THE FINAL IMPRESSION

IN R.P.D

by

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THE FINAL IMPRESSION

The final impression is made after the different steps of mouth preparation .

Impression techniques might be different according to the Functional Design Classification which is either:

1. Tooth Borne Partial Dentures.
2. Extension Base Partial Dentures.

Factors influencing support of the distal extension base:

1. Contour and quality of the residual ridge:

- The best foundation to give denture support is provided by:

<u>The mandibular ridge :</u>

- the crest of the mandibular ridge is formed from cancellous bone it is *not considered a primary stress bearing area*.

On the other hand, ***the buccal shelf of bone*** is better suited as a primary stress bearing area.

The maxillary ridge :

- cancellous bone, covered by soft tissue that is firm, dense in nature. Thus, *the crystal area may be a primary stress bearing area* .
- Buccal and lingual slopes of the ridge may offer more ***resistance to vertical forces*** .

2- The extent of residual ridge coverage:

- The broader the coverage, the greater the distribution of load/ per unit area.

3. Design of RPD:

- *In distal extension bases*, rotation around the most posterior retainer under functional loading ***can be controlling*** by use of an indirect retainer placed anterior to the fulcrum line .

indirect retainer:

- The indirect retainer more anteriorly and in the center to the fulcrum line, more support the denture base.

4. The total occlusal load applied:

The amount of the occlusal force applied to a denture base on a distal extension ridge **influences the amount of support required** to stabilize the denture.

The support may be improved through:

- *Maximum* coverage of the ridge.
- *Narrowing the occlusal* table of the artificial teeth .
- Increasing the efficiency of artificial teeth by supplemental grooves , *increase the cutting action* & *reduce the force* required in chewing & *less force* will be transmitted to the ridge.

5. *Accuracy of fit of the denture base:*

Support is enhanced by the intimacy of contact of the tissues that cover the residual ridge.

6. Accuracy of impression registration:

Accurate impression making will *ensure the construction of a RPD* that will accurately *fit the underlying structures* and *improve support*.

Objectives of impression in Extension Base of R.P.D:

1- *Maximum coverage* of the tissue available within the physiologic limit.

2- *Distributing the load* widely over the largest possible area.

3- ***Fit the base*** to the edentulous ridge.

4- Direct the *forces to the primary stress bearing areas*.

5- ***Equalize the support derived*** from ***edentulous ridges and abutment teeth*** to decrease torque on teeth and preserve bone.

6- ***Record the peripheries*** of the bases accurately.

Types of impression techniques that can be used in partial denture construction:

I- The anatomic form.

1- Using modified stock trays.

2- Using a custom trays.

II. The physiologic or the functional form.

1- At the impression stage:

- Mclean's and Hindel's Methods.
- One stage selective pressure impression technique.

2- At the framework stage:

The selective tissue placement impression technique.
(Altered cast technique)

3- At the finished denture stage.

The functional reline techniques using zn o or rubber base

impression material:

a- Old denture.
b- New denture.

Preparation for Impressions

All mouth and tooth preparations must be completed

prior to final impressions.

1- Instructions to patient:

- Relax lips, tongue, and cheeks
- Advise patient that you will ask them to lift their tongue
- Ask patient to concentrate on breathing.
- Review the procedure with the patient.

2- Block out large embrasures and inter-proximal spaces:

to prevent tearing of the impression material on removal.

3- Dry teeth Pack arch with gauze.

I-The anatomic form impression:

- It is mostly used in tooth supported RPD cases.
- It is a one-stage impression, made using an elastic impression material.
- The cast produced represents the hard and soft tissues at rest.
- It does not represent a functional relation between the various supporting structures of the partially edentulous mouth.

- *In cases of totally tooth supported partial denture cases*, the occlusal *forces are transmitted towards the long axis* of the abutment teeth ***through occlusal, lingual or incisal rests***.

The anatomic form impression technique is performed either by:

1 -Using modified stock trays with modeling compound or wax ' - Alginate impression material.

Or,

2-Fabricate Custom trays on the diagnostic models

- Alginate impression material.

- Rubber base impression material.

1- Modified Stock Tray Technique

- It is a standard technique for 95% of RPD Impressions.
- Ideal stock tray technique includes some "customization" with periphery wax.
- Custom trays are only needed for the unique patient that a stock tray can't be found that will cover the necessary structures.

PROCEDURE FOR MAKING THE IMPRESSION:

- ***Select the suitable stock trays*** that should be adapted, fitted and well extended.
- The size of tray is selected so that the teeth sit centrally within the trough of the tray.
- ***Modify the tray with*** impression compound, pink wax or auto polymerizing acrylic as appropriate, to improve adaptation and extension of the tray.
- The impression procedure is made in the similar manner as described previously for *the preliminary impression using the modified stock tray*.

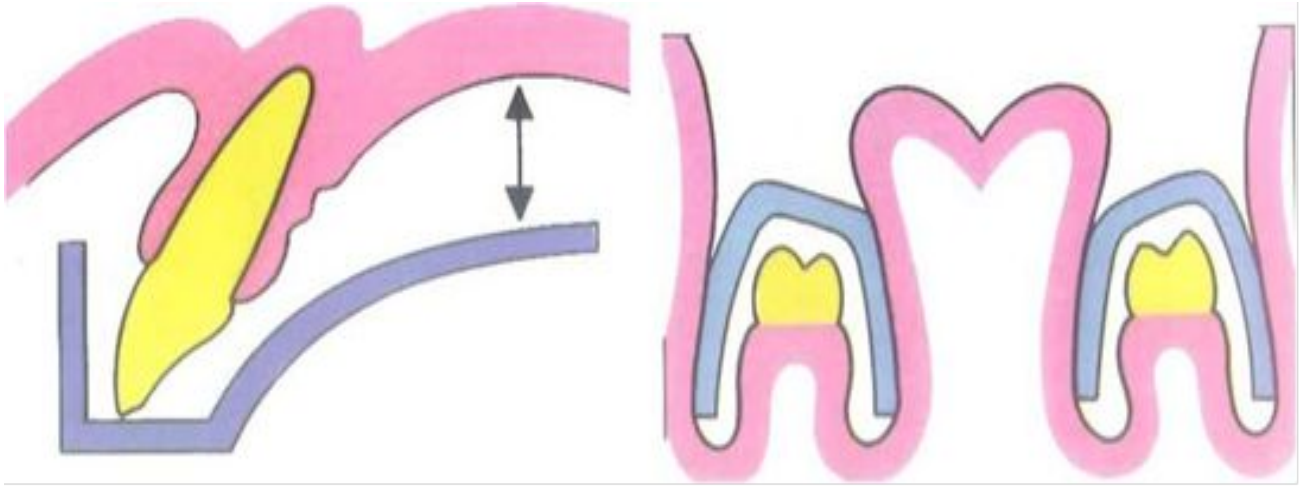


Fig. 1 a and b: The size of tray is selected so that the teeth are .centrally located within the trough of the tray

