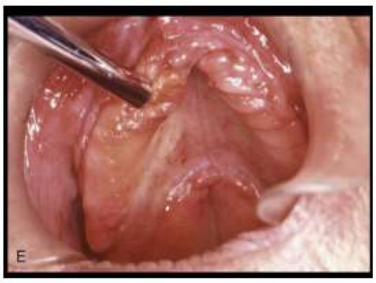
b. Mini-implants have become a common treatment option for improving retention of lower dentures.

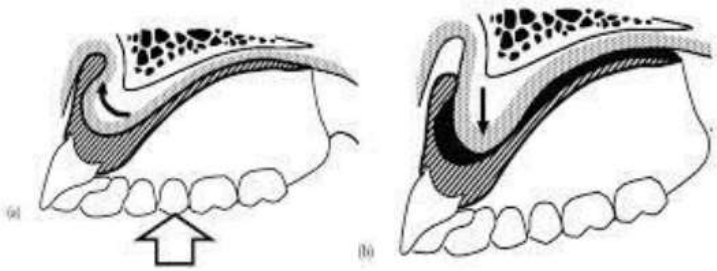
A reduction in support promotes instability, as indicated in the following examples:

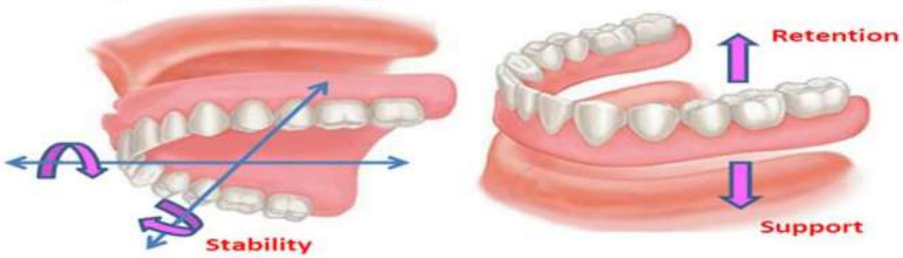
1. Instability of an upper denture follows resorption of the supporting bone. This resorption is largely confined to the region of the alveolar ridges, as there is remarkably little resorption of bone in the centre of the palate. Thus, after a period of time, the denture will be well supported by the hard palate, but there will be limited contact between the impression surface of the denture and the alveolar ridges. In these circumstances, occlusal contact readily produces tipping, with the denture pivoting about the mid-line of the palate.

2. Support will be inadequate if the ridges are small because resistance to lateral displacing forces will be poor.

3. Support will be reduced if the ridges are flabby, the denture will move considerably during function even though the retention may be good and contact with the mucosal surface is maintained.



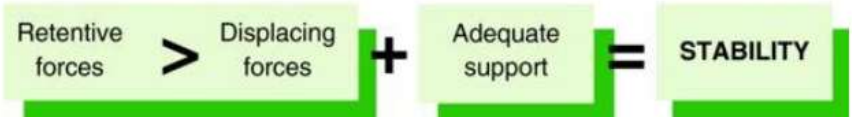




Retention = Denture base + Soft tissue.

Stability = Denture base + Bone.

Support = Denture base + Bone + Soft tissue.



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2023-2024

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

University of Anbar

Dental Faculty

Prosthodontics Unit

Asst. Prof. Dr. Salah Kh. Al-Rawi (BDS, MSc, PhD)

5th Grad / Lec. No. 3

2023-2024

Infection Control in Prosthodontics Perspectives

Introdutction

The treatment offered to patients by a prosthodontist varies depending on the status of their dentition. Most of the dental patients need prosthodontics work. The treatment ranges from simple dental procedures like a dental impression to the more complicated such as maxillofacial rehabilitation.

Providing a patient with a fixed dental prosthesis involves the use of sharp instruments which renders the prosthodontist to be susceptible to percutaneous injuries.

A number of microorganisms existing in the dental clinic environment have been associated with serious and debilitating illnesses. Therefore, all efforts should be taken to prevent cross infection and to avoid any possible transmission of diseases during prosthetic dental work.

Prosthodontists face a high risk of acquiring infectious diseases from their patients because of the close proximity to the patient with exposure to contaminated droplets and aerosols generated during dental treatment procedures. They are also at risk of indirect cross infection through exposure to saliva-contaminated surfaces as well as indirect contact with dental laboratories items including impressions, dental stone casts, and fixed and removable prosthesis. Consequently, very meticulous measures and precautions should be considered in the dental clinic.

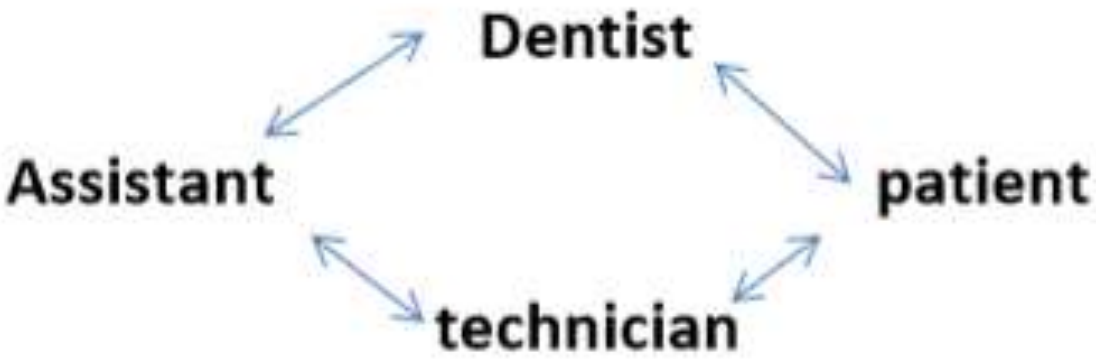
Infection Control

- **Is an essential part of dentistry, dentist have a duty to take appropriate precautions to protect their patients and their staff from the risk of cross – infection.**
- **Cross-infection during clinical practice can occur with transmission of infectious agents between patients and health workers in a clinical environment.**
- **Transmission of dental infection can occur through infected air droplets, blood, saliva and instruments contaminated with secretions.**

- **Dental work should be done in aseptic field, clean and sterile.**

- **To minimize the risk of transmission of infection between patients and health care workers a sensible and practical routine for the prevention of cross – contamination and cross –infection should followed.**

- **Dentists and auxiliary staff should additionally protect themselves by ensuring up – to date immunization against hepatitis B-(HBV) and other infectious diseases such as tuberculosis, poliomyelitis, rubella, tetanus and diphtheria .**



Disinfection: It is the process of using chemicals that kill the growing forms; but not the resistant spores of bacteria. This uses chemical germicides, radiation, ultraviolet rays, or heat.

Disinfectant: It is a chemical substance, which causes disinfection. It is used on non-vital objects to kill surface vegetative pathogenic organisms, but not necessarily spore forms or viruses.

Sterilization: It involves any process, physical or chemical, that will destroy all forms of life, including bacterial, fungi, viruses, and bacterial endospores. It uses chemical methods and physical methods.

Cross Infection: Is the transfer of microorganisms, usually viruses and bacteria, between people, through direct physical contact, indirect contact or through the air when a person coughs or sneezes.

Protection of Health Care Workers:

A- Immunization

- **Vaccination against hepatitis B virus (HBV) is strongly recommended for all clinical dental personal including dentists, chair side assistants, dental hygienists and students.**
- **Protection is also advised against diseases such as tuberculosis, varicella, measles, mumps, diphtheria and tetanus.**

B- Hand Protection

- **Hand washing is a primary disease prevention measure for health care workers. Hand must be washed thoroughly with disinfectant liquid soap and dried prior to putting on and after removing gloves.**
- **Any cuts or abrasions to the hands or wrists should be covered with adhesive waterproof dressing,**
- **Remove all jewelers, rings that bacteria counts are higher when rings are worn and nails should be kept short.**

C- Eye Protection

- **Operators and close support dental nurses should protect their eyes against foreign bodies which may arise during dental work.**
- **Patient ,s eyes should always be protected against possible injury.**
- **Protective glasses with top and side shields are strongly recommended and should be disinfected between patients.**

D- Face Masks

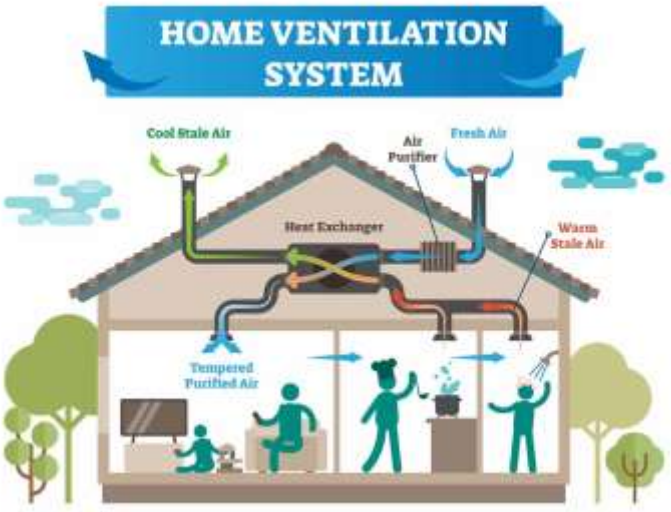
A well- fitting surgical face mask should be worn by health care workers. The dome type face mask is preferable to the paper type which rapidly becomes permeable and inefficient.

E- Protective Clothing

Clothing especially designed, fabricated, or treated to protect personnel against hazards caused by extreme changes in physical environment and dangerous working conditions.

F- Ventilation:

Good ventilation should be used to decrease the chance of contamination



Instrument and Equipment Decontamination

Appropriate disinfectants should be used to disinfect non sterilizable instruments (e.g., wax knifes, dental shade guides, plastic mixing spatula, Fox bite plane, articulators, and face-bows).

Chemical disinfectants can be classified into three levels depending on their activity against Mycobacterium tuberculosis, vegetative bacteria, spores, and viruses.

The three levels of disinfection are: high level, intermediate level, and low level.

1- **High level disinfectants are effective against spores and all microbial forms. Glutaraldehyde solutions and ethylene oxide gas are commonly used as high-level disinfectants.**
2- **Intermediate medium-level disinfectants are effective against microorganisms like Mycobacterium tuberculosis but with no effect on spores. A commonly used intermediate-medium-level disinfectants include iodophors, chlorine compounds, formaldehyde, phenols, and alcohols.**
3- **Low-level disinfectants are chemical agents with a narrow range of antibacterial activity and not recommended for disinfection of dental impressions. Detergents, quaternary ammonium compounds, and simple phenols are considered as low-level disinfectants.**

The dental disinfectants most commonly used come under intermediate level of disinfection. In order to exceed a minimum standard level of intermediate disinfection, a high-level disinfectant like glutaraldehyde can be used. Commonly used dental disinfectants are alcohols, iodophors, phenols, glutaraldehyde, quaternary ammonium compounds, formaldehyde, chlorhexidine, halide disinfectants such as hypochlorite and bromides. These disinfectants can be used by either spraying or immersion technique.

The Most Common forms of heat sterilization in the dental office are:

A- **Moist/Steam Heat Sterilization.**
B- **Dry Heat Sterilization.**
C- **Chemical Vapor Pressure Sterilization.**
D- **Ethylene Oxide Sterilization.**

A-Moist/Steam Heat Sterilization (Autoclave):

It is a reliable and efficient way for dental instruments sterilization by steam generation in a closed chamber producing a moist heat that quickly kills microorganisms. The time required at 121°C is 15 minutes under a pressure of 15 PSI.

Advantages:

- **Short time of sterilization.**
- **Allows good penetration of steam.**
- **It shows consistently good and reliable results.**
- **The instruments can be wrapped.**
- **Water-based liquids can be sterilized.**

Disadvantages:

- **Damage to items which are sensitive to the high temperature like plastic and rubber items.**
- **Blunting and rust of carbon steel burs and sharp instruments.**
- **Wet instruments after sterilization cycle.**

B-Dry Heat Sterilization:

It is an alternative way for sterilizing dental instruments. It needs higher temperatures than other heat sterilizers and runs at approximately 320–375°F (160–190°C) with time range of 60–120 minutes, depending on the type of sterilizer.

There are two types of dry heat sterilizers (static air and forced air).

- **Static air sterilizers: it is almost like a conventional oven and uses radiating dry heat for sterilization. Using this type of sterilizers requires a longer exposure with high temperature because of poor conduction of heat and poor penetration capacity.**
- **Forced air sterilizers: also called a rapid heat transfer sterilizer. It uses a fan circulating the hot air in the chamber at a high speed which**

permits a rapid transfer of heat energy to the instruments from the air, thus reducing the time required for sterilization.

Advantages

- **No rust or corrosion of burs and carbon-steel instruments if thoroughly dried prior to sterilization.**
- **No effect on the sharpness of cutting instruments.**
- **Obtaining dry Instruments after sterilization cycle.**
- **Safe and effective for sterilization of mirrors and metal instrument.**
- **Rapid cycles at high temperatures are possible.**
- **Low cost**

Disadvantages

- **Heat-sensitive items may be damaged at high temperatures, like plastic or rubber goods.**
- **Long cycle is needed because of poor penetrating capacity and poor heat conduction.**
- **It is a must to thoroughly dry instruments prior to sterilization.**
- **Not recommended for sterilization of heat-sensitive hand pieces because the excessive heat will damage bearings.**
- **Cannot sterilize liquid.**
- **Must be monitored and calibrated to avoid errors in sterilization.**

C-Chemical Vapor Sterilization

It is similar to autoclaving, except a special chemical solution (0.23% formaldehyde + 72.38% ethanol + acetone + water and other alcohols) is heated in a closed chamber and used instead of water to create a hot chemical vapor for sterilizing. For a completion of one cycle, a temperature of 270°F (132°C) at 20 lb pressure for 30 minutes are required.

Advantages.

- **No rust or corrosion of carbon steel burs and instruments.**
- **Dry instruments after sterilization.**

- **Short sterilization cycle.**

Disadvantages

- **Damage of sensitive items to higher temperature.**
- **Offensive odor of the vapor which requires good ventilation.**
- **Not recommended for sterilization of paper towels, liner, and heavy clothing as it may absorb chemicals.**
- **Needs special chemical solutions and cannot sterilize liquids.**
- **Instruments must be dried before loading them in the chamber.**

D- Ethylene Oxide Sterilization

This method of sterilization is recommended for sterilizing delicate materials and complex instruments. Ethylene oxide is noncorrosive gas above 10.8°C, has a high penetration capacity, and has acid action for bacteria, spores, and viruses.

Advantages

• No offensive odor.
• Better penetration capability.
• Can be operated at a lower temperature.
• Appropriate for heat sensitive items like rubber and plastic.

Disadvantages

• High cost.
• Toxicity of the gas
• Flammable and explosive

Infection Control: Prosthodontics Perspectives

Disinfection of Impression Materials:

Dental impression materials are classified into rigid or non -elastic (e.g., impression compound and zinc oxide eugenol) and elastic impression materials (e.g., aqueous hydrocolloids and non-aqueous elastomers). In prosthodontics, most procedures are done using elastic impression materials including irreversible hydrocolloids (alginate) and non-aqueous elastomers (addition silicones,

condensation silicones, polysulfides, and polyether). Impressions are highly contaminated with patient saliva or blood which may have viral and bacterial pathogens. Hence, impressions can act as a vehicle for transmission of different types of microorganisms from the patient's mouth to dental personnel and to dental technicians. It has been stated that alginate impressions produced a significantly higher level of contamination compared to polyvinyl siloxane (PVS) and polyether impressions from the same individual.

Consequently, impressions should be disinfected before sending to the dental laboratory. To avoid cross infection, impression should be rinsed thoroughly after removal from the mouth to remove as much blood or bioburden as possible prior to disinfection. The impression is then disinfected using an EPA (Environmental Protection Agency)-registered disinfectant. After disinfecting the impression, it must be rinsed thoroughly to remove disinfectant which may result in a substandard cast due to incorporation of residual disinfectant into the pouring plaster or stone. Exposing an impression to a disinfectant solution by spraying or immersion for various lengths of time after rinsing saliva and blood are the procedures chiefly advocated.

There are important characteristics of impression materials like hydrophilicity, the use of surfactant, and their tolerance of immersion in water or other fluids. These characteristics are important in understanding the disinfection protocols suitable for each impression material. For example, polyether is hydrophilic and has a tendency to distort and absorb moisture. There is also a concern with immersion disinfection regarding the dimensional stability of impression materials, especially irreversible hydrocolloids (alginate) because an adequate time should be given disinfect the impressions before pouring.

Disinfection of impressions by immersion is favored over spraying. Spraying may not be effective because constant contact of the disinfectant with all surfaces of the impression cannot be assured. To prevent possible distortion of the impressions and according to the manufacturers' directions, a disinfection time of 10 minutes or less for the immersion disinfection and 15 minutes of contact time for the spraying disinfection were recommended.

A recent systematic review and meta-analysis of *in vitro* studies reported that disinfection of alginate with sodium hypochlorite, chlorhexidine, glutaraldehyde, and alcohol reduced the colony forming units by a milliliter (CFU/mL) on the surface of alginate impressions. This trend was observed when PVS impressions were disinfected with glutaraldehyde, sodium hypochlorite, and alcohol and when

polyether was immersed in alcohol or glutaraldehyde. Therefore, these substances could be employed to reduce cross-contamination in the dental office.

Methods of Disinfecting Impression :

1- **Rinse under running tap water to remove blood/saliva for 15 seconds.**
2- **Immerse in disinfectant 10 minutes.**
3- **Rinse thoroughly with tap water to remove residual disinfectant and casted.**

- **Most reports indicate dimensional stability is not significantly affected by immersion technique for hydrophobic impression materials.**
- **Hydrophilic impression materials that cannot immersed in disinfectants alginate and polyether due to potential for absorption and distortion like should be disinfected as follows:**

1- **Rinse under water 15 seconds.**
2- **Dipped or sprayed.**
3- **Covered with damp paper towel for 10 minutes.**
4- **Rinse thoroughly and casted.**

Disinfection of Casts and Models:

Disinfection of casts and models is considered an ideal practice to prevent the cross infection. Though, the casts that were obtained from suitably disinfected impressions can later become infected during laboratory and clinical procedures. After try-in, the prosthetic device can be contaminated by the patient. In addition, the cast can be contaminated again during adjusting the prosthesis in the patient's mouth.

Contaminated stone casts are difficult to be chemically disinfected. If avoiding cross-contamination is considered a requirement, disinfection procedures should be applied throughout the treatment period for both the prosthesis and the cast.

Different methods have been used to disinfect casts and models including spraying with disinfectant, immersion in a disinfectant solution, incorporating of disinfectants with dental stone, and using microwave oven. Several *in vitro* studies stated that the immersion in 0.525% NaOCl shows no adverse effect on surface detail reproduction, dimensional accuracy, and compressive strength of casts. Another indicated method for cast decontamination is the microwave irradiation.40

It is reported that autoclaving of the casts may result in a poor reproduction of the surface details, and immersion of the cast in disinfectant chemical solution may dissolve gypsum, thus diminishing the compressive strength of the casts.

