

Prosthodontic Complete denture



Lec 17

Processing, Finishing and
polishing of complete denture

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Processing

The objective of denture processing is to duplicate the trial denture into a hardened polished plastic material (resin material)

This done by using flask

Before processing:

- a) Bases must be sealed to casts around entire border
- b) Soaking master cast and the mounting in the water for few minutes
- c) Remove the cast from mounting
 - ❖ Neither the cast nor the mounting has been damaged , following processing into heat cured acrylic resin the denture and cast can be precisely reattached to the mounting



FLASKING (INVESTING THE DENTURE)

Def:

- ✓ Flasking is the procedure of investing the festooned wax denture in a dental flask to make a mold, into which the denture base resin is inserted and cured

Techniques:

- a) Compression molded technique
- b) Injection technique

Dental flask:

- ✓ It is a metal tool used in investing procedures.

• Parts:

- ✓ (drag (bottom), cope (middle) , cap (thin top of the flask)
- ✓ These three part to facilitate removal of denture after processing without danger of breaking the denture
- ✓ (Cover + Upper ring + Lower ring (base) contain (knock out plate)
- ✓ Difference between flask of upper denture and that of lower is that the posterior portion of the base of the flask for lower denture is higher to accommodate lower cast.



❖ Flasking is better done in threepours:

- First pour to which the cast secured (same level of land area)
- Second pour from first pour to occ surface of trail denture.
- Final pour should fill the mold

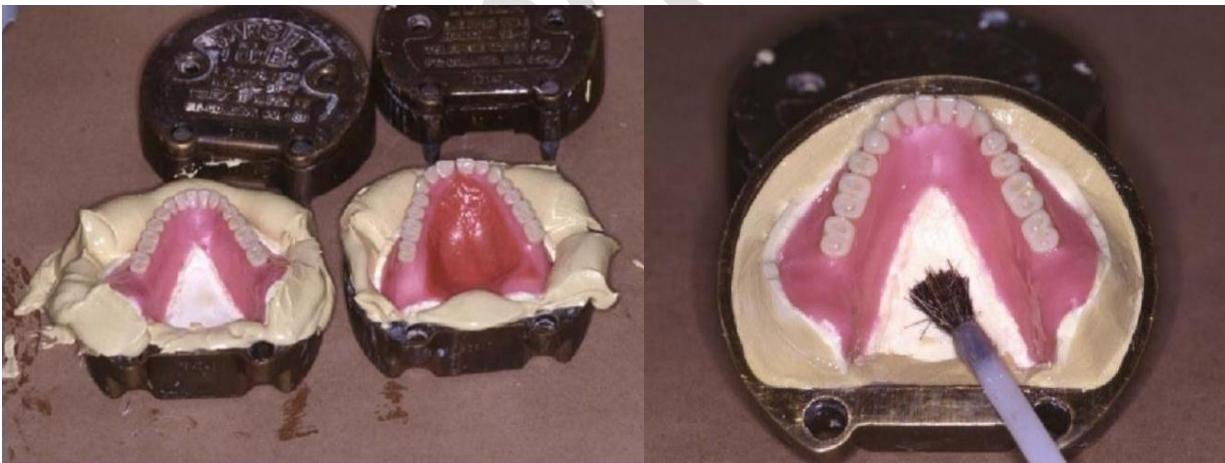
❖ Investing material:

- Use dental stone 2-3 times stronger than plaster.
- First two pours may be from plaster and the capping in stone to prevent the led from being displaced during packing. (Best result when all from stone

❖ Procedure:

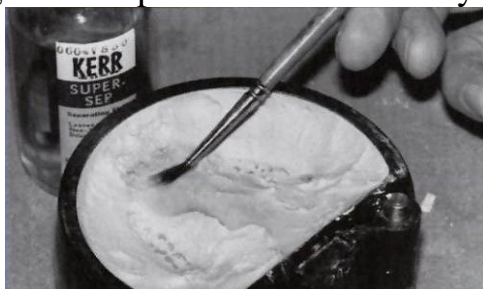
First pour :

- ✓ The cast is soaked in water for 5 min
- ✓ The plaster mounting (on articulator) must be saved
- ✓ Ensure that the flask and the casts are of a compatible size.
- ✓ Casts and flask coated by separating medium
- ✓ Stone is mixed and placed in the base of the flask (plaster may be used)
- ✓ The cast is pushed to place till it touches the base of the flask.
- ✓ borders of the cast must be in level with the edges of the flask and the occlusal plane approximately parallel to the base of the flask.
- ✓ After stone setting separating medium painted over it
- ✓ Put upper half of flask (teeth do not protrude above the top of the flask).