Fig. 3 .'Beading or periphery wax to improve .adaptation

2. Impression using custom trays:

a- Alginate impression with Custom Trays.

b- Rubber base with Custom Trays.

a) Construction of the special tray:

- On the study cast, base plate wax spacer is adapted on the teeth and residual ridges to create space between the teeth and the tray to make room for the impression material ***To maintain a uniform thickness*** for the impression material and to help accurate seating of the tray in the patient's mouth, ***wax stops are used***.
- ***The stops are*** mostly seated in the edentulous ridges *posteriorly* ***and*** *on the incisal edges anteriorly*.
- ***The thickness of the wax spacer*** depends on the impression material that will be used

(2mm for rubber and silicone and *4-6mm for alginate*).

- The monomer and polymer are mixed according to the manufacturer's directions .
- *To have adequate and uniform thickness* of the acrylic resin dough it can be spread *between two wet glass plates* to the desired thickness then adapted gently on the study cast.
- While still soft the material should be trimmed to the desired outline. With the excess material, the handle is formed and attached to the tray.
- The impression material may be retained to the tray either by holes (***a no. 8 round bur***) or by ***adhesive spray***.

b) Making the impression:

After all the steps of mouth and abutment teeth preparation are completed,

the impression procedure is made in the similar manner as described previously for the preliminary impression using the special tray.

N.B:

- No bubbles should be around or in rest preparations.
- ***No bubbles*** should be in the palate where major connectors are to be constructed.
- There should be *no tearing of the impression material* where the *teeth are involved in the design* .
- The tray should not be showing through the *cusp tips*.

- ***After checking the impression*** and its approval, the impression is *poured with stone plaster* and *the master cast is obtained*.

- ***On the master cast*** the *different steps for metal framework construction* and the *completion of the RPD are carried* out.

:RUBBER BASE IMPRESSION

Fig. 4: Custom tray for rubber base impression material, Only one layer of wax spacer (2 mm) is needed. Wax spacer is short of the vestibule. Paint the cast that may contact by the acrylic resin tray material with a separating medium (tinfoil substitute).

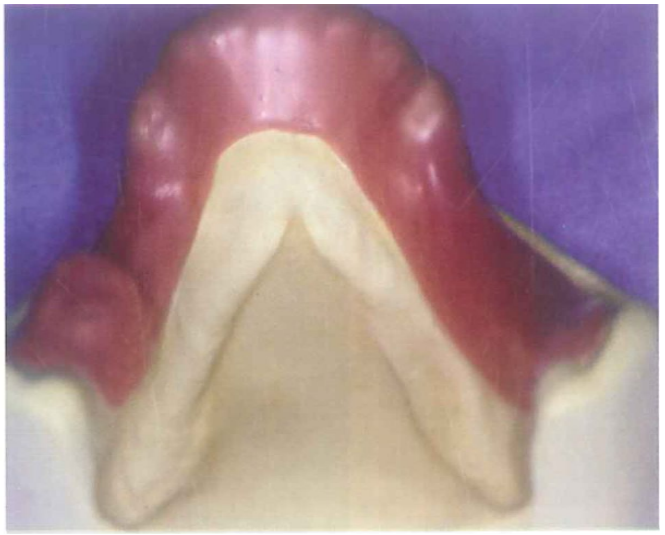


Fig. 5: The wax spacer is short of the Vestibule.

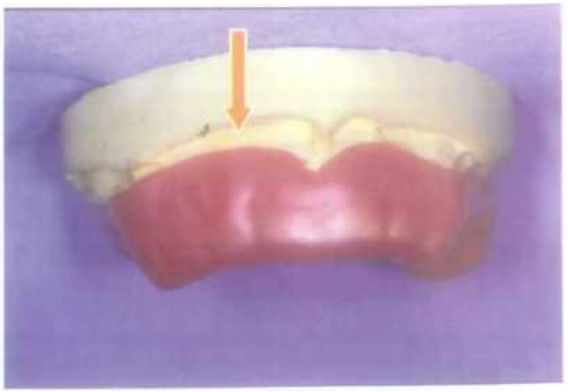


Fig. 6: Adapt two layers of base plate wax to provide enough space for (Spacer) Alginate Impression : minimum 4-6 mm

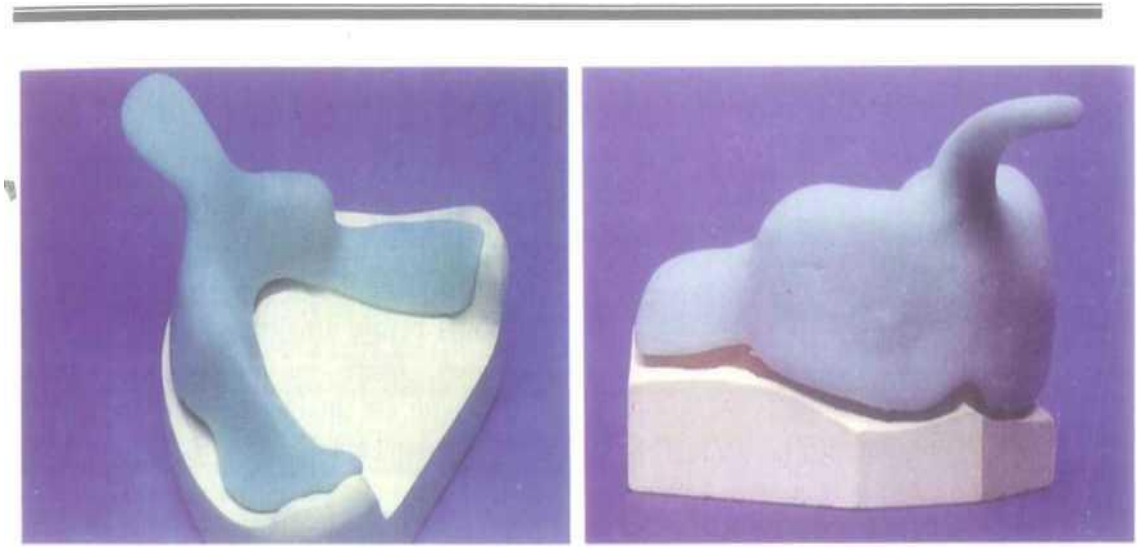


Fig. 7 a and b: Custom tray for RPD impression: The extension of the tray covers the whole vestibule

(Unlike the complete denture custom tray is 2-3 mm short of the vestibule for border molding)

To provide the vertical tissue stops and maintains the proper impression material thickness.