Cast Disinfection: If disinfection of a cast is indicated, immerse for 10 minutes or spray until wet and leave for 10 minutes. Cast should be fully set (at least 24 hours) before disinfecting.

- **Bite registration, wax rims and custom trays should be disinfected by (Rinse-spray –rinse) technique.**
- **Prostheses which have been worn by the patient and have gross deposits must be cleaned well before disinfection**
- **Finished acrylic prosthesis should be clean and disinfect before delivery to patient, after disinfection rinse and place in plastic bag with distilled water until insertion.**
- **Cr-Co prosthesis do not exceed manufacturer recommended contact time on metal components to minimize corrosion. There is little effect on Cr-Co alloy with short-term exposures (10minutes).**
- **Heat stable items like Face-Bow fork, metal impression trays, metal spatulas should be autoclaved while unstable items like articulator, wooden handled spatulas, torches, rubber mixing bowls and shade-guides should be clean and disinfect.**
- **Disposable plastic impression trays which cannot be autoclaved should not be reused between patients.**

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2023-2024

Geriatric patient

Gerodontology: Branch of dentistry that deals with the oral health problems of the old people. One of the problems of aging is that some of the bodily functions don't maintain their efficiency. Aging is a natural process. Old age should be regarded as a normal, inevitable biological phenomenon. As a result of the advances made in medicine and public health measures in the last half of the 20th century, there is a substantial increase in the life span of man. Elders above 65 years (old age) have health problems as a result of aging process, which calls for special consideration.

The "Elderly" Segment of the Population:-

1- People aged 65-74 years are the new or young elderly who tend to be relatively healthy and active.
2- People aged 75-84 years are the old or mild-old, who vary from those being healthy and active to those managing an array of chronic diseases.
3- People 85 years and older are the oldest-old, who tend to be physically frailer. This last group is the fastest-growing segment of the older adult population.

The Aging Patient Usually Fits into One of the 3 Groups:

1- Those who are well preserved physically and emotionally.
2- Those who are really aged an chronically ill.
3- Those who are fall between two extremes.

The Changes In Geriatric Patients Can Be Classified As:

1- Physiologic

- loss or graying of hair.
- loss of teeth.
- Diminished of senses of light, hearing and taste.
- Skin become thin, wrinkled and dried.
- Naso-labial groove deepens which produce a sagging look to the middle third of the face.

2- Psychological

Can be classified in to 3 groups:

A- Realists : Philosophic and exacting type.
B- Resenters: Indifferent and hysterical.
C- Resigned : Vary in their emotional and systemic status.

3- Pathologic:

Pathologic disorders or changes most frequently encountered are:-

Metabolic, Skeletal, Muscular, Circulatory and Neoplastic.

The principle cause of disability in persons of 65 years and above are :

- Heart disease.
- Hypertensive vascular disease.
- Tuberculosis.
- Disease of the bones and joints, accidents, nephritis, diabetes, cancer and eye diseases.

Oral Health Status in Aged

1- Nutrition in Old Age and Its Implications for Oral Care:

- Adequate nutrition is a vital factor in promoting the health and well-being of the aged.
- Inadequate nutrition may contribute to an accelerated physical and mental degeneration.
- Poor oral health can be a detrimental factor to nutritional status and health.
- Disorders of the oral cavity have contributed to poor eating habits in the elderly.
- Loose painful teeth or ill-fitting dentures may result in a reduced desire or ability to eat.
- A compromised nutritional status, in turn can further undermine the integrity of the oral cavity are closely interrelated, diet and nutrition should be considered as an integral part of the oral health assessment and management of the elderly.
- Although chewing efficiency and nutritional status improve when inadequate dentition or edentulousness is corrected with partial or complete dentures, with these replacements, mastication is less efficient than with intact natural dentition.
- Denture status may contribute to dietary changes to soft; easily masticate certain foods, which are often high in fermentable carbohydrates that may predispose to the development of root caries lesions.
- The dentists are hence in an ideal position to contribute to the well-being of the elderly population.
- Dentists should be alert to nutritional risk factors in the elderly population and by careful screening can intervene in the early stages of nutritional problems when such interventions can be most valuable and effective.

2- Changes in Salivary Glands and Salivary Secretion with Aging:

- With advancing age, there is an atrophy of tissue, a proliferation of ductal elements and some degenerative changes in the major salivary glands. These alterations tend to occur linearly with increasing age.
- Minor salivary glands also undergo similar degenerative changes with advancing age. Thus, there is a normal, uniform decrease of salivary gland tissue accompanying the aging process. As the serous gland decrease in activity the saliva become more mucous and soapy.
- The main oral health problems of old age that is mouth dryness and dental caries have been attributed to the reduced salivary flow.

3- Age Changes in Oral Mucous Membrane:

- The oral mucosa performs essential protective functions that profoundly affect the general health and well-being of the host.
- A decline in protective barrier function of the oral mucosa could expose the aging host to myriads of pathogens and chemicals that enter the oral cavity during daily activities.
- The thinning of mucous membrane of the geriatric patient allows **Fordyce spots** (White – Yellow bumps enlarge oil glands) to become more apparent.

4- Changes in the Teeth with Aging

- The gradual changes taking place in the dental tissues after the teeth are fully formed are referred to as age changes.
- Most of the tissues have a physiological turnover of their components but however, some tissues do not exhibit any turnover such as the enamel.

A two age dependent change takes place in dentin

1- Continued growth, referred to as physiological secondary dentin formation.
2- Gradual obturation of the dentinal tubules referred to as dentin sclerosis.

The dental pulp in teeth from old individuals differs from that in younger teeth by having more fibers and fewer cells, and hence reduces in volume.

Cementum apparently continues to be laid throughout life, but the rate of formation diminishes with age. Under some circumstances, excess amounts of cementum may be formed (hypercementosis) associated with accelerated elongation of an unopposed tooth or to an inflammatory stimulus.

5- Tongue:

- Macroglosia usually result from relaxation of the tongue musculature. This occurs in disturbance of the endocrine glands as hyperpituitarism, however ,the extraction of mandibular posterior tooth allows the musculature to relax and preferably the most prevalent etiologic factor.

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RESIDUAL RIDGE ATROPHY

Residual Ridge :- **Is a term used to describe the shape of the alveolar ridge after healing of bone and soft tissues following tooth extraction.**

- **Post tooth extraction, many inflammatory reactions is immediately activated and the extraction socket is temporarily sealed by blood clotting. Epithelial tissues begin its proliferation and migration within the first week and the disrupted tissue integrity is quickly restored.**

- **Histologic evidence of active bone formation in the bottom of the socket is seen as early as 2 weeks after the extraction and the socket is progressively filled with newly formed bone in about 6 months, even after the healing of wounds, the residual ridge alveolar bone undergoes a lifelong remodeling. The size of the residual ridge is reduced most rapidly in the first six months, but the bone resorption activity of the residual ridge continues throughout life at a slower rate, resulting in removal of a large amount of jaw structure.**

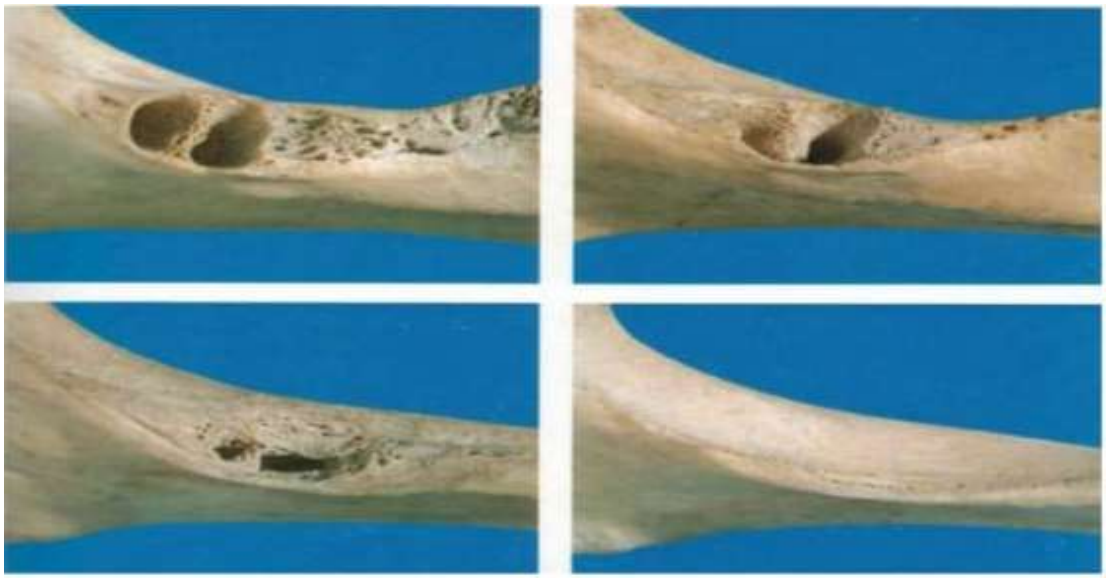
- **The rate of RESIDUAL RIDGE RESORPTION (RRR) is different among persons and even at different times and sites in the same person. Residual ridge remodeling affects the function of removable prostheses. Hence treatment of edentulous patients requires a maintenance phase that must be carried out throughout the life of a patient.**

- **R.R.R. is chronic, progressive, irreversible and cumulative.**

Consequences of Residual Ridge Resorption (RRR)

1- **There is apparent loss of sulcus width and depth.**
2- **Muscle attachments are displaced closer to the crest of the residual ridge.**
3- **Due to loss of VDO lower face height is reduced and mandible is rotated anteriorly.**
4- **Patient may develop habitual prognathic appearance.**
5- **Inter-alveolar ridge relationship is altered.**
6- **Morphological changes in residual ridge may appear such as sharp, spiny, uneven residual ridges.**

7- **Resorption of the mandibular canal wall and exposure of the mandibular nerve.**
8- **Location of the mental foramina close to the top of the mandibular residual ridge.**
9- **Residual ridge resorption provides serious problems to the clinician on how to provide adequate support, stability and retention of the denture.**



Bone is Dynamic

Bone is constantly remodeling and recycling Coupled process between

1- **Bone deposition by osteoblast.**
2- **Bone resorption by osteoclast.**

This happen to prevent mineral salts from crystallizing protecting against brittle bones and fractures.

Classification of Sequence of Residual Ridge Resorption (RRR) According (Atwood's Classification):-

phase 1

Pre-extraction: **The lower central incisor is in its socket with very thin labial and lingual cortical plates with the lamina dura.**

phase2 :

Post-extraction: **The healing period includes clot formation, clot organization, filling of the socket to the height of the cortical plates with new trabecular bone and epithelization over the socket site.**

Phase 3

High, Well-Rounded Residual Ridge: **The cortical plates are rounded, narrowing of the crest of the ridge has begun and remodeling of the internal trabecular structure has taken place.**

Phase 4

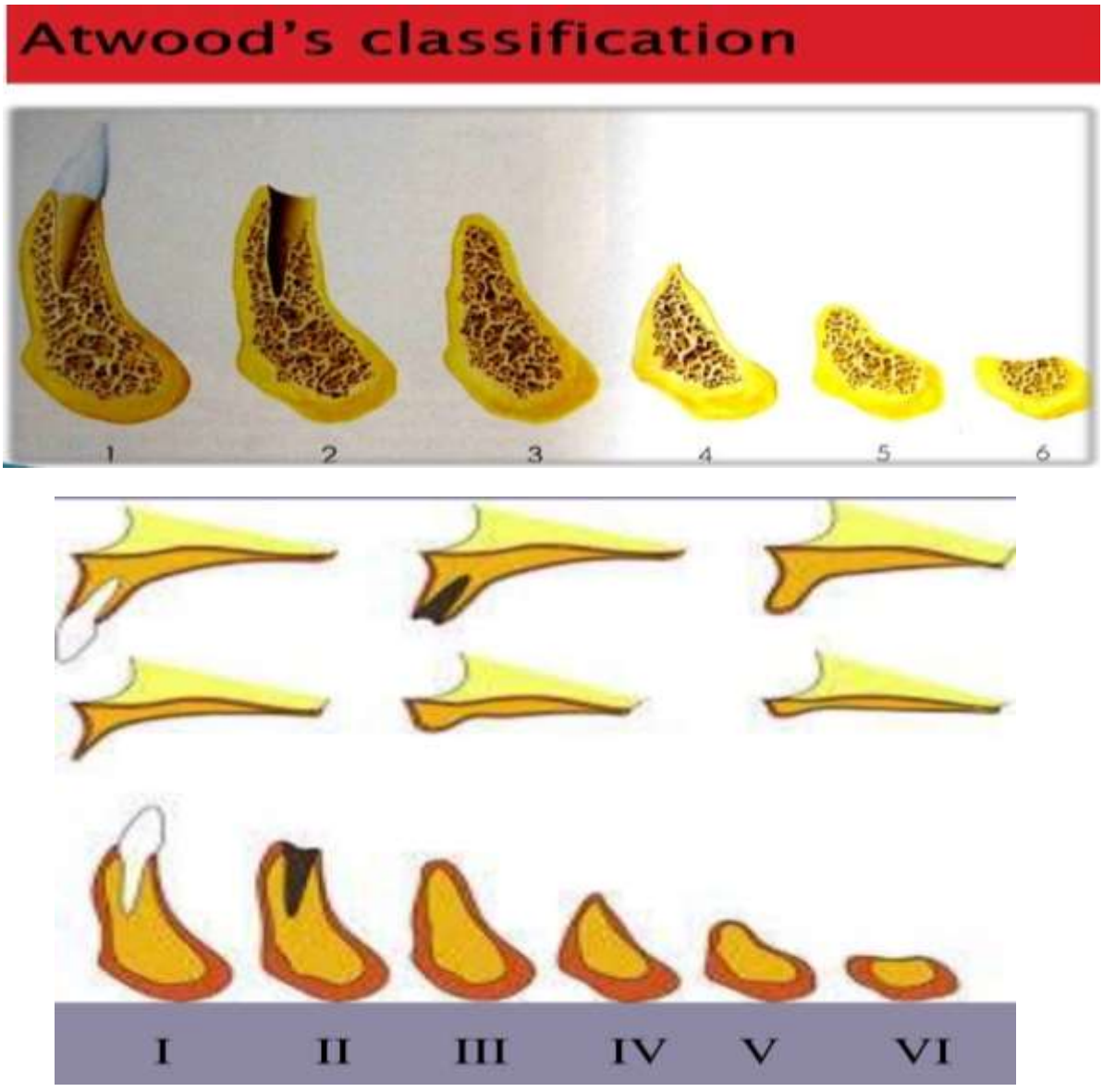
Knife Edged Residual Ridge: **There is marked narrowing of the labiolingual diameter of the crest of the ridge.**

phase 5

Low-Well Rounded Residual Ridge: **The end result of progressive labiolingual narrowing of a knife edged ridge is the disappearance of the knife edged portion. A more widely rounded, but considerably lower residual ridge remains.**

Phase 6

Depressed Residual Ridge: **Resorption has continued below the level of the genial tubercle.**



Etiology & Factors Affecting Residual Ridge Resorption (RRR) :-

RRR is a multi-factorial, biomechanical disease that results from a combination of anatomic, metabolic and mechanical determinants.

These factors vary among patients.

1- Anatomic Factors:

RRR Anatomic factors as amount or Quantity of bone and Quality of bone.

A- Quantity of Bone:

Some large ridges resorb rapidly and some knife edge ridges may remain with little changes for long periods of time. Although the broad ridge may have a greater potential for bone loss, the rate of vertical bone loss may actually be slower than that of a small ridge because there is more bone to be resorbed per unit of time and because the rate of resorption also depends on the density of bone.

B- Quality of Bone:

The denser the bone, the slower the rate of resorption because there is more bone to be resorbed per unit of time.

2- Metabolic Factors:

RRR Varies directly with certain systemic or localized bone receptive factors and inversely with certain bone factors formation.

RRR α	Bone resorption factors
	Bone formation factor

- **General body metabolism is the net sum of all the building up (anabolism) and the tearing down (catabolism) going on in the body. In equilibrium the two antagonistic actions (of osteoblasts and osteoclasts) are in balance.**
- **In growth, although resorption is constantly taking place in the remodeling of bones as they grow increased osteoblastic activity more than makes up for the bone destruction.**

Whereas in Osteoporosis,

- **Osteoblasts are hypoactive and in the resorption related to hyperparathyroidism, increased osteoblastic activity is unable to keep up with the increased osteoclastic activity.**
- **The normal equilibrium may be upset and pathologic bone loss may occur if either bone resorption is increased or bone formation is decreased, or if both occur.**
- **Since bone metabolism is dependent on cell metabolism, anything that influences cell metabolism of osteoblasts and osteoclasts is important.**

  - **The thyroid hormone affects the rate of metabolism of cells in general and hence the activity of both, the osteoblasts and osteoclasts.**
  - **Parathyroid hormone influences the excretion of phosphorous in the kidney and also directly influences osteoclasts.**
  - **The degree of absorption of Ca, P and proteins determines the amount of building blocks available for the growth and maintenance of bone.**
  - **Vit. C aids in bone matrix formation.**
  - **Vit. D acts through its influence on the rate of absorption of calcium in the intestines and on the citric acid content of bone.**
  - **Various members of Vit. B complex are necessary for bone cell metabolism.**
  - **Type I and Type II Osteoporosis.**
  - **Type I Osteoporosis is defined as the specific consequence of menopausal estrogen deprivation, and characteristically presents the bone mass loss, especially in the trabecular bone.**

  - **Type II Osteoporosis reflects a composite of age related changed in intestinal, renal and hormonal function. Both cortical and trabecular bone are affected in Type II osteoporosis.**

3- Functional Factors:

- **Functional factors include the frequency, intensity, duration and direction of forces applied to bone which are translated into cellular activity, resulting in either bone formation or bone resorption. When force within certain physiologic limits is applied to living bone that force, brings about by some unknown mechanism the remodeling of bone through a combination of bone resorption and bone formation.**

- **Masticatory and non-masticatory force is ordinarily transmitted to the dento-alveolar bone through the periodontal ligament. Once the teeth are removed, the residual ridge is subjected to entirely different types of forces. Some RRR is due to "disuse atrophy". Others RRR is an "abuse" bone resorption due to excessive forces transmitted through dentures.**

4- Prosthetic Factor :

1- **Excessive stress resulting from artificial environment.**
2- **Abuse tissues from lack of rest.**
3- **Long continued use of ill-fitting denture.**
4- **Lack of freeway space due to increase vertical dimension of occlusion**
5- **In correct centric relation record.**

Treatment and Prevention of RRR

The best way to manage the problem of residual ridge resorption is by using every means to prevent it.