Fig. 8 a and -b: Carefully positioned internal stops are made ***to*** re-establish the *intended spacing* ***and*** permit the ***accurate relocation of the tray*** every time it is inserted in the mouth.

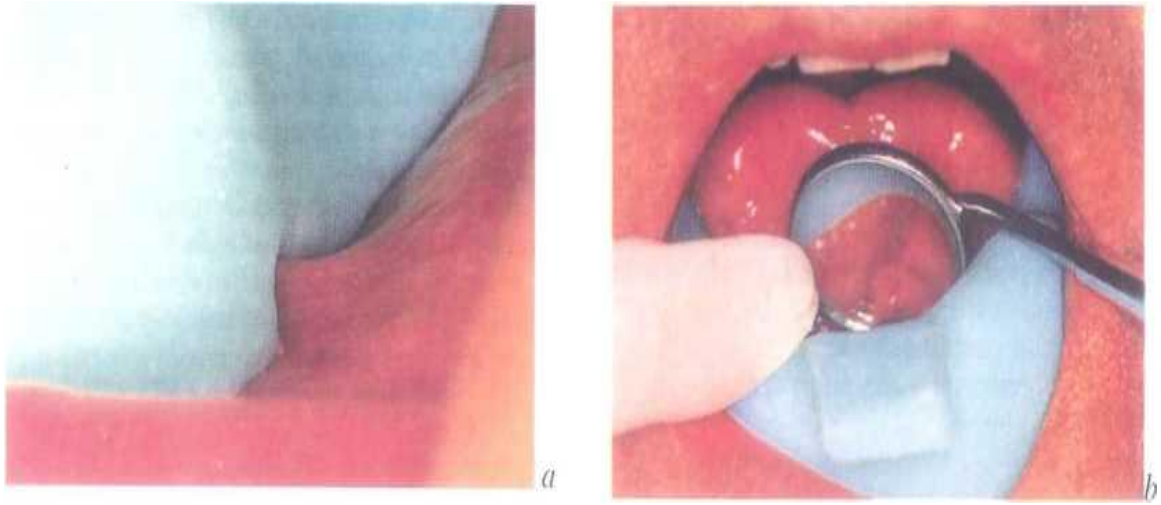


Fig. 9 a and b: *The extension of the tray* covers the whole vestibule to provide the vertical tissue stops and maintains the .proper impression material thickness

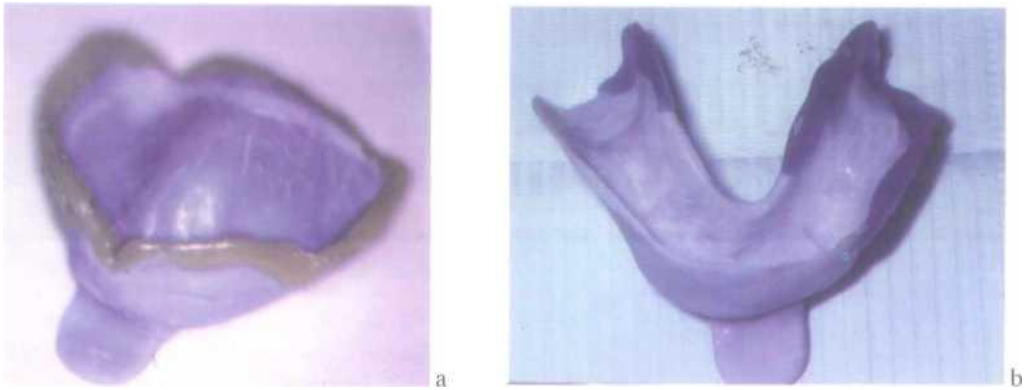


Fig. 10 a and b: *Adjust Length of Tray Borders*. The borders should be smooth and rounded. Adequate clearance is provided for the frenum,

Fig. 11: Place Adhesive on Internal and External Areas, Use Disposable Brush.

Fig. 12: Use gauze and saliva ejector to remove excess saliva, prepare mixing area

Fig. 13: maxillary Completed Impression.

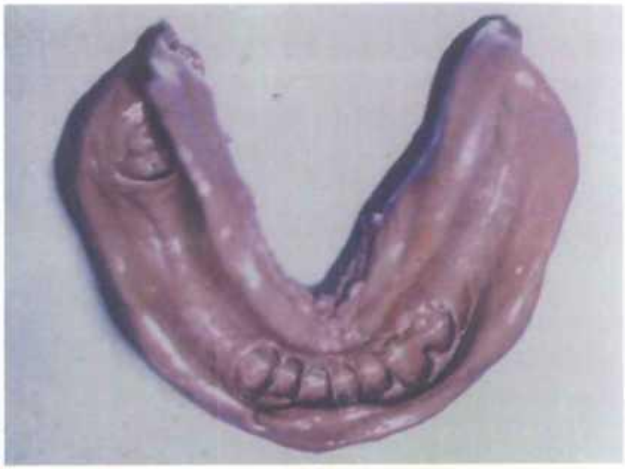


Fig. 14: mandibular Completed Impression.

a

b

:Fig. 15 a and b

Mark Denture Base Extensions: The mark should be placed 3-4 mm .above the peripheral roll. Apply sticky wax to marked border

Fig. 16 a -c:

Boxing the impression: Mark Denture Base Extensions. The mark should be placed 3 4 mm above the peripheral roll-.c, pour master cast.

Alginate Impressions in Special Trays

- Place perforations (No. 8 bur size) in the tray to provide mechanical retention for alginate material.