A- **Prevention of loss of natural teeth.**
B- **Nutrition.**
C- **Pre Prosthetic Surgery**
  • **Excessive RRR leads to loss of sulcus width and depth with displacement of muscle attachment more to the crest of residual ridge.**
  • **Osseous reconstruction surgeries, removal of high frenal attachments, augmentation procedures (bone graft) Vestibuloplasty –etc.**

D- **Immediate Denture.**
E- **Over Denture.**
  Help to minimize ridge resorption and contribute to enhanced retention, stability and support of prosthesis along with preservation of proprioception.
F- **Implants.**

G- **Proper design of dentures and maintenance.**
  1- **Optimal tissue health prior to making impression.**
  2- **During teeth arrangement**
    A- **Avoidance of inclined planes to minimize dislodgement of dentures and shear forces.**

B- Centralization of occlusal contacts to increase stability –provision of adequate tongue room to improve stability of denture in speech and mastication.

C- Occlusal table should be narrow.

3- Impression procedures.

A- Minimal pressure impression technique.

B- Selective pressure impression technique places stress on those areas that best resist functional force.

C- Adequate relief on non- stress bearing areas.

Impression Technique

- **In patients with severely resorbed ridges, lack of ideal amount of supporting structures decreases support and the shape of the surrounding mobile tissues onto the denture border reduces both stability and retention. Thus the main aim of the impression procedure is to gain maximum area of coverage.**

- **Selection of proper trays and the correct impression procedure is very essential for an accurate impression. Selective pressure technique is most widely advocate managing RRR. It makes it possible to confine the forces acting on the denture to the stress bearing areas This helps in better withstanding the mechanical forces induced by denture wearing.**

- **Winkler Technique describes a technique which uses tissue conditioners.**

  - ✓ **An over extended primary impression of alginate is made.**
  - ✓ **Occlusal wax rims are constructed and the borders are adjusted so that the lingual flange in harmony with the floor of the mouth by an open and closed mouth technique.**
  - ✓ **Two applications of conditioning material are used each application approximately 3-10 minutes.**
  - ✓ **The third and final wash is made with a light bodied material.**

This technique results in the impression that has tissue placing effect with relatively thick, buccal, lingual and sublingual crescent area borders. Mouth temperature waxes can be used instead of tissue conditioners.

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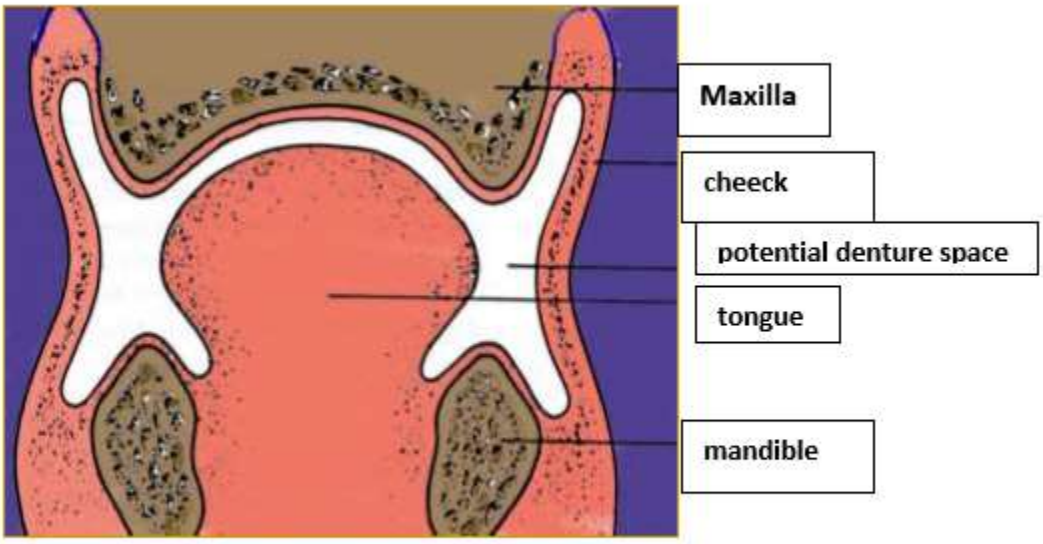
NEUTRAL ZONE

The lower denture commonly presents the most difficulties with pain and looseness being the most common complain. This is because the mandible atrophies at greater rate than the maxilla and has less residual ridge for retention and support. The Neutral Zone technique is most effective for patients who have had numerous unstable and un retentive lower complete dentures. These patients usually have highly atrophic mandible and there has been difficulty in positioning the teeth to produce a stable denture.

Neutral Zone (N.Z.) is that :- Area in the potential denture space where the forces of tongue pressing outward are neutralized by the forces of the cheeks and lips pressing inward.

Since these forces are developed through muscular contraction during the various functions of chewing, speaking and swallowing. They vary in magnitude and direction in different individuals.



Cross section/ The potential denture space

INDICATIONS:-

1- Severely atrophic mandibular ridge.
2- Patients with prominent and highly attached mentalis muscle.
3- Lateral spreading of tongue as a result of poor transition from dentate to edentulous state and sever resorption.
4- Patients with diminished neuromuscular control such as those with a history of stoke, Parkinson,s disease or patients with impaired motor innervations to oral and facial muscles as a result of brain surgery.
5- Patients with a typical shape or consistency of oral and perioral structure for example. patient who have scleroderma, marginal or segmental mandibulectomy and partial glossectomy.
6- N.Z. technique can be used to locate optimal position for implants in cases of implant supported or retained the overall outcome of treatment.

Muscles Involved in the N.Z.

The musculature of the denture space can be divided into two groups:-

1- Those muscles which primarily dislocate the denture during activity (Dislocating muscles).
2- Muscles that fix the denture by muscular pressure on the polished surfaces (Fixing muscles). These can then be further divided according to their location on the Vestibular (labial and buccal) side or lingual side of the dentures.

Dislocating Muscles

Vestibular:

- Masseter.
- Mentaalis.
- Incisive labii Infer.

Lingual:

- Medial Pterygoid.
- Palatoglossus.
- Styloglossus.
- Mylohyoid.

Fixing Muscles

Vestibular:

- Buccinator.
- Orbicularis oris.

Lingual:

- Gnioglossus.
- Lingual vertical.
- Lingual transverse.

Materials Used for N.Z. Impression:-

1- **Impression plaster.**
2- **Impression waxes.**
3- **Tissue conditioner.**
4- **Impression compound.**
5- **Regular bodies silicon.**
6- **Polyether.**

Neutral Zone Impression Technique

The loose and unstable lower complete denture is one of the most common problems faced by denture patients. One of the methods used to solve this problem is the neutral zone technique. The neutral zone is the area where the displacing forces of the lips cheeks and tongue are in balance. It is in this zone that the natural dentition lies and this is where the artificial teeth should be positioned. This area of minimal conflict may be located by using the neutral zone technique. The artificial teeth can then be set up in the correct positions. This Technique is described below.

- **Primary and final impressions of the upper jaw.**
- **Primary impression for the lower jaw are taken and models were prepared.**
- **On the upper model wax rim is made.**
- **A lower special tray is constructed.**
- **The special tray is a plate of acrylic adapted to the lower ridge, without a handle, with spurs or fins projecting upwards towards the upper arch. These help with retention of the impression material.**

1) *A lower edentulous arch*

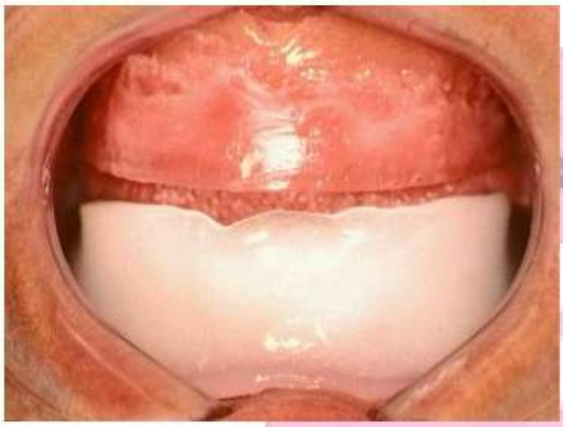
2) *A lower acrylic special tray with metal spurs to aid retention of the impression material*

- **The upper wax rim is adjusted as in normal registration for a complete denture.**
- **The lower special tray is placed in the mouth.**
- **Two occlusal pillars are then built up in green stick or self-cure on opposite sides of the lower arch. These pillars are molded and adjusted to the correct height so as to give the usual 3mm Free-Way space.**

3) *Occlusal pillars have been built up in green stick to the correct occlusal height*

4) *Establishing the correct occlusal height*

- **A thick mix of heavy body silicone impression material is then placed around the rest of the lower special tray, distally and mesially to the occlusal pillars. Then impression material is applied to the base plate and retained by the wire loops and or acrylic pillars. The patient is then asked to talk, swallow, drink some water etc. After 5-10 minutes the set impression is removed from the mouth and examined. The impression material will have been molded by the patient's musculature into a position of balance. Then a light body silicone material is put on the tissue surface and on the heavy body to make a final impression for the facial and lingual surfaces. It is useful if the chosen material has relatively long working time to allow the required movements to be carried out before the material becomes rigid. Also denture is fitted in the patient mouth as it may help to control recording material and prevent it from being displaced in a labio-occlusal direction.**



5) *The impression material being molded within the mouth*

6) *A completed silicone impression*

- **After applying petroleum gel separating medium, plaster index are then constructed in the lab, by surrounding the impression with plaster and a stone cast.**

7) *A plaster index used to locate the teeth to the neutral zone.*

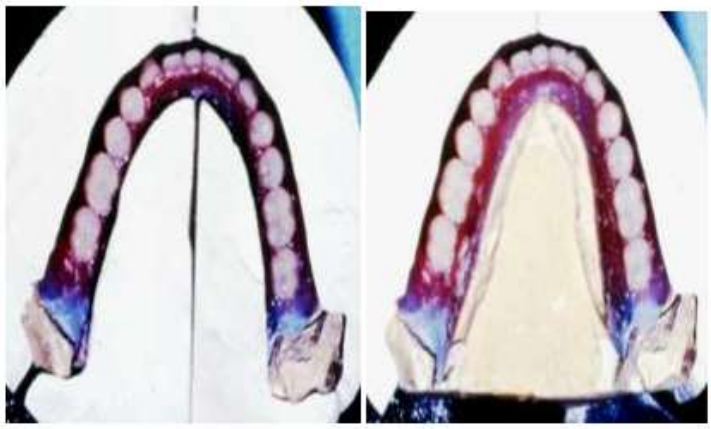


fig:- plaster index

- **When the silicone and the tray is removed, a temporary denture base constructed and a gutter corresponding to the neutral zone is left behind that filled with wax to form bite rim in the neutral zone.**
- **Tooth arrangement and initial wax up for the soft tissue contours.**
- **The teeth may then be placed into the neutral zone.**
- **Then lingual index are being removed and buccal index after that.**
- **Intra oral try-in.**

The resulting denture should feel more comfortable and be more stable and retentive because the denture should not interfere with or be displaced by the functions of the lips, cheeks and tongues.

8) *The teeth positioned in the neutral zone leaving plenty of tongue space*

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PhD- Maxillofacial Prostheses

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University of Anbar

Dental Faculty

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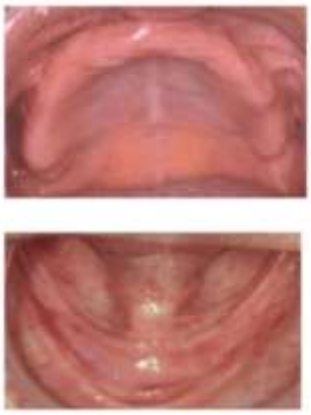
2023-2024

Jaw Relation for Completely Edentulous Patient

Jaw Relation:- **It is defined as "Any relation of the mandible to the maxilla"**



Types:

1- **Orientation Jaw Relation.**
2- **Vertical Jaw Relation.**
3- **Horizontal Jaw Relation.**

1- Orientation Jaw Relation

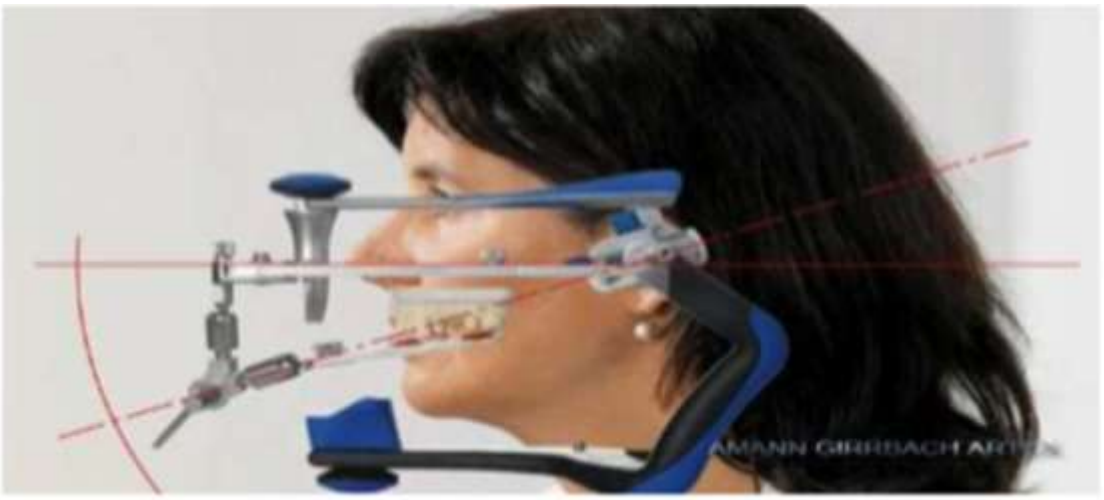
Are those that orient the mandible to the cranium in such a way, that when mandible is kept in its most posterior position, the mandible can rotate in sagittal plane around an imaginary transverse axis passing through or near the condyles.

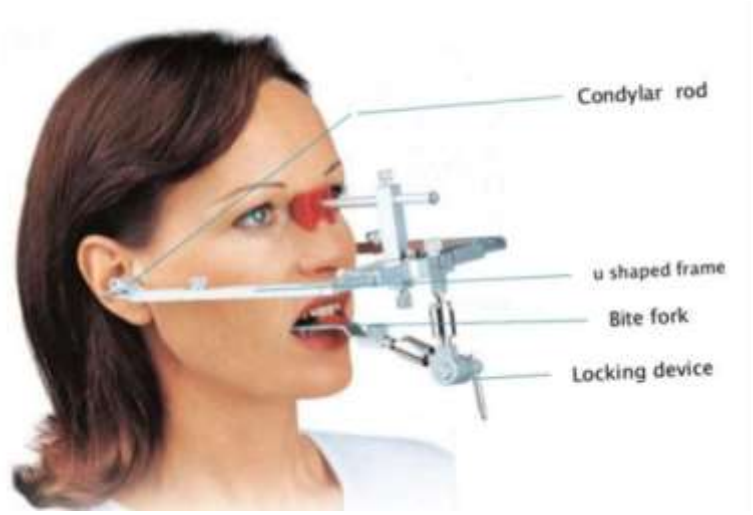
It include:

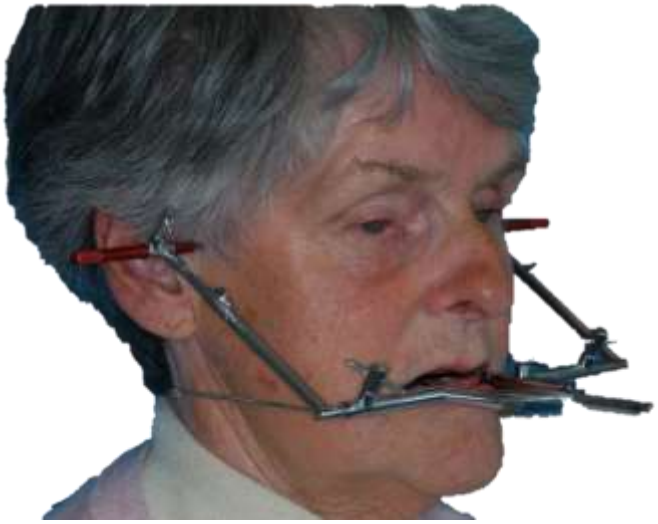
1- **Orientation of maxilla or mandible to cranium (Skull) by using (Face - Bow).**
2- **Orientation of occlusal plane by using Fox Plane (Fox Bite).**

Face Bow

- **U shaped Caliper like instrument used to record the relationship of the maxillary arch to some anatomic reference point or points and then transfer this relationship to an articulator.**
- **Face bow is used mainly when the vertical dimension of occlusion is expected to be altered.**
- **Use of face-bow minimizes occlusal errors in the restoration as the casts will be oriented as close to as they are in the patient.**
- **It orients the dental cast in same relationship to the opening axis of articulator.**
- **Customarily the anatomic references are the mandibular condyles transverse horizontal axis and one other selected anterior point.**
- **Also called Hinge bow, Ear bow, Kinematic face bow.**







Indications of face bow:

1. During complete denture fabrication while balanced occlusion is desired.
2. During fixed partial denture fabrication to obtain accurate crowns and bridges.
3. When cusp form of teeth are used for complete denture fabrication.
4. When interocclusal check records are used.
5. During full mouth rehabilitation when accurate occlusal restorations are to be made.
6. When vertical dimension at occlusion is to be changed during teeth setting.
7. In gnathological studies and treatment.
8. For making occlusal corrections after denture processing.

Objectives of face bow:

- To record the relationship of the jaws to the opening axis of the jaws and to orient the casts in this same relationship to the opening axis of the articulator.

- To support the maxillary cast while it is being mounted on the articulator.

Advantages of face bow

1 . Avoids errors in occlusion of finished prosthesis.

2. Allows minor changes in the occlusal vertical dimension in articulator without having to make new maxillo-mandibular relations.

3. Most helpful in supporting the maxillary cast while it is being mounted on the articulator.

4. Allows more accurate programming of the articulator.

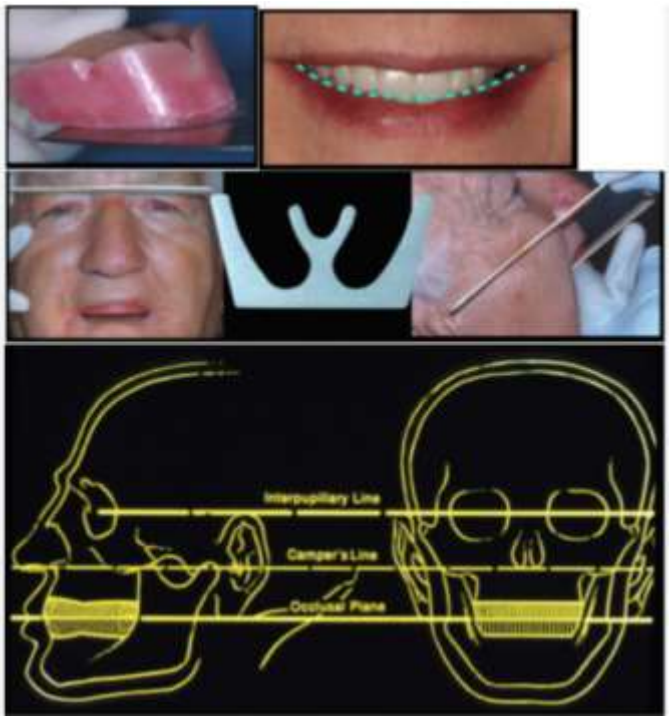
During Orientation Jaw Relation Clinically we Should Do the Following:

- **Properly contoured maxillary occlusal rim is inserted in the patient's mouth and following are assessed:-**
  - ✓ **Lip support: Upper lip - just supported enough.**
  - ✓ **Visibility of the rim: at rest 1.5-2 mm of the rim should be visible.**
  - ✓ **Lips relaxed.**
  - ✓ **Nasolabial angle should be at 90 degree.**
  - ✓ **Philltrum should be depressed slightly, there should be no obliteration or stretching of philltrum.**

Fox Plane (Fox Bite)

- **Anteriorly the maxillary occlusal plane is adjusted to be parallel to interpupillary line.**
- **Posteriorly the occlusal plane is adjusted to be parallel to alaetragus line (camper's plane),**

Camper's plane: Imaginary line joining the alae of the nose to the tip of the tragus.