The tray should be seated properly in the mouth and held -gently in place.

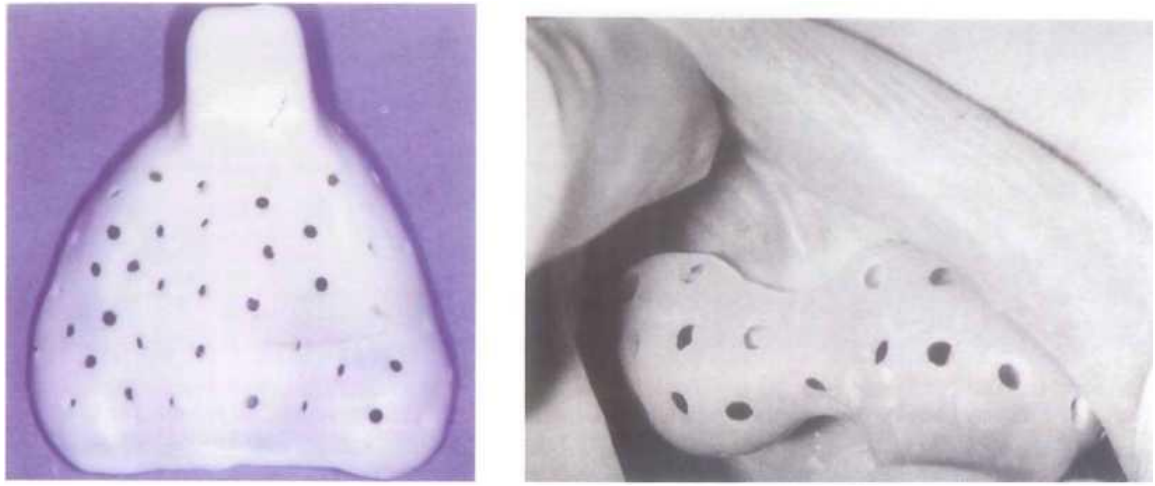


Fig. 17 a and b: Remove the wax spacer. Perfect the borders of the tray with acrylic burs.

Fig. 18 a a and b: For maximum accuracy:

The impression material should be thoroughly mixed.

-Rapid stroke against the wall of the bowl.

- Look for a thoroughly mixed creamy consistency.

Fig. 18: A wider clearance is needed around the buccal frenum.

Fig. 19: The buccal space is recorded by lateral movements of the mandible.

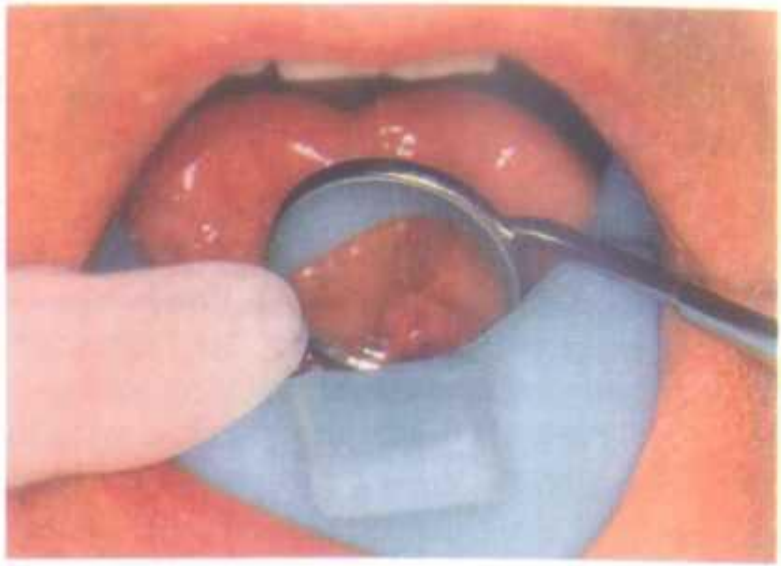



Fig. 21 a and b:

- The lower impression tray is inserted in the patient's mouth.
- The operator sitting or standing in front of the patient.
- The tray borders should be examined in turn by referring to the anatomical landmarks for impression making.
- The border should be smooth, round, and conforming the contour of the buccal pouch.

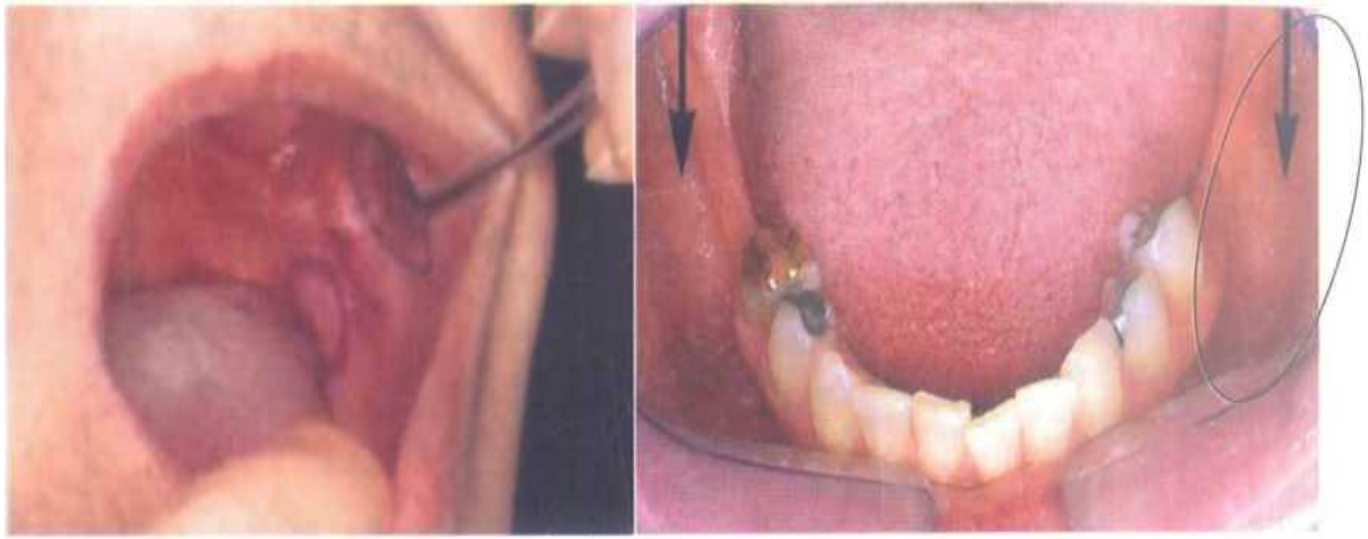


Fig. 22 a and b:

- **The outline** of the retromolar pad and the buccal shelf bone should be marked with an indelible pencil.
- ***The buccal shelf*** is a wide area lying perpendicular to the *direction of occlusal force* and is therefore an *appropriate area for denture support*.