2- Vertical Jaw Relation

Vertical Dimension: is the distance between two selected points -: one on the fixed part and the other on the movable (maxilla and mandible) at the mid line.

Rest Vertical Dimension (RVD):- The distance measured when the mandible is in the rest position .

Occlusal Vertical Dimension (OVD) :- The distance measured when the occluding members are in contact.

Inter Occlusal Distance {Free Way Space (FWS)}:- It is the distance measured when the occluding surface of the maxillary and mandibular teeth when the mandible in its physiologic rest position and it is equal to 2-4mm.

Importance of Vertical Dimension:

1- **Functional role which include mastication, respiration, deglutition and phonetics.**
2- **Esthetic role.**
3- **Preservation role maintenance of healthy tissues such as mucosa, bone, muscles and TMJ.**

The Vertical Jaw Relations can be recorded in tow positions:-

1- **The vertical dimension at rest position.**
2- **The vertical dimension at occlusion.**

1- Methods of Recording Rest Vertical Dimension (RVD):-

A- Swallowing Method :

- It is based upon **the hypothesis** that after each act of swallowing the subject passes through rest V.D. After insertion of the occlusion rims inside the patients mouth where the head in the upright position the patient swallows and then let the jaw relax several times when the relaxation is obvious several measurements between the 2 selected points and do average for them to obtain the rest vertical dimension. it is

important to mention that there must be a separation between the occluding members of 2-4mm before taking the measurement.

- However it has been found in experimental research that a rapid adaptation takes places takes place after changes of the vertical dimension leading to another rest position such findings indicate that the rest position is not are liable basis for the determination of vertical dimension .

B- Tactile Sense Method :

This method depends upon the patients muscular perception in registering comfortable and relaxed position . We instruct the patient to open widely until strain is felt in the muscles and when this opening become uncomfortable ask him to close slowly until the jaws reach a comfortable relaxed position and then measure the distance.

C- Phonetic Method:-

The bilabial sounds like M , P or (emm) are considered the most popular sound used as the patient repeat these sounds when the lips come together in contact we measure the distance.

D- Facial Expression:-

The experienced dentist learn the advantage of recognizing the related facial expression when the patients jaw are at rest where the lips will be even anterio-posteriorly and in slight contact the skin around the eyes and over the chin will be relaxed.

E- Anatomical Landmarks:-

The distance between the outer canthus of the eye to the corner of the mouth and the distance between the anterior nasal spine and the lower border of the mandible. When these measurements becomes equal the jaws are considered at rest position.

2- Methods Recording Occlusal Vertical Dimension (OVD):-

A- Mechanical Methods:

1- Pre-extraction records:-

- Profile photographs.
- Radiography (cephalo metric profile and the condyles in the fossae)
- Articulated cast.
- Facial measurements.

2- Former dentures.

3- Ridge relation.

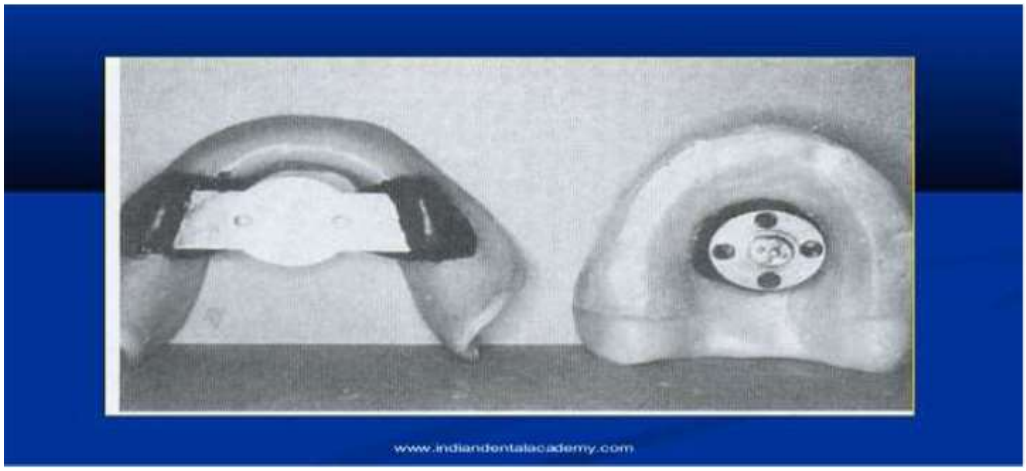
B- Physiological Methods:

1- Swallowing Threshold:

The position of the mandible at the beginning of the swallowing act as a guide to the vertical dimension of occlusion .

2- Tactile Sense Method:

A central bearing screw and central bearing plate apparatus is used and attached to accurately adapt record bases permits the patient to experience through neuromuscular perception the different vertical relations. The central bearing screw is adjusted downward and upward until the height of contact feels right to the patient and this represents the occlusal vertical dimension .



3- Phonetics (Silver Man,s Closest Speaking Space) ;-

It is the minimal amount of inter occlual space between the upper &lower teeth. When sounds like Ch, S, and J are pronounced, there is 1-2mm clearance between teeth when observed from the profile and frontal view. If the distance is too large it mean that too small a vertical dimension of occlusion may have been established. If the anterior teeth touch when these sounds are made , the vertical dimension is probably too great.

Effects of Excessively Increasing the Vertical Dimension:-

1- **Discomfort – teeth come into contact sooner than expected.**
2- **Trauma – caused by constant pressure on the mucous membrane.**
3- **Loss of freeway space.**
4- **Clicking of teeth – teeth are raised & the opposing cusps frequently meet each other during speech & mastication.**
5- **Appearance – over opening may cause elongation of the face & at rest the lips are parted.**

Effect of Excessively Decreasing the Vertical Dimension:-

1- **Inefficiency – the force exerted with the teeth in contact decreases considerably with over closure.**
2- **Cheek biting – the flabby cheek tend to become trapped between the teeth & bitten during mastication.**
3- **Appearance – Closer approximation of nose to chin, soft tissue sag & fall in, & the lines on the face are deepened.**
4- **Soreness at the corner of the mouth (Angular cheilitis) – falling in of the corner of the mouth beyond the vermilion border & the deep fold thus formed become bathed in saliva. This area becomes infected & sore.**
5- **Pain in TMJ – caused due to strain of the joint & associated ligaments.**

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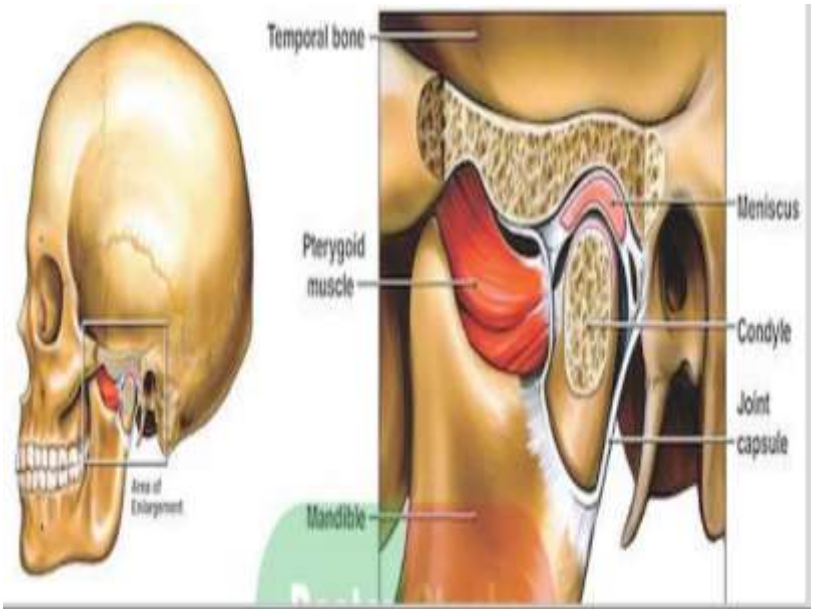
Horizontal Jaw Relation for Complete Denture Construction

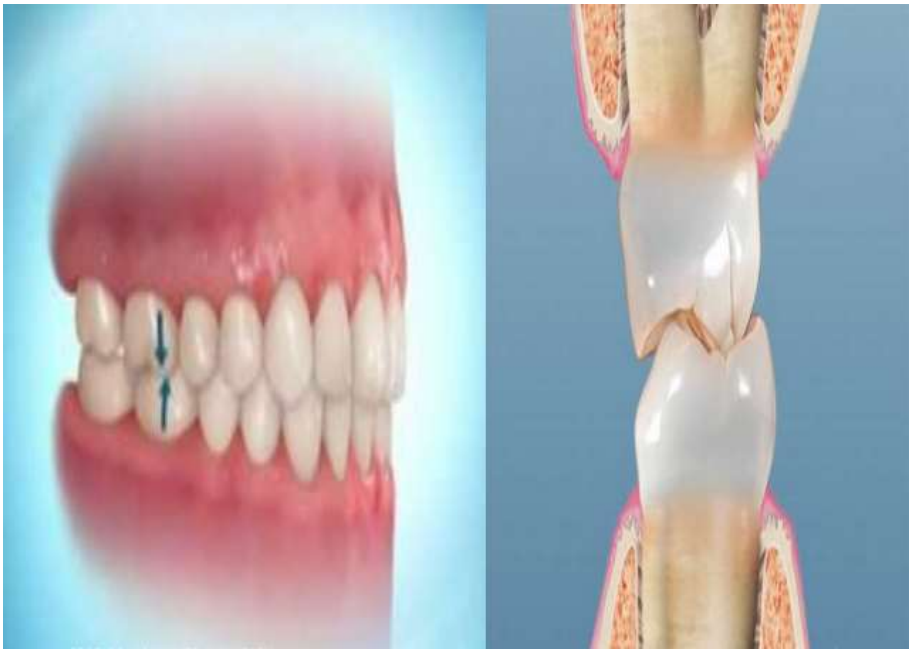
- **Is the most retruded physiologic relation of the mandible to the maxilla and from the individual can make a lateral movements.**
- **This movement can exist at various degrees of jaw separation, it occurs around the terminal hinge axis.**
- **Also it can define as the most retruded relation of the mandible to the maxilla when condyles are in the most posterior unstrained position in the glenoid fossa from which lateral movements can be made at given degree of jaw separation , (bone –to- bone relation).**
- **This position is independent of tooth contact.**



The horizontal jaw relation are the relationship of the mandible to the maxilla in a horizontal plane (in anterio-posterior and side to side direction) which include:

1- **Centric jaw relation.**
2- **Eccentric jaw relation which include:-**
   - **A- Protruded or forward relation.**
   - **B- Left or right lateral relation.**

Centric Jaw Relation : The occlusion of opposing teeth when the mandible is in centric relation. This may or may not coincide with the maximum inter-cuspation, tooth –to-tooth relation.



Eccentric Jaw Relation: Any occlusion other than centric occlusion. In many people centric occlusion of the natural teeth does not coincide with centric relation of the jaws, but in construction of complete denture the centric occlusion must be coincide with centric relation

The Significance of Centric Jaw Relation

1- **It is a learnable, repeatable, and recordable position which remains constant throughout life.**
2- **It is a reference position from which the mandible can move to any eccentric position and return back involuntary.**
3- **It is the start point for developing occlusion.**
4- **Functional movement like chewing and swallowing are performed in this position, because it is the most unstrained position.**

Factors that Affect Centric Relation Records

1- The resiliency of the supporting tissues.
2- The stability of the record bases.
3- The TMJ and associated neuromuscular mechanisms.
4- The character of the pressure applied in making the recording
5- The skill of the dentist.
6- The health and cooperation of the patient.

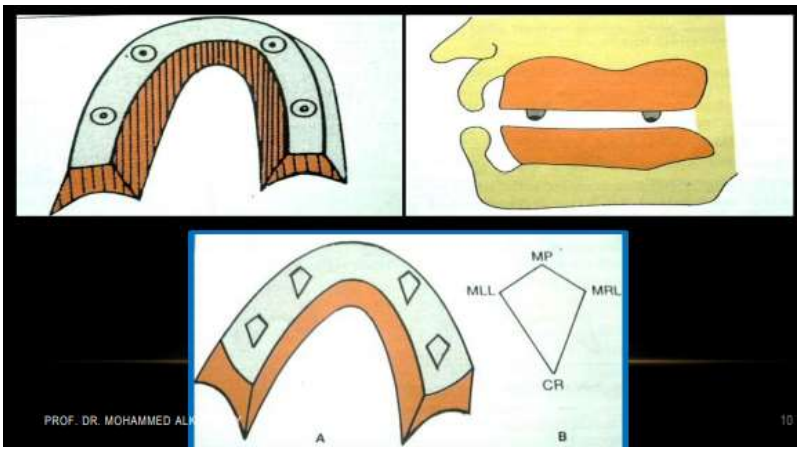
Methods (Techniques) of Recording Centric Relation

A- Functional Methods.
B- Graphic Methods.
C- Tactile-interocclusal method (physiologic).

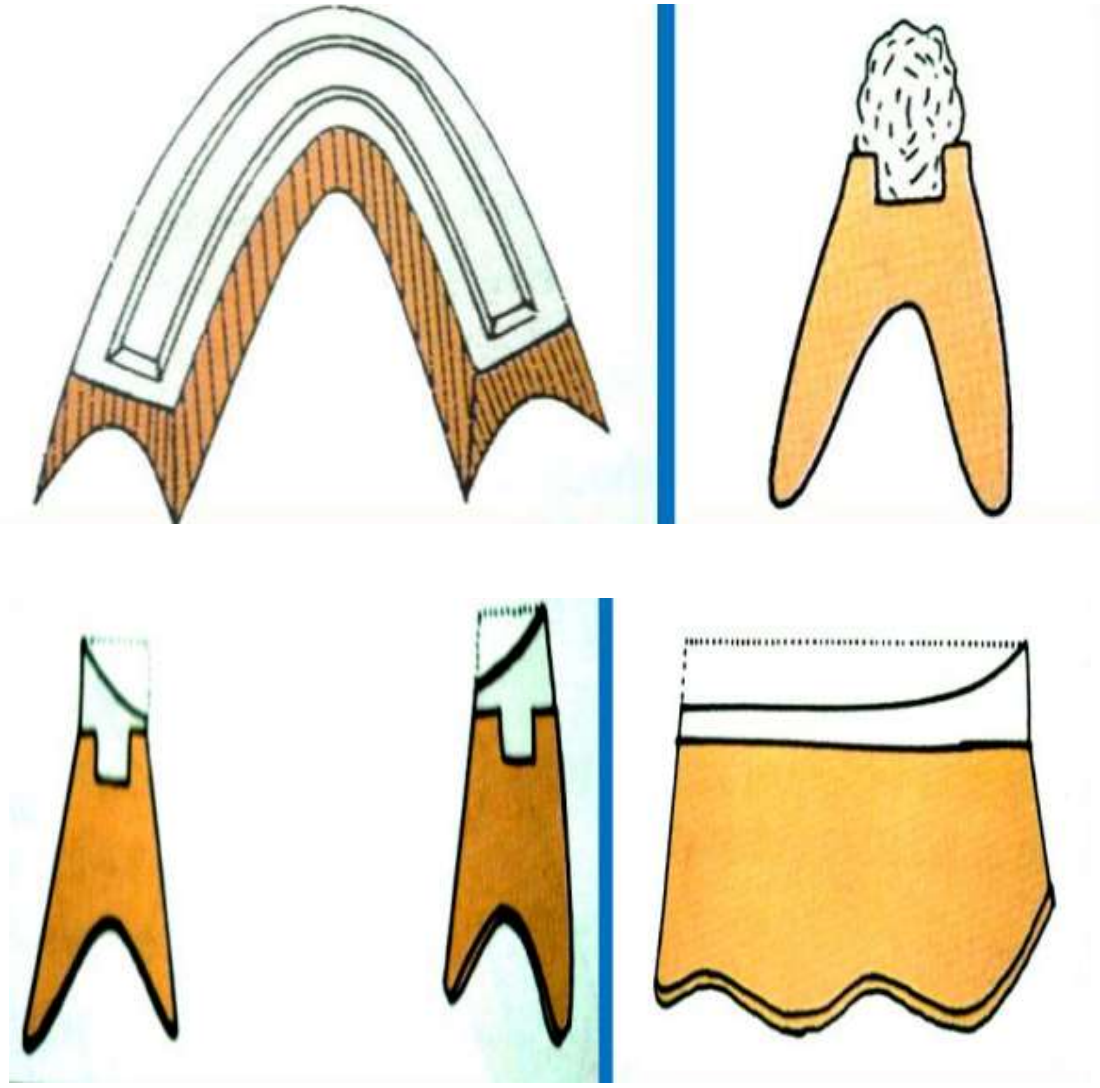
A-Functional Technique

Or called Chew–in, examples on this are House Needle and Patterson techniques. The patient produces of mandibular movements by moving the mandible to protrusion, retrusion and right and left lateral movement.

1- Uses compound occlusion rims with: House Needles technique - A four metal styli placed in the maxillary rim. When the mandible moves with the styli contacting the mandibular rim, the styli cut four diamond shaped tracings. The tracings incorporate the movements in three planes, and the records are placed on a suitable articulator.

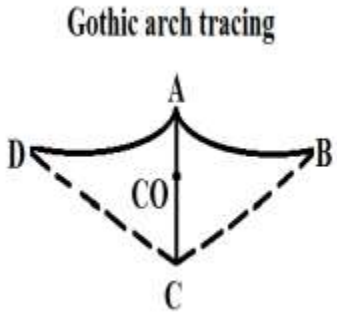


2- **Patterson Method** uses wax occlusion rims. A trench is made along the length of mandibular rim. A 1:1 mixture of dental plaster is loaded into the trench. When the patient moves his mandible, compensating curves on the mixture will produced, and the height of the mixture is also reduced. The patient is asked to continue these movements till a predetermined vertical dimension is obtained. Finally, the patient is asked to retruded his jaw and the occlusal rims are fixed in this position with metal staples.

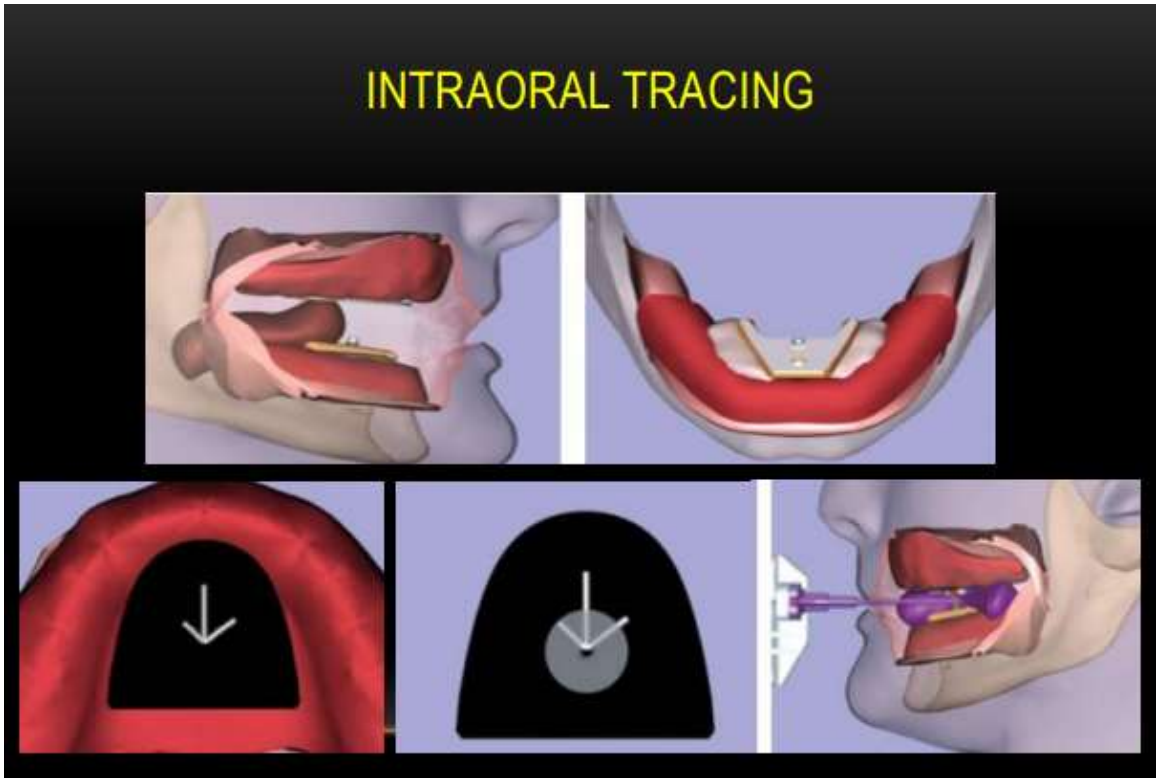


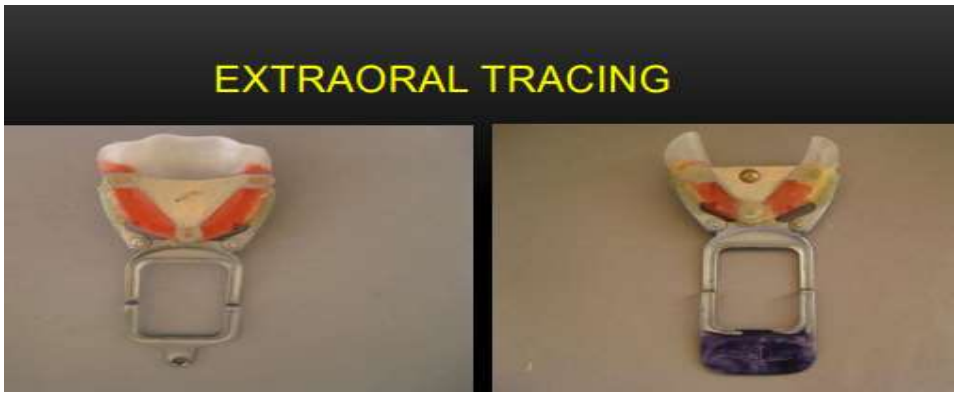
B- Graphic Methods (Gothic Arch Tracing).

- **Gothic arch tracing.**
- **Arrow point tracing.**
- **Tracing in one plane.**
- **Apex - the most retruded position.**



These methods are called because they use graphs or tracing to record the centric relation. The general concept of this technique is that a pen-like pointer is attached to one occlusal rim and a recording plate is placed on the other rim, the plate coated with carbon or wax on which the needle point can make the tracing, when the mandible moves in horizontal plane, the pointer draws characteristic patterns on the recording plate.


INTRAORAL TRACING


EXTRAORAL TRACING

C- Interocclusal Methods or Tactile-Interocclusal (physiologic).

- **The tactile or inter occlusal check record method is referred to as a physiologic method. The normal functioning of the patients and the tactile sense is essential in the making of an accurate record.**

Indications:

1- **Abnormally related jaws.**
2- **Excessively displaceable supporting tissues.**
3- **Large tongue.**
4- **Abnormal mandibular movements.**
5- **Verify occlusion in existing dentures.**

Bite Registration/Recording Materials

1- **Waxes.**
2- **Quick setting plaster.**
3- **Impression compound.**
4- **Bite registration paste (ZOE).**
5- **Bite registration silicon.**

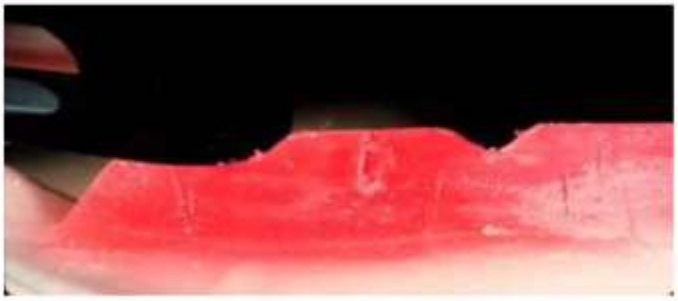
- **The records are made using a recording medium (impression plaster, zinc oxide eugenol, impression compound and wax) between the occlusion rims or the trial denture bases. The patient closes into the recording medium with the lower jaw in its most retruded position and stops the closure at a predetermined vertical relation.**

Procedure

1- **This procedure is done after establishing the V.D. of the jaws , and mounting of the face bow transfer.**
2- **Seat the patient comfortably with head upright.**
3- **Place 3 widely separated lines between the rims in the centric position (mid line & canine eminences).**

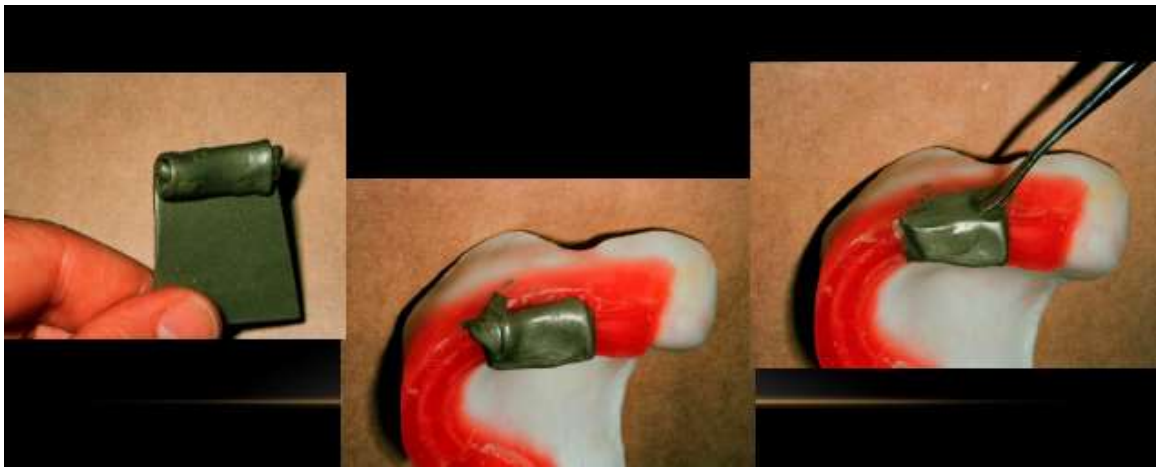
4- Check that record base heels (rims do not touch).

5- Make two sharp "V" shaped notches in the molar /premolar area of each sided wax depth 3-4 mm in the upper bite rim wax.



6- Reduce the mandibular occlusal rim from the premolar area to the end to allow foe excess inter-occlusal distance.

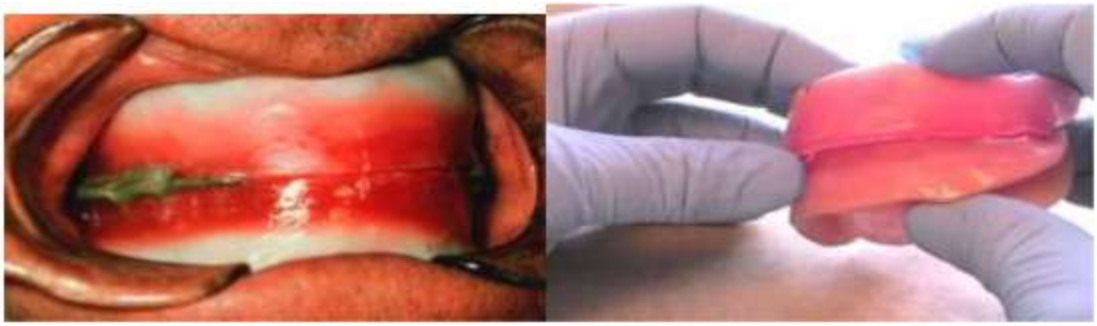
7- Making role of soft wax or can use silicone impression material,
8- place wax into a 1-2mm slot in mandibular or maxillary rim. Ensure wax is dead soft. Fill to slight excess. Hot water bath for softening (use care).



9- Stabilize mandibular record base using index fingers on the flange and thumbs under the symphysis.

10-Making a tentative centric record by having the patient retrude and close the jaw until he feels the closure to be at a tentative vertical dimension of jaw separation .

- Patient slowly closes.
- patient closes until rims are almost touching (1mm separation).
- Ask patient to stop as soon as this position has been reached.
- Hold position until set 1-2min.
- Remove both rim together.

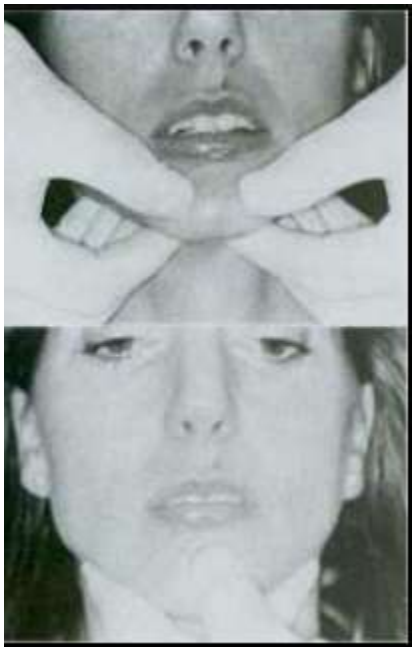


11- Mount on a suitable articulator.

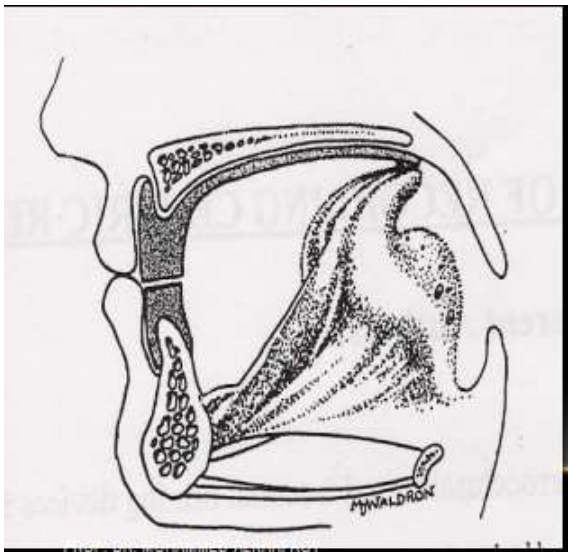
NOTE: IF the retention of the record bases is not adequate, apply a fine dusting of denture adhesive to the wet tissue surface.

Methods of Assisting the Patient to Retrude the Mandible

- **Let the jaw relax, pull it back and close slowly on the posterior teeth. Protrude and retrude the mandible repeatedly**

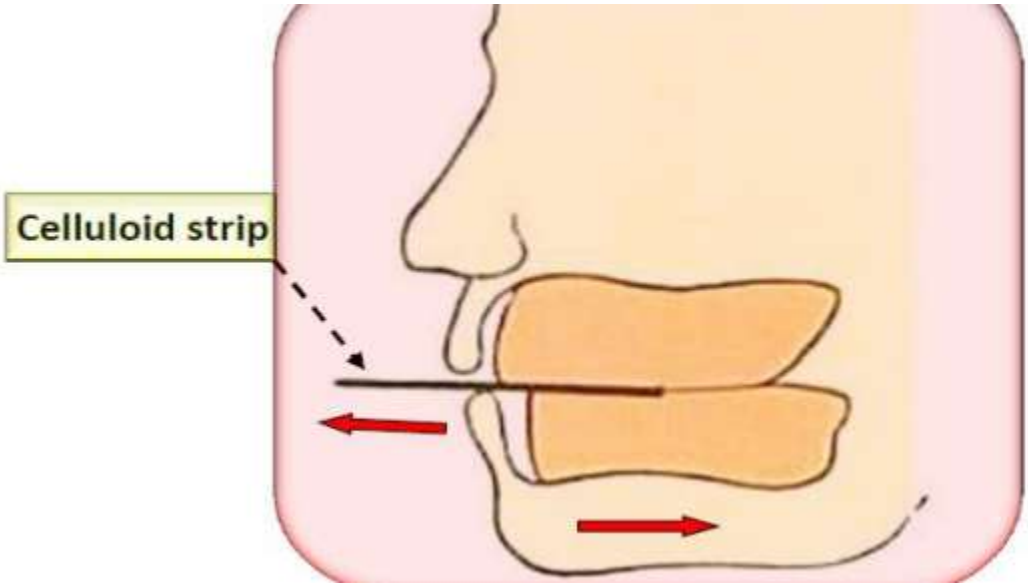


- **Roll the tongue backwards towards the posterior border of upper denture and close the rims until they meet.**



- **Boos stretch-relax exercises. Tilting the head backwards. Swallow and close.**

- **Pulling a strip of celluloid interposed between the occlusal rims will automatically retrude the mandible to centric relation.**



- **Swallowing Method.**

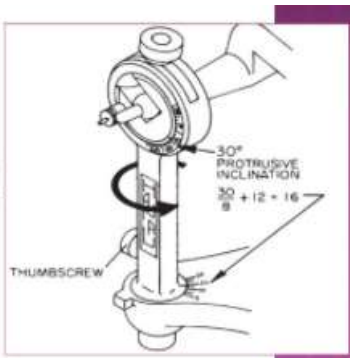
Eccentric Relation Records

- **Protrusive relation.**
- **Lateral relation.**
  - **Left lateral.**
  - **Right lateral.**
- **When the protrusive eccentric record is made on Hanau articulator, the following (Hanau formula) is used to obtain an acceptable lateral inclination.**

$$L=H/8+12$$

L = the lateral condylar path

H = the horizontal condylar path angle which is recorded from the patient.



Factors to be Considered While Making Eccentric Jaw Relations

- **The condylar path of the patient cannot be altered.**
- **The condyles do not travel in straight lines during eccentric mandibular jaw movements.**
- **Semi-adjustable articulators in which the condyles travel on a flat path cannot be used to reproduced eccentric movements exactly.**
- **Fully-adjustable articulators, where the condylar and incisal guidance are fabricated individually with acrylic, can travel in the path of the condyle using pantographic tracing.**

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University of Anbar

Dental Faculty

Prosthodontics Unit

Dr. Salah Kh. Al-Rawi (BDS, MSc, PhD)

5th Grade / Lec. No. 9

2023-2024

Trial Insertion for Complete Denture

This appointment is perhaps the most critical in the series of appointments for denture construction. This is your last opportunity to correct errors before the dentures are processed.