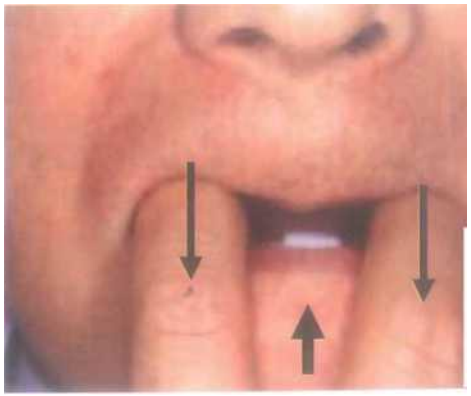


Fig. 24:

- The tray should be inserted into the mouth and forcefully seated in place.
- The movement of the masseter muscle is recorded creating its reactive contraction through exertion of a downward pressure on the tray using the fingers.

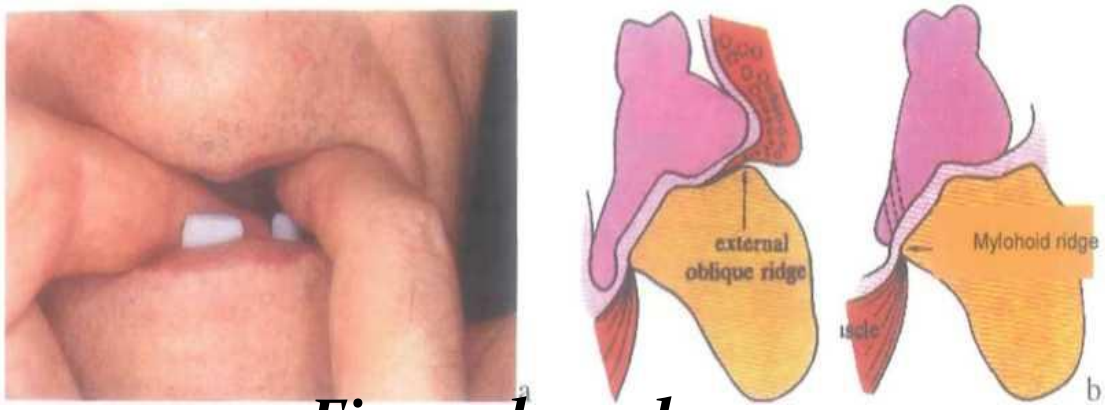
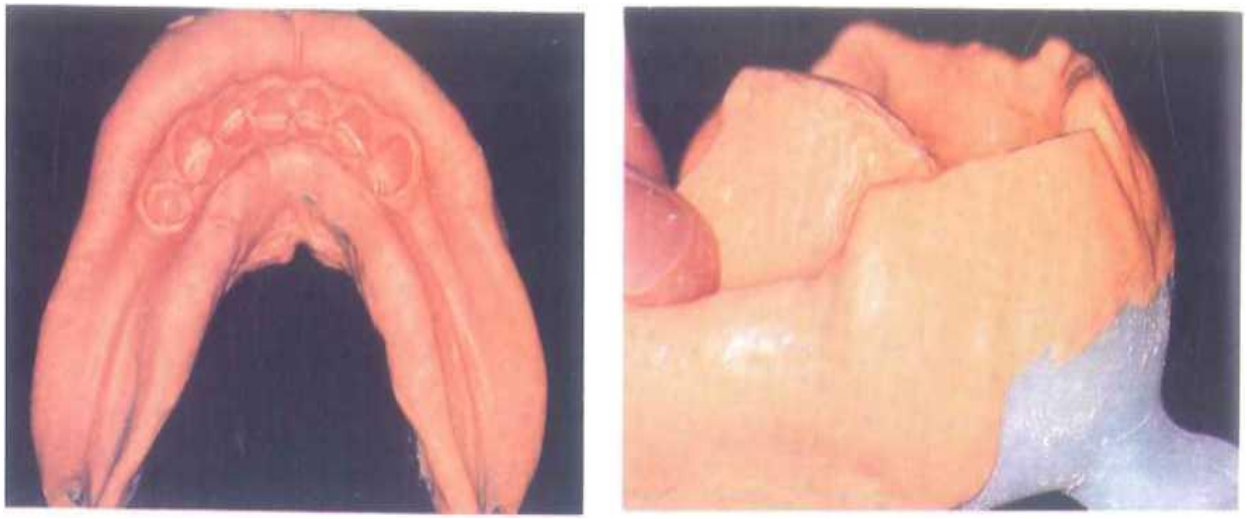


Fig. 25 b and a:

- In the mylohyoid ridge area the impression should be made 4- 6 mm below the mylohyoid ridge.

A- The impression surface of the denture on the mylohyoid ridge area is relieved.

b- A denture border short of the mylohyoid ridge digs into the residual ridge and causes pain.



:Fig. 26

Excess paste that has flowed beyond the posterior border

..of the tray should he trimmed with a hot spatula

Fig. 27 a and b:

- Completed Alginate impressions in special trays, the impression should be accentuated with an indelible pencil.
- Consequently, *this line can be clearly transferred onto the master cast*.

Fig. 28 a and b:

Double Pour Technique: Do not invert first pour of stone until initial set. Then add the Base (10-15 mm thick)

Gagging: ?????

o Thicker mix of Alginate.

o ***Mandibular impression:*** contact with tongue can be unavoidable.

Proper fit of tray, shorten un-necessary areas .

o ***Maxillary impression:*** Bend head forward, causes lift of soft palate.

Beading wax to reduce alginate posterior flow.

o Tell patient, please do not move your tongue

Inspect the Impression ???????

- Carefully rinse the impression with tap water.
- Failure to do so will result in a cast with a soft or chalky surface.
- Saliva can be identified on the cast by sprinkling stone on the impression and gently rinsing it away with tap water.
- Inspect areas that the framework contacts (rests, guide planes, major/minor connector.