1. Occlusal Vertical Dimension –

- **Develop the ability to look at the patient and form an opinion as the whether their OVD contributes to a normal appearance. Make nose to chin measurements at rest position. This should be 2-3 mm greater than the OVD. Teeth should not contact during speech sounds, especially the sibilant sounds. A larger change of vertical dimension will require a new centric relation record made at the new vertical dimension of occlusion.**
- **The patient should look normal. During sibilant sound production one or two millimeters of space should exist between the maxillary and mandibular first premolars. Patient should feel comfortable with the degree of jaw separation their trial dentures provide.**

2. Midline –

- **Should be centered to the philtrum of the upper lip when the patient is smiling. Mandibular midline should correspond with maxillary if a complete mandibular denture is being constructed. A discrepancy usually indicates an incorrect centric relationship.**

3. Centric Relation –

- **The posterior teeth must all contact simultaneously when the patient closes lightly to their perceived "first contact" in centric relation. If a prematurity exists the mandibular cast must be remounted and the teeth rearranged to provide even and simultaneous contact. This must be verified again in the mouth. Never ignore an erroneous relationship. It will be worse after the dentures are processed.**

- **To Confirm Centric Jaw Relations the Following Procedures Should Be Applied.**

A- **Insert the wax trial dentures in the patient's mouth. Instruct the patient not to hold the teeth firmly together during the try-in phase as this may dislodge the teeth from the wax and alter the arrangement.**

B- **Holding the lower record base in place, guide the patient slowly into centric relation. Clinical observation of the tooth contacts intraorally in centric relation will detect gross errors. Repeat this several times until you are certain the centric relation is correct or incorrect.**

- **To Verify Centric-On on Mounting Use the Following Procedures:**

A- **Apply Vaseline to the maxillary posterior teeth and place it in the patient's mouth.**

B- **Remove the mandibular posterior teeth and place recording material bilaterally on the posterior of the mandibular record base.**

C- **Place the mandibular record base in the patient's mouth and guide the patient into centric relation.**

D- **Remove the trial bases and centric relation record from the patient's mouth. Place the trial bases on the master casts mounted on the articulator.**

E- **Invert the articulator and carefully position the trial bases into the new centric relation record. The mandibular posterior teeth must then be rearranged.**

4. Lip and Cheek Support and normal Contour –

- **Observe the lip support when the complete denture in place.**
- **The labial flange must be waxed to proper contour.**
- **The patient's lip should have proper support and a natural appearance.**

5. Teeth Position –

- **Maxillary anterior teeth are set to provide natural lip support and position that is agreeable to the patient.**
- **The inclination of the maxillary six anterior teeth must be correct.**
- **Mandibular anterior teeth should be set slightly anterior to the crest of the ridge and non-interfering in protrusive position.**
- **Check the inclination of these 6 teeth carefully.**
- **Adjust the canine and premolar as necessary.**

- **When the six maxillary and mandibular anterior teeth have been set correctly and the posterior teeth meet the requirements for their correct position, observe the relationship of the maxillary canine to the mandibular first premolar.**
- **The first premolar should by slightly wider in arch position than the canine.**
- **All of the maxillary posterior teeth should have nearly the same inclination to their facial surfaces as the canine to create a harmonious appearance.**
- **Mandibular posterior teeth are set over the crest of the lower ridge.**
- **A cross bite relationship may need to be established if the maxillary posterior teeth tend to be positioned too far buccally.**
- **The posterior teeth must have approximately 1.5 mm of horizontal overlap to avoid cheek biting.**
- **A compensating curve may be developed later, after a protrusive record is made.**

6. Buccal Corridor –

- **The buccal corridor is the space between the buccal surfaces of the posterior teeth and the cheeks. This space should be neither excessive (maxillary teeth constricted) nor diminished (maxillary teeth set too far toward buccal).**

7. Occlusal Plane –

- **The occlusal should be parallel with the pupils of the eyes when viewed from in front of the patient. The occlusal plane should not drop as it progresses posteriorly. The mandibular second molar distal occlusal surface should be 1/2 to 2/3's up the retromolar pad. Ascertain that the maxillary anterior teeth are not at a higher level than the posterior teeth.**

8. Phonetics

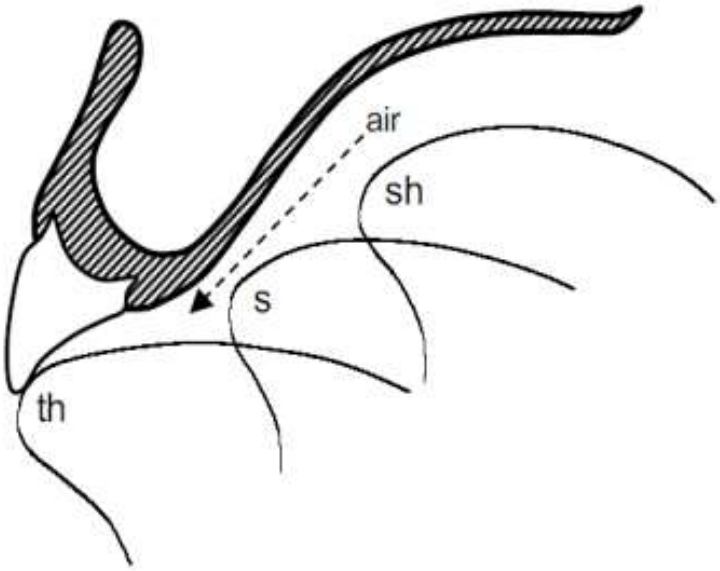
- **Ask the patient to count from sixty to seventy. Observe how close the teeth approach each other. They should not contact during speech. If they touch, the occlusal vertical dimension is too great and will need to be reduced. Also listen for sibilant distortions such as a whistle or central lisp. It is helpful to attempt to engage the patient in a meaningful conversation in which the patient expresses himself in a natural way.**

- **During the conversation certain sounds should be observed carefully:**

A- **"F" and "V"** **sounds are produced when the highest part of the lower lip is barely in contact with the incisal edges of the upper teeth. Difficulty in producing the "F" and "V" sounds is due to placing the maxillary anterior teeth too far lingually or placing the occlusal plane too high.**

B- **"S"** **sounds are produced by air as it escapes behind the maxillary incisors near the center of the mouth between the tongue and palate. Lisping can be caused by excessive thickness lingual to the maxillary central incisors. A deep channel located lingual to the maxillary central incisors causes whistling. An "S" sound that sounds like the "sh" may be caused by too broad a channel lingual to the maxillary central incisors preventing contact between the tongue and the denture base in the premolar and molar region.**

C- **"Th"** **sounds are produced by slightly protruding the jaw and bringing the tip of the tongue in contact with the incisal edges of the upper and lower incisors. Difficulty in producing this sound is due to too much horizontal overlap or a deep and/or board channel between the tongue and the area of the denture base lingual to the upper incisors. The "S, "Sh" and "Th" sounds are closely related to one another. Remember all patients will have some difficulty with new dentures and require an adaptation period. Don't be too demanding of phonetics at this stage. Use phonetics to verify the position of the teeth.**



9. Overall Appearance (Size, Position, Form and Arrangement)–

- **Stand back away from the patient. Ask him to smile and speak. The dentures should appear natural looking.**

10. Maxillary Posterior Extension (PPS) -- (Lec. 10).

- **Using an indelible transfer applicator, mark each pterygomaxillary notch and the vibrating line. Evaluate the extension of the trial denture to verify that it ends on the line and in the pterygomaxillary.**

11. Selection of Denture Base Shade-

- **If a custom gingival denture base shade is to be tested, it must be selected at this time.**

12. Patient Approval –

- **The wax trial dentures should be clean and neatly festooned. All excess wax on the teeth should be removed so the patient can visualize the final appearance. Wax caught between the teeth, incisal to the contact level should be removed carefully with un-waxed dental floss. The patient may then be provided with a mirror to view the arrangement. Ask for comments and objections. Do not "bully" the patient to accept the dentures. Correct objections immediately, where possible. Try to have a family member present at this time. Criticism is better at this time than when the patient goes home with the completed prosthesis. Some especially particular patients may require an additional trial insertion appointment before they are satisfied. Accept this as a learning opportunity and a chance to provide a superior service.**

Asst. Prof. Dr. Salah Kh. Al-Rawi

PhD- Maxillofacial Prostheses

MSD - Fixed and Removable Prosthodontics

BDS - Oral and Dental Surgery

2023-2024

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University of Anbar

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Dr. Salah Kh. Al-Rawi (BDS, MSc, PhD)

5th Grade / Lec. No.10

2023-2024

Posterior Palatal Seal Area (PPS)

Definition:- The soft tissue area at or beyond the junction of the hard and soft palates on which pressure within physiological limits, can be applied by a complete denture to aid in its retention.

Importance and Functions of PPS:-

1- It maintains contact of denture with soft tissue during functional movements of stomatognathic system, by which it decreases gag reflex.
2- Decreases food accumulation with adequate tissue compressibility.
3- Decrease patient discomfort of tongue with posterior part of denture.
4- Compensation of volumetric shrinkage that occurs during the polymerization of PMMA.
5- Increases retention and stability.

Anatomic Consideration:

P.P.S. Divided according to anatomic boundaries into: -

A- Post palatal seal extends through the pterygo maxillary notch.

B- Post palatal seal extends medially from one tuberosity to the other.

C- Posterior palatal area lies between the anterior and posterior vibrating line.

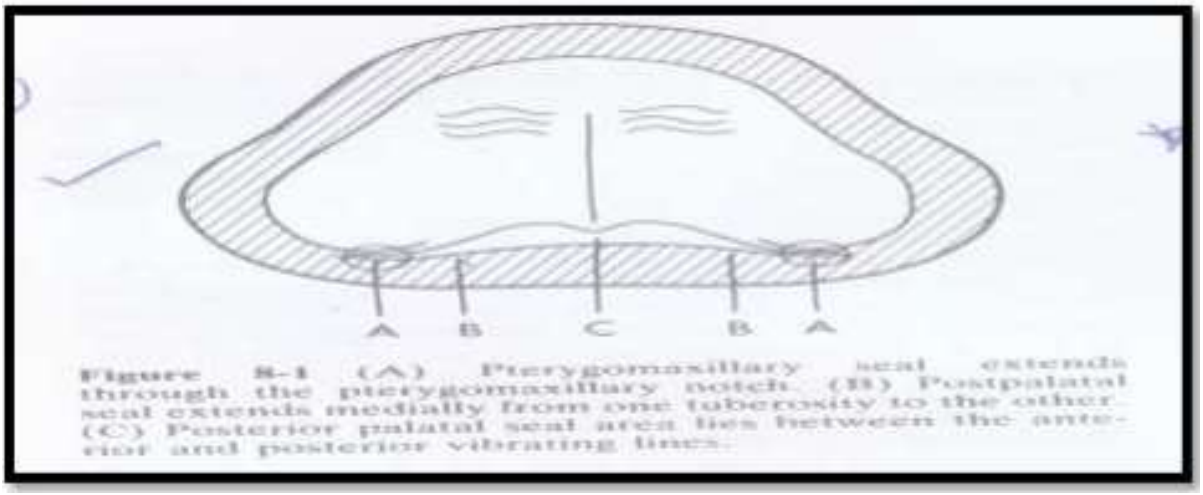


Figure 8-1 (A) Pterygomaxillary seal extends through the pterygomaxillary notch. (B) Postpalatal seal extends medially from one tuberosity to the other. (C) Posterior palatal seal area lies between the anterior and posterior vibrating lines.

Physiologic Consideration

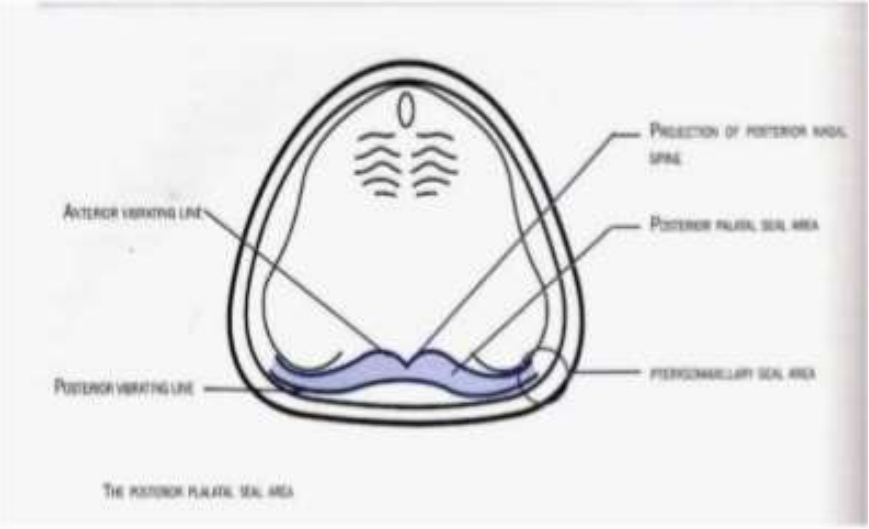
Saliva:

1- **Presence of thick ropy saliva can create hydrostatic pressure in the area anterior to posterior palatal seal, resulting in a down ward dislodging forces.**
2- **Posterior extent of 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.**

Vibrating line

An imaginary line across the posterior part of the palate marking the division between the movable and immovable tissues of the soft palate. This can be identified when the movable tissues are functioning.

1- **The posterior palatal seal (post dam) of the upper denture should be placed on non-movable tissue of the soft palate just behind the hard palate.**
2- **The vibrating line of the soft palate, normally used as a guide to the ideal posterior border of the denture, is usually located slightly posterior to the foveae palatine.**
3- **The posterior palatal seal is formed through both humular (pterygomaxillary) notch and across the palate over the vibrating line.**
4- **The vibrating line is observed in patient's mouth as the patient says a series of short "ah" and the hamular notches are palpated.**



Classification of Soft Palate

Based upon the angle that the soft palate makes with the hard palate, there are 3 classes of soft palate:-

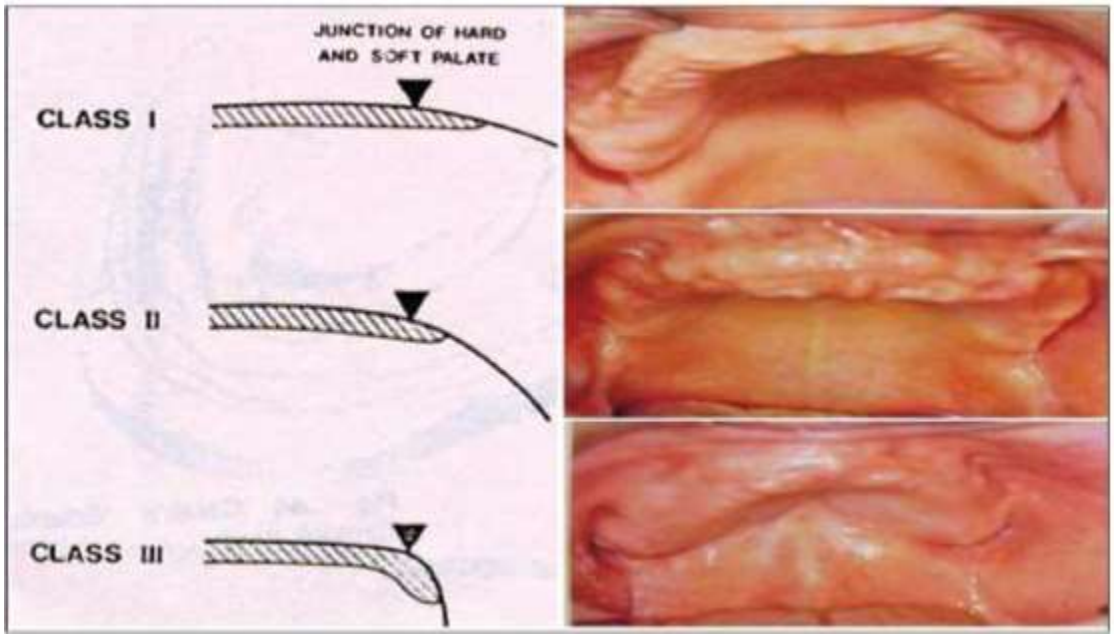
1 - CL I : indicates a soft palate that rather horizontal as it extends posteriorly, with minimal muscular activity.

- More than 5mm of movable tissue available, ideal for retention.

2 - CL II : designates those palatal contour that lie somewhere between CLI and CL III

- 1 -5mm of movable tissue available –good retention.

3 - CLIII :- indicate the most acute contour in relation to the hard palate. Usually seen in persons with a high v shape palate vault, fewer millimeter separate the ant. and post. Vibrating line.



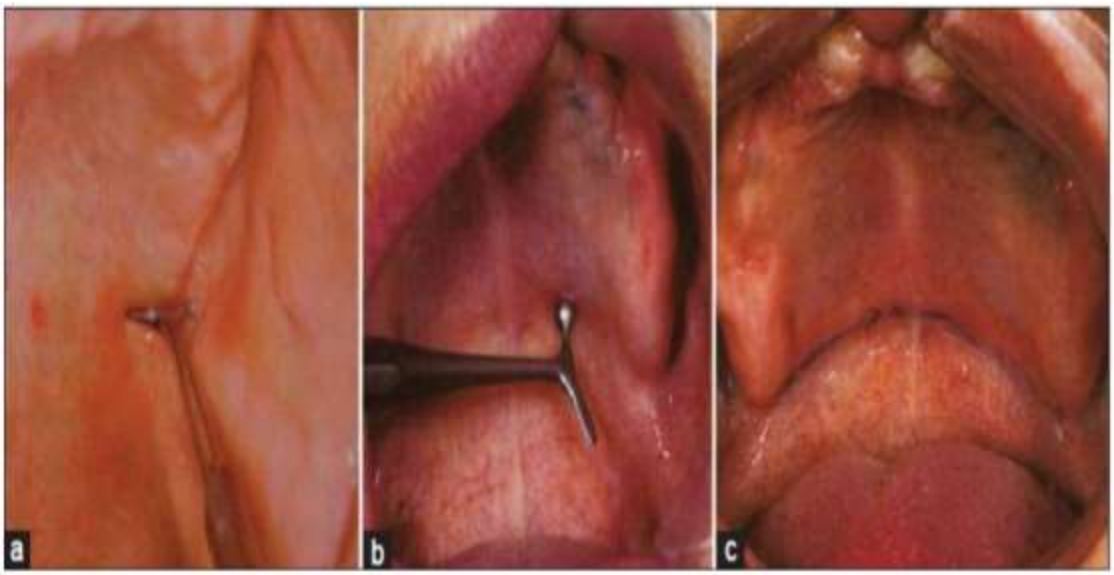
Techniques of Post Damming

There are several established for the placement of the posterior palatal seal:

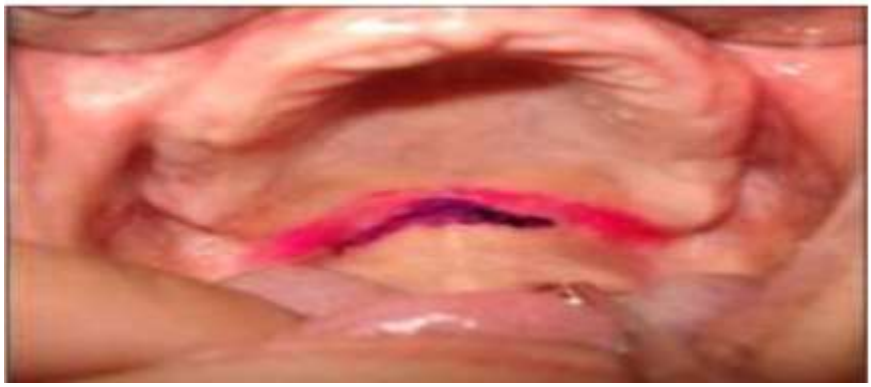
A- Conventional technique.
B- Fluid wax technique..
C- Scraping master cast.
D- Post damming during try in procedure.

Conventional Technique

1- This procedure is done after the impression is made and the master cast is poured.
2- A trial base is fabricated using shellac base plate or a well – adapted self-cure resin.
3- The patient is asked to sit in upright position and asked to rinse his mouth with some astringent mouth wash.
4- The P.P. area is wiped with gauze.
5- The T burnisher is used to locate the hamular notch by palpating posteriorly to the maxillary tuberosity on both sides, the full extent of the hamular notch is marked with an indelible pencil.
6- The hamular notch is marked using indelible pencil.
7- The posterior vibrating line is marked by asking the patient to say "Ah " in non-vigorous manner.



8- The trial base is inserted into the patient mouth, so that the indelible markings are transferred to the trial base.
9- The trial base is seated on the master cast to transfer the markings marked in the patient mouth to the cast.
10- The trial base is trimmed till the posterior border.
11- The markings are transferred to the master cast.
12- The area between the anterior and posterior vibrating line is scraped in the master cast to depth of (1-1.5mm) on either side of Mid -palatine raphe . In the region of the mid palatine raphe , it should be only (0.5mm to 1mm in depth).



Advantages

1- The trial base will be more retentive, this can produce more accurate maxillo-mandibular records.
2- Patient will be able to experience the retentive qualities of the trial base.
3- The new denture wearer will be able to realize the posterior extent of the denture.

Disadvantages

1- It is not a physiologic technique and therefore depends upon accurate transfer of the vibrating lines and careful scraping of the master cast.
2- The potential for over compression of the tissues is great.

Fluid Wax Technique

All of the procedure remain the same as conventional technique that is transfer location & transfer marking of the anterior & posterior vibrating line.

The marking are recorded in final impression one of the four type of wax can be used for their technique:-

1- Iowa wax white.
2- Korecta wax no.4 orange .
3- Adaptol green.
4- physiologic paste ,yellow -white

The melted wax is painted into the impression surface & in the outline at seal area, the wax applied in slightly & excess of the estimated depth & allowed to cool to blow mouth temperature to increase its consistency & make it more resistant of flow.

- The impression is carried to mouth & held under gentle pressure 4-6 minute to allow the material flow. position of head & tongue during this procedure.
- The soft palate should be impression in it most functionally depressed positions that is by keeping Frank-Fort plane 30° & the tongue is firmly positioned against mandibular anterior teeth.

Frank-Fort plane: In profile view, a plane connecting the highest point of the opening of the external auditory canal with the lowest point on the lower margin of the orbit, used to orient a human skull or head so that the plane is horizontal.

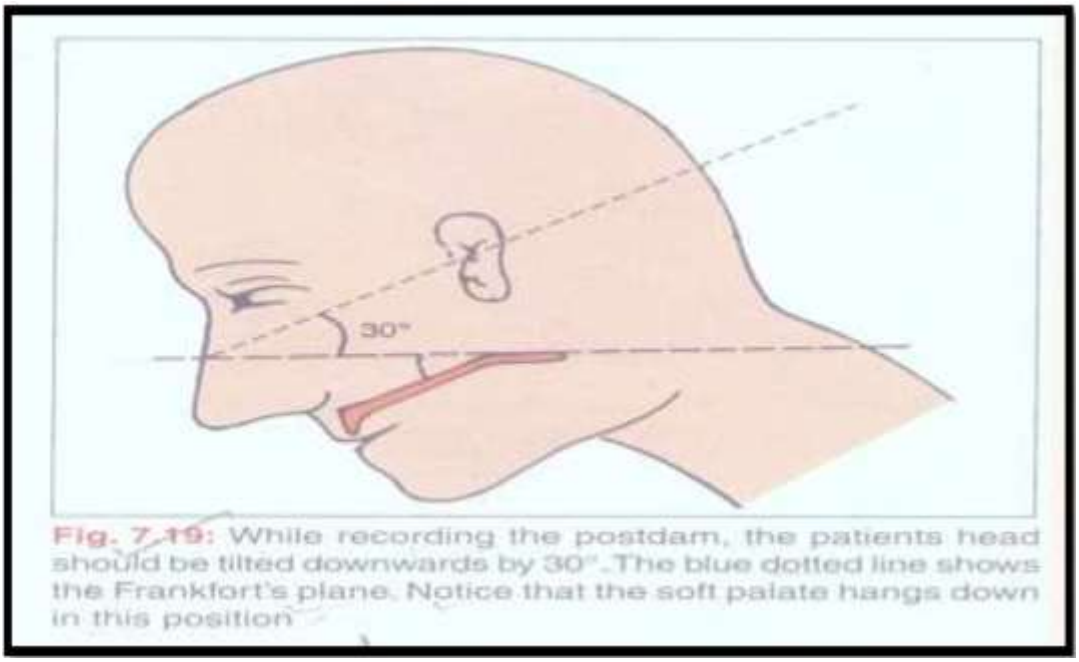


Fig. 7.19: While recording the postdam, the patients head should be tilted downwards by 30°. The blue dotted line shows the Frankfort's plane. Notice that the soft palate hangs down in this position

Advantages of This Position

1- Soft palate is impression in its most functionally depressed position.
2- The flow of saliva & impression material into the pharynx is prevented.

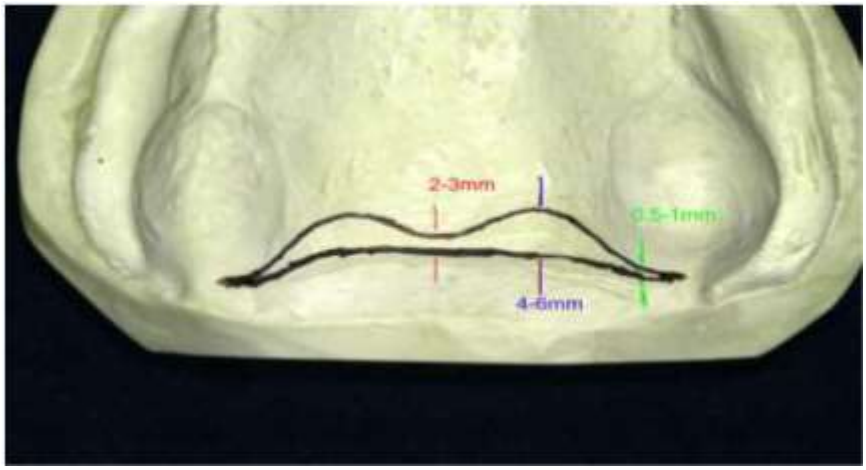
- After 4-6 minutes impression tray is removed from the mouth & examined for uniform contact.
- If the tissue contact has not established the wax will appear dull.
- If the tissue contact has been established it will appear glossy.
- If excess wax protruded out of the tray it should be removed.

Scraping Master Cast Technique

A- This technique is the least accurate and leaves the most to chance of tissue compressibility of the insertion of the denture.
B- This technique is almost as un physiologically correct as the technician's attempt to place the posterior palatal seal. So post damming must be done at the impression stage rather than by attempting the scrap the cast.

Post Damming During Try-in Procedure

- The trial denture base is inserted so the indelible pencil line marked on vibrating line of the soft palate will be transferred from the soft palate to the trial denture base.
- And the excess base plate is reduced to this line. The trial denture base is placed on the cast and a knife or pencil is used to mark a line following the posterior limits of the base plate.



Errors In Processing Posterior Palatal Seal Area

1- Under extension.
2- Over extension.
3- Under post damming.
4- Over post damming.

1- Under Extension

This is the most common cause for poor posterior palatal seal. It may be produced due to one of the following reason:-

1- The denture does not cover the fovea palatine, the tissue coverage is reduced & the posterior border of the denture is not in contact with the soft resilient tissue which will move along with the denture border during functional movements.
2- Reduce the patient anxiety to gagging.
3- Improper delineation of the anterior & posterior vibrating line.

Prevention:

- Excessive trimming of the posterior border of the cast.

2- Over Extension

1- The denture base can lead to ulceration of the soft palate & painful deglutition.

2- The most frequent complaint from the patient will be that swallowing is painful & difficult.

3- The hamuli are covered by the denture base , the patient will experience sharp pain, especially during function.

Prevention :

- The pterygoid hamuli must never be covered by the denture base.
- The overextension can be removed with a bur & then carefully repolished.

3- Under Post Damming

1- This can occur due to improper head positioning & mouth positioning. E.g. the mouth is wide open while recording the posterior palatal seal the mucosa over the hamular notch becomes stretched. This will produce a space between the denture base & tissue.

2- Inserting a wet denture into a patient's mouth & inspecting the posterior border with the help of mouth mirror. If air bubble are seen to escape under the posterior border it indicates under damming.

Prevention:

The master cast can scraped in the posterior palatal area or the fluid wax impression can be repeated with proper patient position.

3- Over post damming

1- This commonly occur due to excess scraping of the master cast. It occur more commonly in the hamular notch region.

2- Pterygo maxillary seal area, then upon insertion of the denture the posterior border will be displaced inferiorly.

Prevention:

- Reduction of the denture border with a carbide bur, followed by lightly burnishing the area while maintaining its convexity.

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2023-2024

Insertion and Follow-up of Complete Dentures

The insertion of the completed dentures should follow a systematic sequence of procedures, including :-

A- Evaluation of the denture outside patients mouth.
B- Evaluation of the denture inside the patients mouth.
C- Evaluation for occlusion.
D- Instruction to patient receiving dentures.

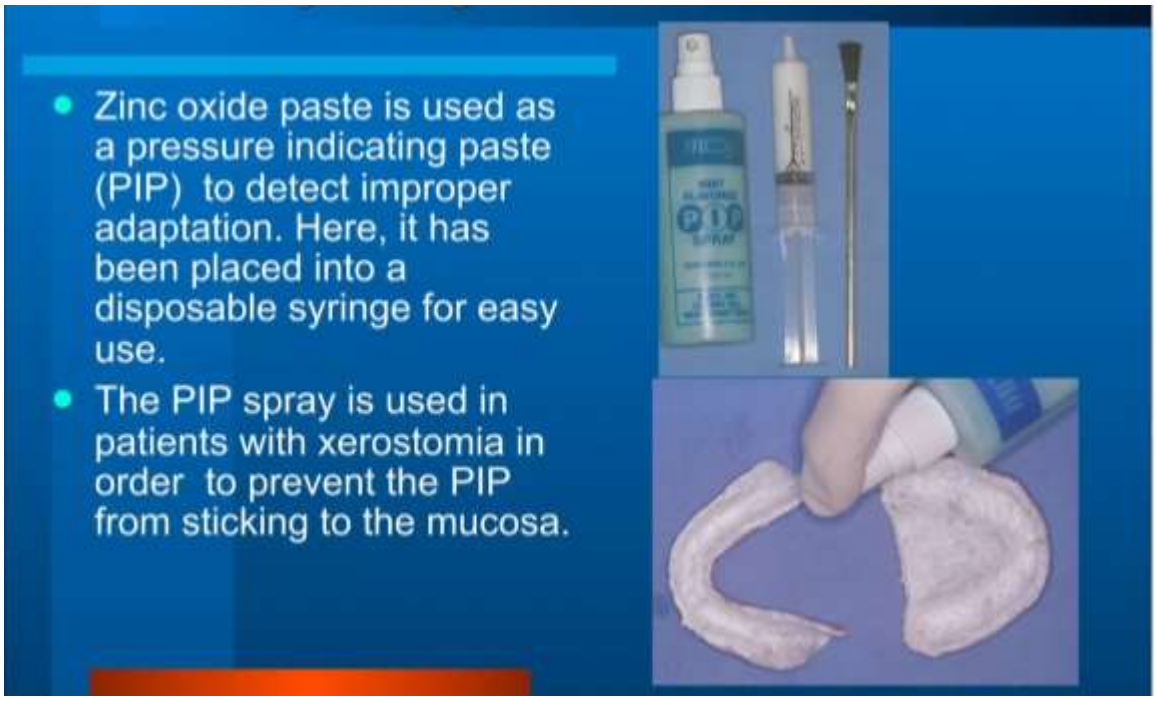
A- Evaluation of the Denture Out Side Patients Mouth:,

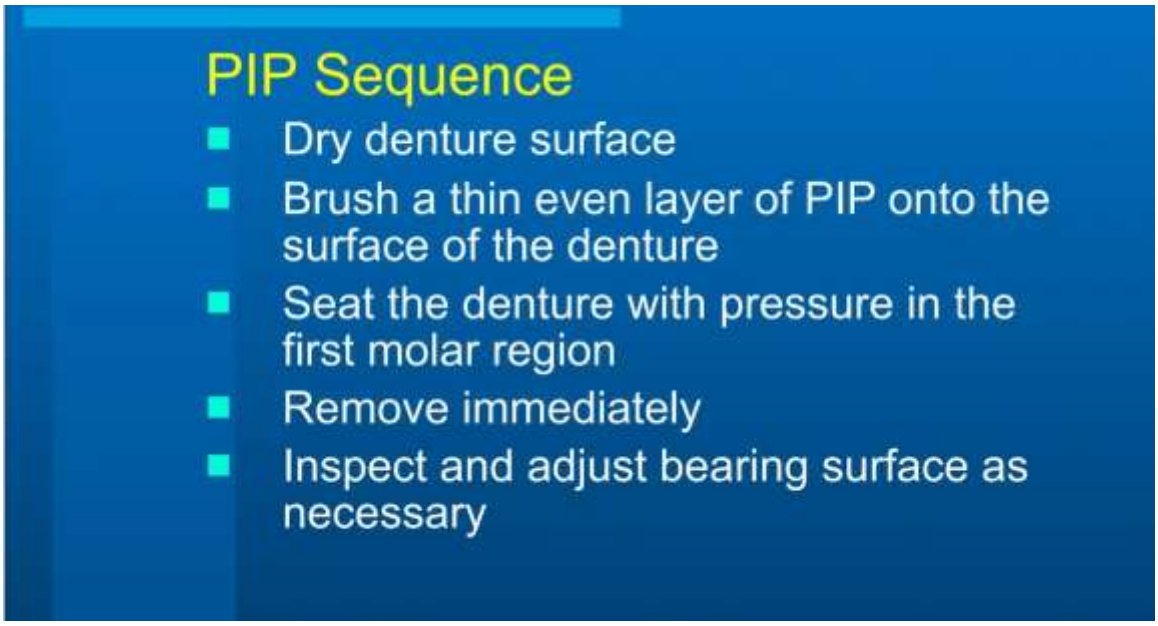
1. **Prior to delivery the dentures must be soaked in water for 72 hours to get rid from free monomer which considered a traumatic for mucosa.**
2. **Examine the finished dentures for sharp ridges, bubbles or spicules. If found; remove them with an acrylic bur.**
3. **Examine the dentures for obvious undercuts. If they are present; they may need to be removed. If an undercut is present and allows a path of insertion without denuding the tissues.**
4. **Examine the posterior palatal seal area. If it was cut deeply into the cast and has a real sharp edge; round it off with an acrylic bur.**

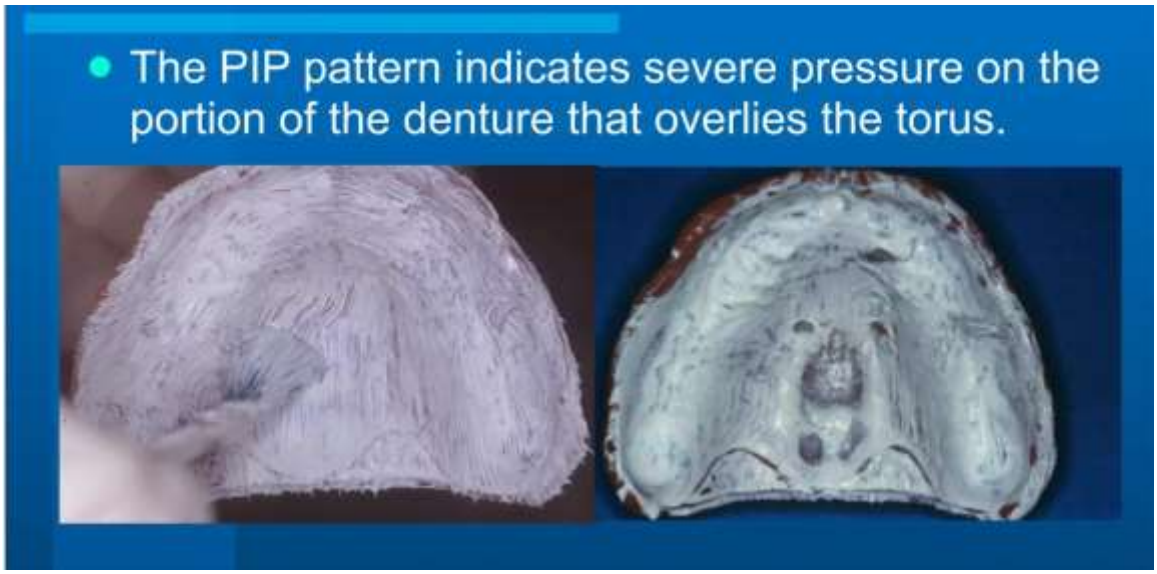
B- Evaluation of the Denture Inside the Patients Mouth

1. Evaluating the Denture Base

- **Before the insertion appointment; the clinician should inspect the denture bases to determine that the polished surfaces are smooth and devoid of scratches; that no imperfections on the tissue surface remain, and that the borders are round with no sharp angles especially in the frenum area.**
- **Next; each denture base should be individually evaluated for accuracy of adaptation to the tissues and for areas of excessive tissue/denture base pressure.**
- **Excessive pressure will result in irritation to the tissue and pain to the patient, and must be eliminated. To identify pressure areas; the tissue side of the denture should be painted with a thin film of Pressure Indicating Paste (PIP) using uniform brush strokes. The denture is then inserted and removed. When removed , the pressure indicating paste will be wiped off in areas of excessive pressure, this procedure should be repeated to verify that the markings are correct**

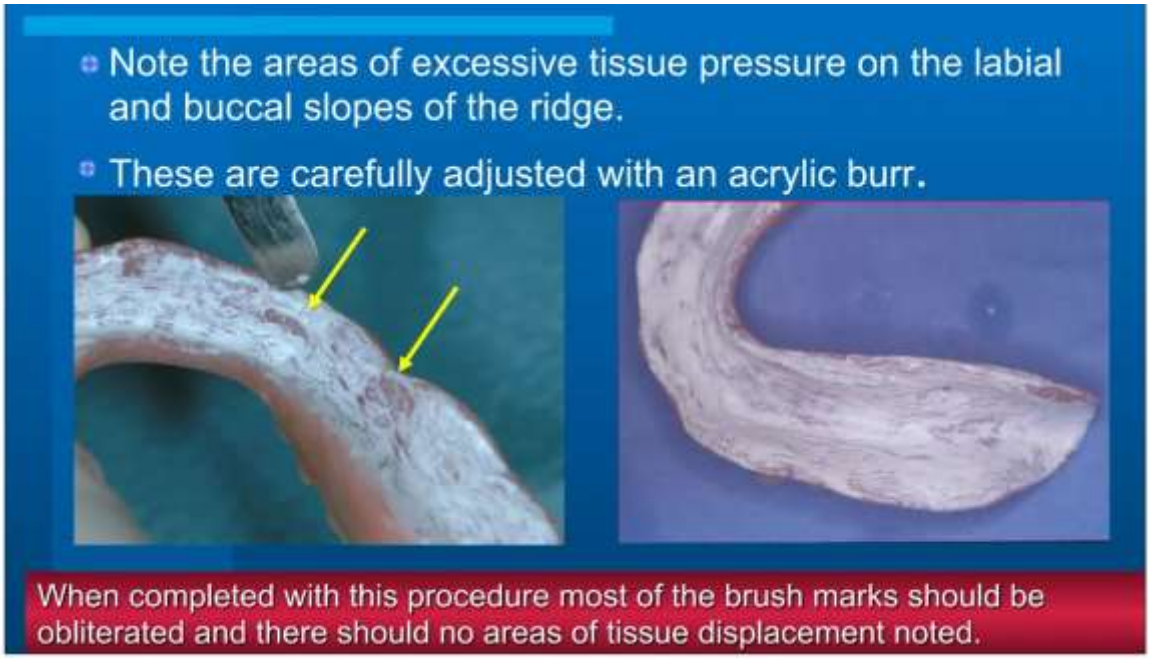

Zinc oxide paste is used as a pressure indicating paste (PIP) to detect improper adaptation. Here, it has been placed into a disposable syringe for easy use.
The PIP spray is used in patients with xerostomia in order to prevent the PIP from sticking to the mucosa.