- Inspect areas that the framework contacts (rests, guide planes, major/minor connector.
- Before pouring the cast remove all moisture with a gentle stream of air. Be careful not to over dry the impression.
- Disinfect the impression.
- Pour immediately!- Double Pour Technique

Never box an alginate impression with wax or a mixture of plaster and pumice.

Imbibition - distortion by water absorption.

Syneresis - loss of water and shrinkage distortion.

- Pouring of the alginate impression without making boxing, but take care when pouring and trimming the cast to ensure that the functional depth and width of the sulcus so carefully is preserved. Pour within 10 minutes.

Pour in vacuum mixed stone.

- Measure the required amounts of water and powder.
- Carefully mix the stone in a vacuum power mixer
- Using gentle vibration, flow the stone into the indentations in the impression formed by the teeth.
  - Use a small brush to avoid trapping air

- **The bottom surface of the cast should be rough to facilitate attachment of the base:**
  - poured impression by the handle in the tray holder.
- Once the stone is fully set invert the cast and add a base. The base should be *10-15 mm thick* (Provide adequate base thickness).
- ***After 60 minutes of the first pour***, separate the impression from the cast .

- Trimming should not begin until 24 hours after pouring.
- Before trimming the cast soak it in clear water for 5 minutes to ***sludge adhering to and damaging the cast.***
- The cast should be trimmed so that its base is 10-15 mm thick.
- The land should be 4 mm wide.
- The cast should ***never be rinsed, or soaked in water because*** dental stone is water-soluble.

PROBLEM	PROBABLE CAUSE
Surface of the cast soft or chalky	Saliva in the impression when cast was - poured Improper water powder ratio used - Water from rinsing remains in impression -
Distorted cast	Impression material separated from the - tray Air inclusion in impression that distorts - when stone is poured

Objectives of impression in distal extensions:

- Provides maximum support, by distributing load on as large an area as possible.
- Equalizes support derived from edentulous ridges and abutment teeth.
- Directs forces to the primary stress bearing areas.

For an impression technique to achieve those objectives it must:

1. Record and relate the supporting structures under some loading.

2. Distribute the load over the largest possible area.

3. Record the peripheries of the bases accurately.

A thorough understanding of the impression techniques and materials is essential in RPD construction to provide maximum support.

II. The physiologic or the functional form impression techniques:

1- At the impression stage:

- Mclean's and Hindel's Methods.
- One stage selected pressure impression technique.

- If a distal extension RPD were constructed from an anatomic impression it would exert excessive pressure on the abutment teeth during function.

- The main objective in an impression for distal extension is to provide maximum support for the RPD, maintaining occlusal contact to distribute the occlusal forces over the natural, and artificial teeth and minimize movement of the base that may create leverage on the abutment teeth.

- The philosophy of these techniques is to record the edentulous ridges under some degree of loading (functional pressure to have functional form) and the other supporting structures are recorded during rest (to have anatomic form).

Mclean's and Hindel's Methods.

- These old techniques have several drawbacks as they could not record exactly the functional displacement of the tissues produced by the biting force. And they did not eliminate the variable of the patients and dentist's individual interpretation of the functional loading magnitude.

One stage selective pressure impression technique

The selective pressure impression technique helps to equalize the support between the abutment teeth and the residual ridge, and directs the force to the ridge areas that are most capable of withstanding these forces i.e. the primary stress bearing areas

Dumbrigue and Esquivel in 1998 described a technique for the selective pressure impression technique from a single impression made prior to framework construction and after mouth preparation.

Procedure:

1. *On the study cast a tray is constructed as follows:*

- Two layers of base plate wax relief are adapted on the teeth and residual ridges. Aluminum foil is burnished over the wax.
- Occlusal stops are placed over the remaining teeth by cutting boxes through the aluminum foil and wax to ensure proper seating of the tray.
- Construct an acrylic resin special tray 2mm short of the borders.
- Remove wax from the cast and wet the surface of the cast.

2. On the tissue surface of the tray, corresponding to the residual ridges, apply softened modeling compound and seat the tray on the cast (to shape the compound appropriately before intraoral placement).
3. Reheat compound and place intraorally with finger pressure on the area of the residual ridge.
4. Remove, check and then apply modeling compound to the borders to perfect border molding.

5. Relief the tissue surface of the compound 1mm except for the primary stress bearing area (buccal shelf of bone).
6. Make a complete impression using rubber base material applying finger pressure on the residual ridge while the impression material is setting.

Pour the impression and proceed the steps for constructing the framework.

Fig. 29 a and-b: Two layers of base plate wax relief are adapted on the teeth and residual ridges

Fig. 30: Occlusal stops are placed over the remaining teeth by cutting boxes through .wax to ensure proper seating of the tray

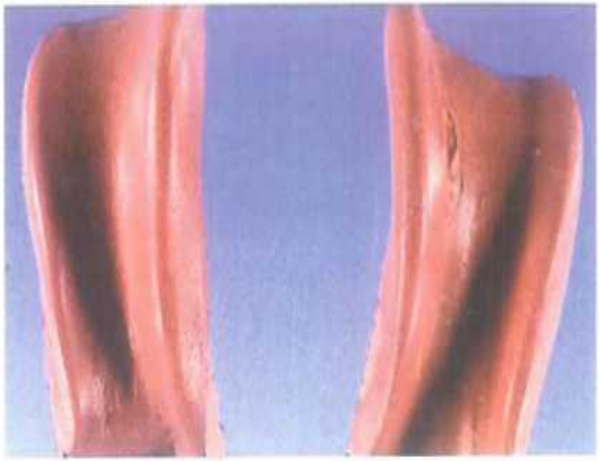


Fig. 31: On the tissue surface of the tray, corresponding to the residual ridges, apply softened