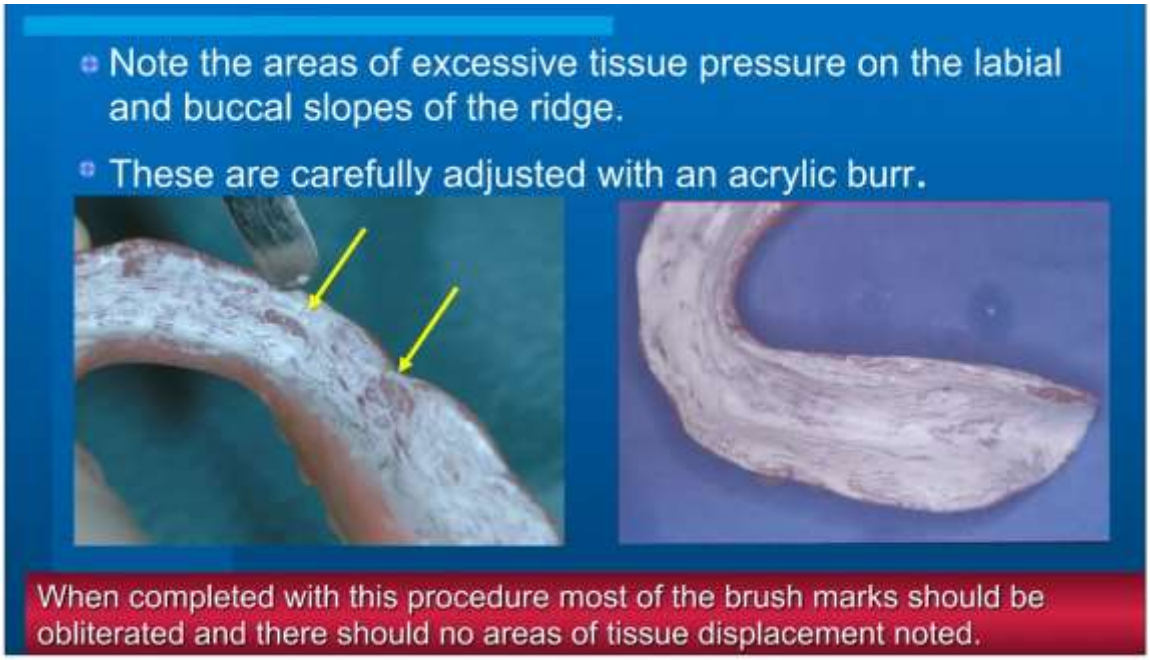

PIP Sequence
Dry denture surface
Brush a thin even layer of PIP onto the surface of the denture
Seat the denture with pressure in the first molar region
Remove immediately
Inspect and adjust bearing surface as necessary


The PIP pattern indicates severe pressure on the portion of the denture that overlies the torus.


This area is adjusted with an acrylic burr.
When completed the brush marks are mostly absent and the posterior palatal seal bead is showing.

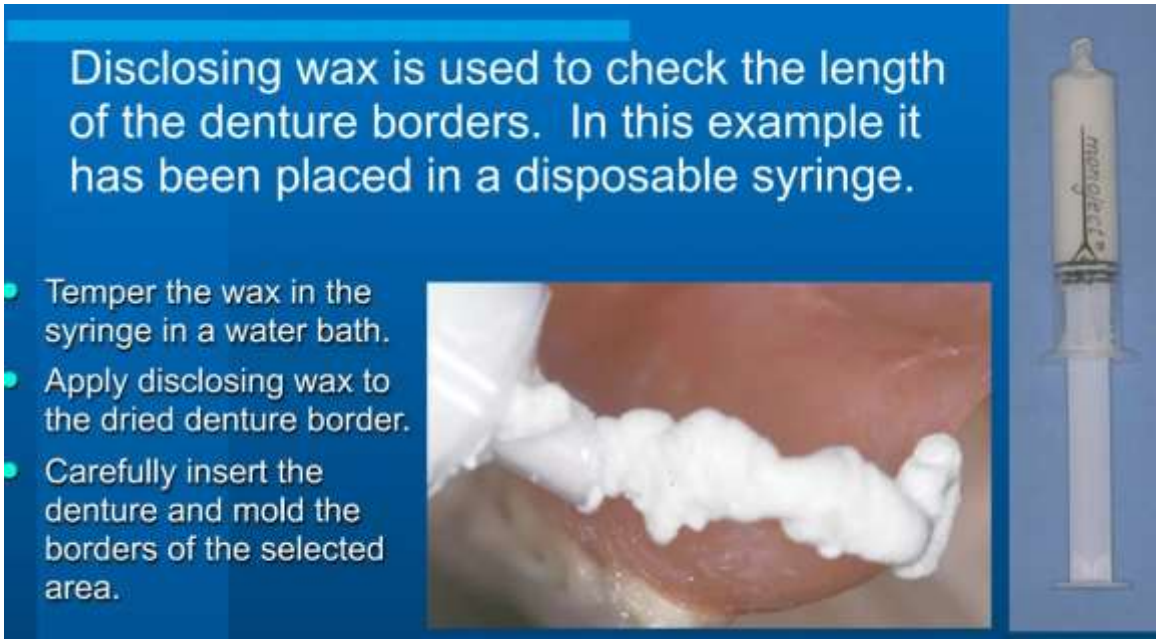

PIP the mandibular denture
Use smooth even brush strokes
Carefully insert denture so as
Pay particular attention to the mylohyoid ridge region.


Note the areas of excessive tissue pressure on the labial and buccal slopes of the ridge.
These are carefully adjusted with an acrylic burr.
When completed with this procedure most of the brush marks should be obliterated and there should no areas of tissue displacement noted.



2. Evaluating Borders:

- **Apply disclosing wax to the border of the maxillary denture in the same manner as the impression compound material was applied during the border refining procedures, to determine whether the border extensions and contour are compatible with the available spaces in the vestibules.**
- **Disclosing wax can be used to evaluate areas of border length. The wax is in a syringe that is tempered in a water bath and applied to the denture border.**
- **Instruct the patient to open the jaws as in yawing, push the lower jaw forward, and move the lower jaw from right to left.**
- **Disclosing wax is very displaceable, and slight overextension that might have been developed during border molding can be determined.**
- **Relieve any existing overextensions (length and thickness) by grinding and then polish the relieved areas.**


Disclosing wax is used to check the length of the denture borders. In this example it has been placed in a disposable syringe.
Temper the wax in the syringe in a water bath.
Apply disclosing wax to the dried denture border.
Carefully insert the denture and mold the borders of the selected area.


Carefully adjust the denture flange as necessary.
Reapply, border mold and adjust until areas of overextension are eliminated.

C- Evaluation of Occlusion

1. **Place the maxillary and mandibular dentures in patient,s mouth.**
2. **Practice placing the patient into centric relation.**
3. **See if you can repeat the position, if not; put the patient in supine position.**
4. **Place Vasaline on the occlusal surfaces of the maxillary and mandibular denture teeth.**
5. **Remove the upper and lower denture from the mouth.**
6. **Place heated green stick compound or Aluwax on the posterior teeth, evenly heat the material and temper the compound in a water bath set at 140^0.**
7. **Insert the upper and lower denture in the mouth.**
8. **Ask the patient to close on the back teeth.**
9. **Do not allow the maxillary teeth to contact as it will allow the denture to lift or shift.**
10. **Hold the lower denture in place until the compound /Aluwax is completely set.**
11. **Remove the lower denture, run under cold water, and trim the excess compound with a sharp blade leaving occlusal imprints only.**

12. **Check your CENTRIC JAW RELATION registration. If your record is not repeatable, remove the compound and go back to step 6th.**
13. **Points of penetration that occur upon closing with the jaws in centric relation may be marked with a pencil and relieved where indicated.**

This method may also locate points of interference during functional movements. Again, the disadvantage of this method is that shifting of the dentures. Articulating paper may be used to detect the premature contacts over resilient supporting tissues may give false markings.

Extra-Oral Selective Grinding Is More Preferable Than Intra-Oral Selective Grinding For The Following Reasons:

1. **Presence of compressible tissue under the denture, that may move with the denture especially in flabby ridge and very resorbed ridges, while in extra-oral selective grinding the dentures are on hard bases (casts).**
2. **The bad psychological impact on the patient as he will see his teeth ground in front of him in intra-oral selective grinding.**
3. **Lateral excursion (right and left) and protrusive movements are difficult.**

Occlusal errors in centric occlusion. In selective grinding the Bull rule should be considered which means that only the nonfunctional cusps should be modified (buccal cusps of maxillary denture and lingual cusps of mandibular denture). If the functional cusps are indicated for modification, the opposing fossae should be modified or the opposing cusp incline is ground, not the cusp height.

Instructions to Denture Patient

A- What to Expect From Your New Dentures-

1. **You must learn to manipulate your new dentures. Most patients require to learn to use new dentures, and some patients at least three weeks require more time.**
2. **Dentures are not as efficient as natural teeth so you should not expect to chew as well with dentures as with your natural teeth .**
3. **Dentures are better than no teeth at all.**
4. **Start with small bites of easy to manage foods.**
5. **Do not try to bite with your front teeth.**
6. **Use the area of the canine teeth to bite foods, but it is even better to cut the food into small pieces before attempting to chew.**
7. **Speaking will feel awkward for a while.**
8. **Diligent practice usually enables a patient with new dentures to speak clearly within a few days.**

B- Adjustments-

1. **You must return to your dentist for follow up treatment after the dentures have been inserted.**
2. **In nearly every instance, it is necessary to make some minor adjustments to the denture.**
3. **Most patients must make some adjustments in their attitude and habits in order to wear denture successfully.**
4. **If you develop soreness, do not become alarmed, call your dentist for an appointment. Do not expect soreness to go away by itself.**
5. **If you are unable to reach your dentist during weekends or holidays, remove your dentures to prevent excess tissue damage.**

C- Cleaning

1. **Your dentures and supporting ridges must be cleaned carefully after each meal.**
2. **Clean your gums with a soft brush and tooth paste.**
3. **Clean your dentures with liquid dish detergent, and gently brush with a soft denture brush. Many tooth pastes are too abrasives to use on the polished denture surface.**
4. **Soak your dentures at night in a denture cleaner or a water/mouthwash solution.**
5. **Always keep your dentures wet when not wearing them to prevent warping.**

TROUBLE SHOOTING

Many possible problems associated with the use of dentures after insertion requires persistence on the part of patients and skill and experience on the part of dentists.

A- Pain:

This generally takes the form of ulceration, redness or inflammation. It could be due to a number of causes:

1- **Roughness under the denture:- the surface of the denture against your gum is rough or sharp.**
2- **Over- extended denture:- the denture flange long and dig into your gums.**
3- **Undercuts on the denture not relieved:- your ridges are often slightly bulbous in shape and the hard acrylic of the denture is not flexible so it can scrape your gums. This creates pain on putting the denture in and taking it out, often resulting in a nasty little ulcer. This undercut just needs to be identified and smoothed, then the denture left out at any opportunity while this heals up- generally about a week.**
4- **Lack of freeway space:- if your denture teeth touch when you your mouth is totally at rest (just after you swallow), this can causes your muscles around your mouth to be in constant tension causing pain.**
5- **Errors in the bite:- uneven chewing can cause pain and pressure in certain areas or lead to looseness.**
6- **Retained roots or bony tori :- bony areas that occur in the palate (roof of your mouth) and on the inside of your lower jaw opposite the premolars. They can potentially affect how the denture sits down if they are large and may need to be corrected with surgery before making your dentures. Tori have very little gum overlying them to cushion the denture, so can often be painful to sufficient space around them.**
7- **Xerostomia; a lack of lubrication can cause friction and inadequate suction.**

B- Cheek Biting.-

1- Reduced vertical height:- remake at the proper OVD.
2- Biting the tongue:- due to decreased tongue space or decreased OVD

C- Gagging:-

1- The palate (roof) of your denture could be too thick.
2- The post dam too far back.
3- The top teeth placed too far towards the inside (palatally) or too far down so they contact the tongue. These possible causes would need to be investigated by your dentist.

D- Inability to Eat:

Causes:- -Usually, new denture wearer.

1- Certain food stuffs are more difficult to consume.
2- Cusp teeth against low-cusp or zero-cusp teeth.
3- Lack of inter digitation of posterior teeth. -Unbalanced occlusion.
4- Restricted tongue space.
5- Over-extension of periphery.
6- Habit of eating on anterior teeth only.

E- Burning Tongue and Palate:-

The burning sensation that some patients experience in the anterior third of the palate may result from pressure on the naso- palatine area. Relief of the denture over the incisive papilla is usually effective.

Accurate location of postpalatal seal area on the maxillary complete denture cast

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An adequate postpalatal seal of a maxillary denture is essential for retention.[1-3] The postpalatal seal (PPS) area has been 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 prosthesis to aid in retention.[4] The functions of the PPS of the maxillary complete denture include enhancing retention, sealing the denture base with the underlying tissue to prevent food and debris from entering, reducing the gagging tendency, compensating for the volumetric shrinkage of the acrylic resin in this area, and providing increased thickness of the posterior border, resulting in increased strength.[5,6] Despite improvement in techniques of processing dentures and materials, the dimensional changes of acrylic resin from polymerization and thermal shrinkage result in a space between the tissue and the intaglio surface of the dentures. For this reason, a compensating mechanism is necessary.

The methods for achieving a postpalatal seal of a maxillary complete denture include arbitrarily scraping the cast prior to denture processing, the selective pressure impression technique, and the physiologic impression technique. Winland and Young[7] and Chen et al[8] stated that most dental schools teach the method of carving the PPS arbitrarily in the maxillary cast. This arbitrary location and scribing of the definitive cast was found to be the least accurate technique because the effectiveness of the posterior seal of a maxillary denture is confirmed only at the insertion appointment.[7]

The anterior vibrating line at the area of the junction of the hard and soft palate can be located by palpation of the hamular processes and the fovea palatine[9] The anterior vibrating line serves as the anterior border of the PPS area. The posterior vibrating line lies in the junction of the aponeurotic portion of the soft palate and represents the posterior extension of the PPS area.[9]

The location and incorporation of the PPS on the maxillary definitive cast are often done by the dentist or dental laboratory technician. However, these procedures should be the responsibility of the dentist, as the tissue displacement can only be determined clinically.[10] A faulty PPS may cause poor retention and/or tissue irritation. This article describes a technique for the location of the PPS intraorally and accurate transfer to the maxillary complete denture cast.

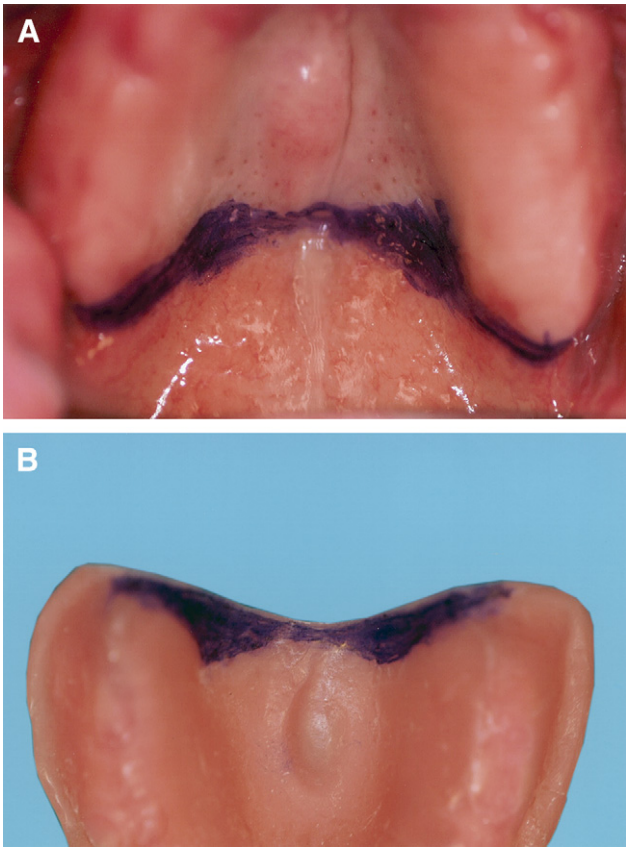

Fig. 1. A, Identify anterior and posterior vibrating lines intraorally. **B,** Trim trial-denture base to posterior vibrating line.

PROCEDURE

1. Determine and mark anterior and posterior vibrating lines on the soft palate with an indelible marking stick. (Dr. Thompson's Sanitary Color Transfer Applicators; Great Plains Dental Products, Cunningham, Kan) (Fig. 1, *A*).
2. Insert the trial denture intraorally and allow it to remain in place for 1 minute. Confirm that the ink is transferred from the soft palate to the base of the wax trial denture.
3. Trim the trial denture base to the posterior vibrating line of the PPS area (Fig. 1, *B*).
4. Draw the posterior vibrating line of the PPS area on the cast (Fig. 2, *A*).

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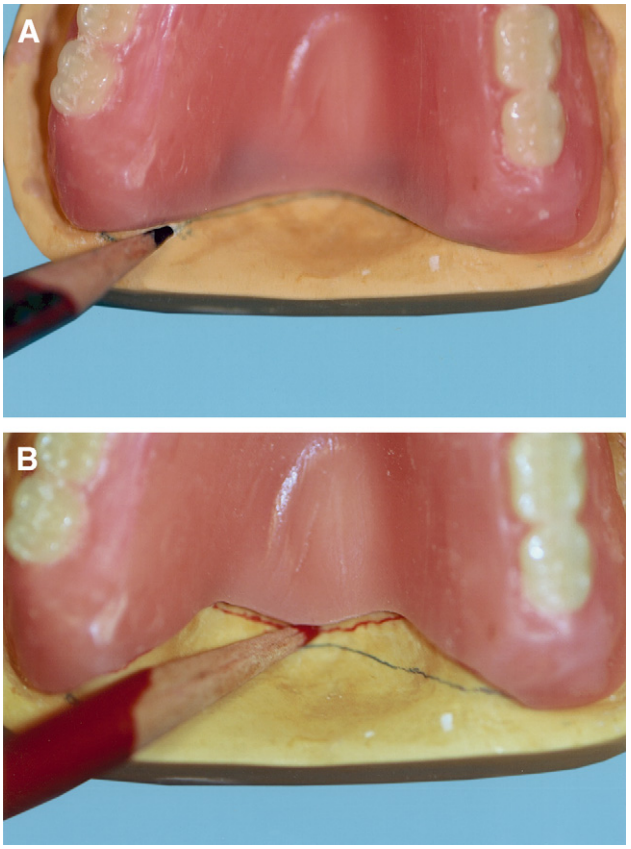

Fig. 2. A, Draw posterior vibrating line on cast. **B,** Trim trial denture base to anterior vibrating line and draw on cast.

5. Trim the trial denture base to the anterior vibrating line of the marked PPS area.
6. Draw the anterior vibrating line of the PPS area on the cast (Fig. 2, *B*).
7. Scrape the PPS area into the cast.

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