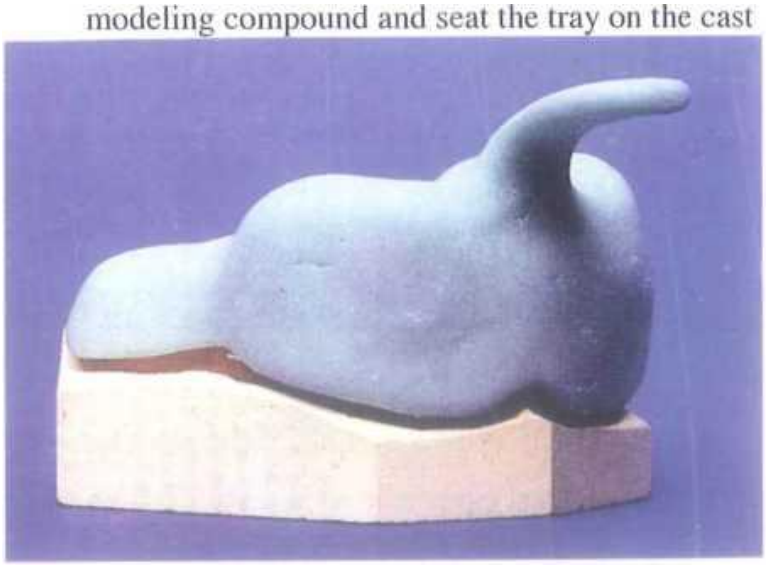


Fig. 32 a and b: Seat the tray on the cast with the softened modeling compound (to shape the compound appropriately before intraoral placement).

Fig. 33 a and b: Complete impression using rubber base material

2- The functional impression technique at the framework stage:

The altered cast technique (The selective tissue placement impression technique)

- This selective pressure impression technique is made after construction of the framework on a cast obtained from an anatomic impression.
- It is mainly used in mandibular class I and II cases.

■ The framework is tried in the patient's mouth, and adjusted to fit accurately on the supporting structures with the rests properly seated on their seats and the indirect retainers in their position.

■ The occlusion with the opposing dentition is also adjusted if in need.

■ Areas that need relief e.g. internal oblique ridge if prominent and top of the ridge (lower ridge) are relieved on the master cast using wax.

■ The stress bearing areas (buccal shelf of bone) is left without relief.

- An acrylic resin special tray is constructed on the ridge area, attached mechanically to the mesh of the framework (by seating the framework properly over the cast while the acrylic resin is still soft).
- The framework with the tray attached to it is tried in the patient's mouth, making sure that the framework fits accurately.
- The borders are then shortened and border molded using green stick compound.

■ The trays are then loaded with the impression material and the framework seated in the patient's mouth. Be sure that the occlusal rests and indirect retainers are properly seated and maintained in position by the three fingers of the operator (two on the main occlusal rests and one on the indirect retainer) until complete setting of the impression material.

■ Different materials may be used for making the impression as zinc oxide and eugenol and rubber base materials. Fluid wax may also be used. Fluid waxes are waxes that are firm at room temperature and have the ability to flow in mouth temperatures (Iowa wax no.l and Korrecta wax no. 4). Its drawback is that it is time consuming as it is applied layer by layer and needs some experience.

- After the impression has been made and is accepted, the distal extension areas on the master cast are sawed off or cut off by means of a disc.
- Two cut lines are done on each side, one horizontal distal to the last abutment and the other nearly perpendicular to it in the lingual sulcus.
- Retentive grooves are then cut on the sides of the cast along the cut off areas.

■ The framework with the impression is reseated on the cast, making sure that the framework is perfectly seated in position with no interference anywhere. Modeling plastic placed on the rests and indirect retainers may aid in ensuring that no movement of the framework occurs during pouring the new impression of the edentulous ridges.

■ The impression is beaded, boxed and the edentulous ridge is poured with stone preferably with a different color than that of the original cast.

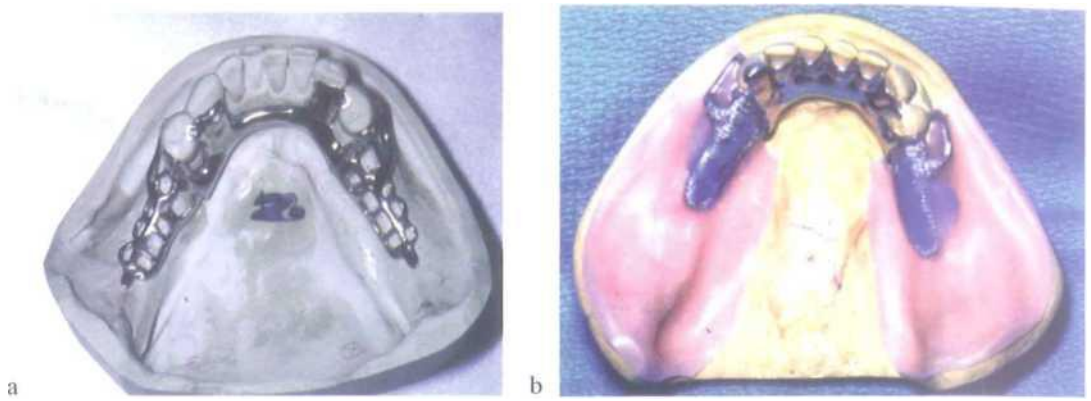


Fig. 33 a and b: The casting which lias been adjusted is placed on the master cast. A single layer of baseplate wax is placed over the edentulous .area to provide a space for the impression material
.Ensuring that all rests are well in place

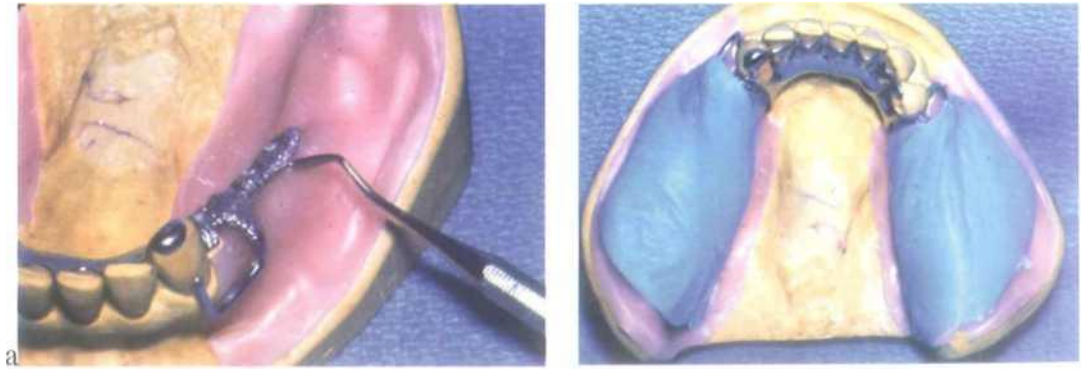


Fig. 34 a and b: Prepare the tray The purpose of the tray is to carry a uniform thickness of the final impression material to the mouth exerting reasonable pressure on the mucosa

Fig. 35 a and b: When the tray material is cured the entire cast is submerged in the warm water foi few seconds for easy separation, and .then the wax spacer is removed. The plastic tray is trimmed and polished

Fig. 36 : The tray is placed in the mouth and checked for proper .peripheral extension

Fig. 37: Border extensions are refined with modeling compound, then cut back to allow room for the impression material

Fig. 38: Vent holes are placed in the maxillary plastic tray near the finish line for escape of .excess impression material

Fig. 39: Vent holes are placed in the mandibular plastic tray near the finish line for escape of excess .impression material

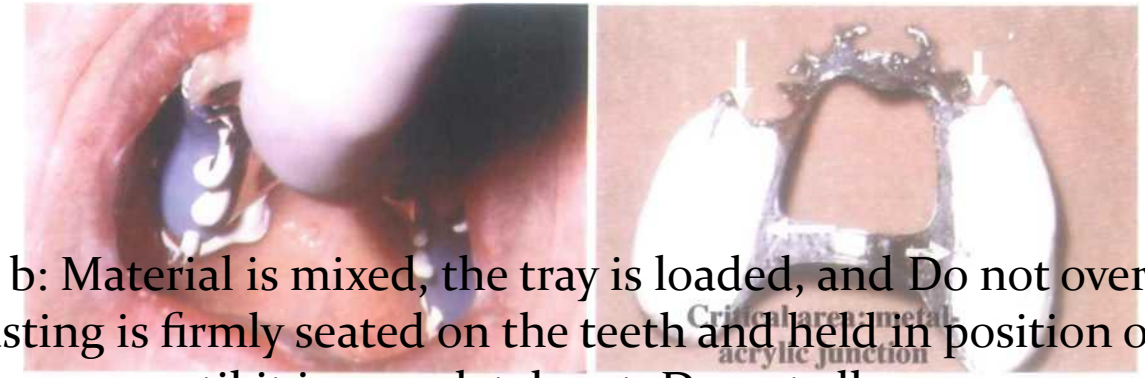


Fig. 40 a and b: Material is mixed, the tray is loaded, and Do not over load the material! The casting is firmly seated on the teeth and held in position over the rests until it is completely set. Do not allow !movement on the edentulous area

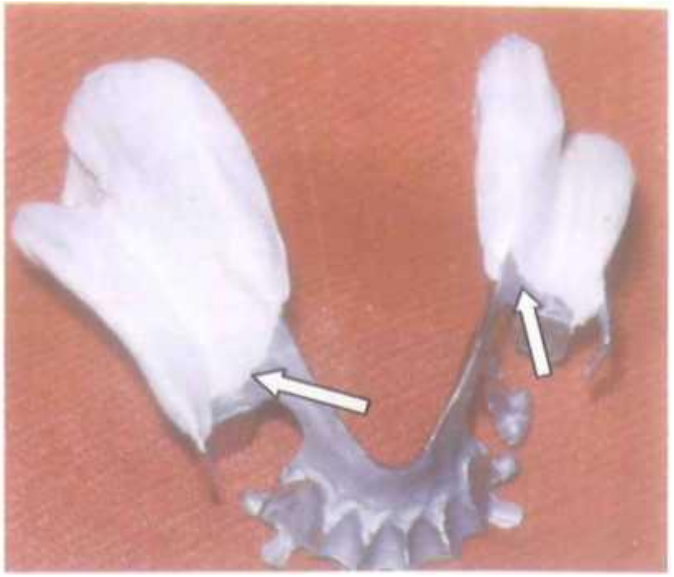


Fig. 41 a: While the impression is mde. Notice that the casting is firmly seated on the teeth and held in position over the rests until it is completely set
metal b, After border molding is carried out trim the impression material exactly to the .finish line on the tissue surface

area Fig. 42 a and b: The master cast is now "altered" by the technician. The edentulous
The of the master cast is removed, and the metal casting is seated in place on the teeth.
.casting is secured to the stone cast with sticky wax
.***Note***\ Only the metal will touch the cast. All impression areas must be out of contact

Fig. 43: Retention grooves are placed in the cast. The impression is beaded and boxed and ready to be poured in vacuum-mixed .stone

Fig. 44: The Altered Cast with the Edentulous Area Repoured

This produces the best possible support from the edentulous area of the extension partial denture, and protect abutment teeth by minimizing denture movement.

Altered cast technique
Using Light body Rubber Base Impression material

Fig. 45: Tray fabrication

Fig. 46: Border molded Rubber base impression

Fig. 47 a-c: The Altered Cast with the Edentulous Area Repoured This produces the best possible support and orientation of the metal casting to the remaining teeth. greater Effective preventive measure to protect abutment teeth by providing 2-3 times .mucosal support and minimizing denture movement

3- The functional reline techniques using zinc oxide and eugenol paste or rubber impression material at the finished denture stage

The idea of this technique:

1 - For New Denture:

Used for a distal extension RPD constructed from single anatomic impression to avoid movement on the edentulous area after application of masticatory load that create torque on the abutment teeth.

2- For Old Denture:

After denture use for a long time, a combination of occlusal wear and sinking of the denture following alveolar resorption occurs .So functional impression is required to improve the fit of the PD to the underlying tissues.

It is an open mouth procedure:

1. The borders are shortened and the denture base is relieved to allow room for the impression material.
2. Modeling plastic is applied over the tissue surface and tempered in water bath, seated in the patient's mouth and held in position with 3 fingers, two on the main occlusal rests and one on the indirect retainer. This is done several times until an accurate impression of the ridges is obtained.

3. The tissue surface is then scraped to about 1mm thickness. A mix of zinc oxide and eugenol material is then applied. The denture is seated in the patient's mouth and held in position by the three fingers the same as before until complete setting of the material.

Different impression materials may be used successfully, for functional reline impression; zinc oxide and eugenol, rubber base, silicones, mouth temperature waxes as well as tissue conditioning material) provided that there is proper space and border molding is carried out.

4. An overall alginate impression is made and the whole impression is poured. The denture on the obtained cast is flasked and relining procedure is completed.

It is essential that occlusal errors are adjusted, so the relined denture should be remounted.