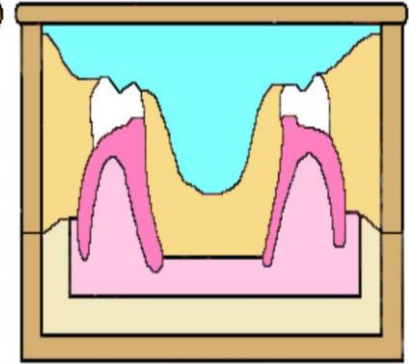
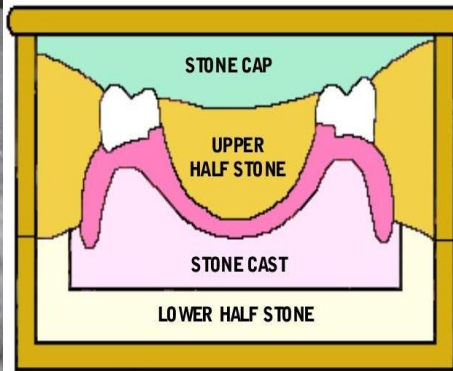
Second pour :

- ✓ The second mix is poured (cover all parts of denture except occlusal surface)
- ✓ After setting separating medium painted over stone only (not on occlusal surface).



Third pour

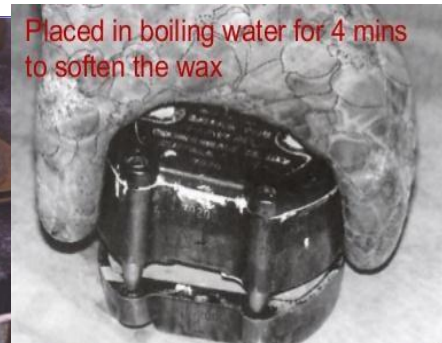
- ✓ Third mix is placed in flask (capping) and put the cover
- ✓ Plaster extrusion ensure positive pressure



- ❖ Three pour preferred to be all from stone but some lab use plaster in this case at least second pour is stone to preserve teeth relation
- ❖ Parts of flask must make metal to metal contact to preserve vertical dimension

Boil out: (wax elimination):

- ✓ The flask is placed into boiling water for 5minutes; this will soften waxed denture base
- ✓ The flask is opened by plaster knife
- ✓ The wax denture is removed from the mold in one piece.
- ✓ All the teeth should remain in the top half of the flask.
- ✓ Wash with clean hot water until the remaining wax is removed.
- ✓ Wax solvent is applied around the teeth; hot clean water is used to remove all traces of the wax solvent. Acrylic resin will not adhere to a surface coated with wax.
- ✓ After the mold and the teeth have dried, Paint flask and cast (not teeth) with separating medium and allow excess to evaporate





Packing of acrylic resin

Techniques:

a) Compression molding technique: (open flask technique):

- ✓ Separating medium is applied
- ✓ Polymer and monomer are mixed with ratio (3:1)
- ✓ Mixture is spatulated and mixing jar covered to prevent evaporation of monomer.
- ✓ The jar is opened after 2-3 minutes as mix reach dough stage
- ✓ The material is packed with clean hands in the upper half of the flask.
- ✓ A piece of wet cellophane or plastic sheet is placed over the resin before the flask is close
- ✓ This allows the flask to be reopened for inspection (prevent cast resin adherence)
- ✓ The packing pressure should be moderate and gradually as excess escapes.
- ✓ Great pressure ----- can displace or intrude teeth into the investing material.
- ✓ The flask is opened and excess acrylic resin is trimmed with sharp carver
- ✓ Small amount of acrylic resin is added and repeat previous steps
- ✓ We must be sure that all excess material is removed by metal to metal contact.
- ✓ A separating medium is applied to the cast and close flask then allow it to stand for 30-60 minutes before curing.





b) The injection molding technique

- ✓ With the injection molding technique (a special flask is used).
- ✓ The flask halves after boil-out are assembled together and acrylic resin injected into the mold via a sprue opening in the flask.
- ✓ The shrinkage of polymerization is compensated for by the constant injection of uncured material under pressure.
- ✓ Fluid resin is used with this technique to be easily indictable.
- ✓ It was reported that more linear shrinkage occurred with injection molding than with the ordinary compression molding technique, but the difference was not significant.



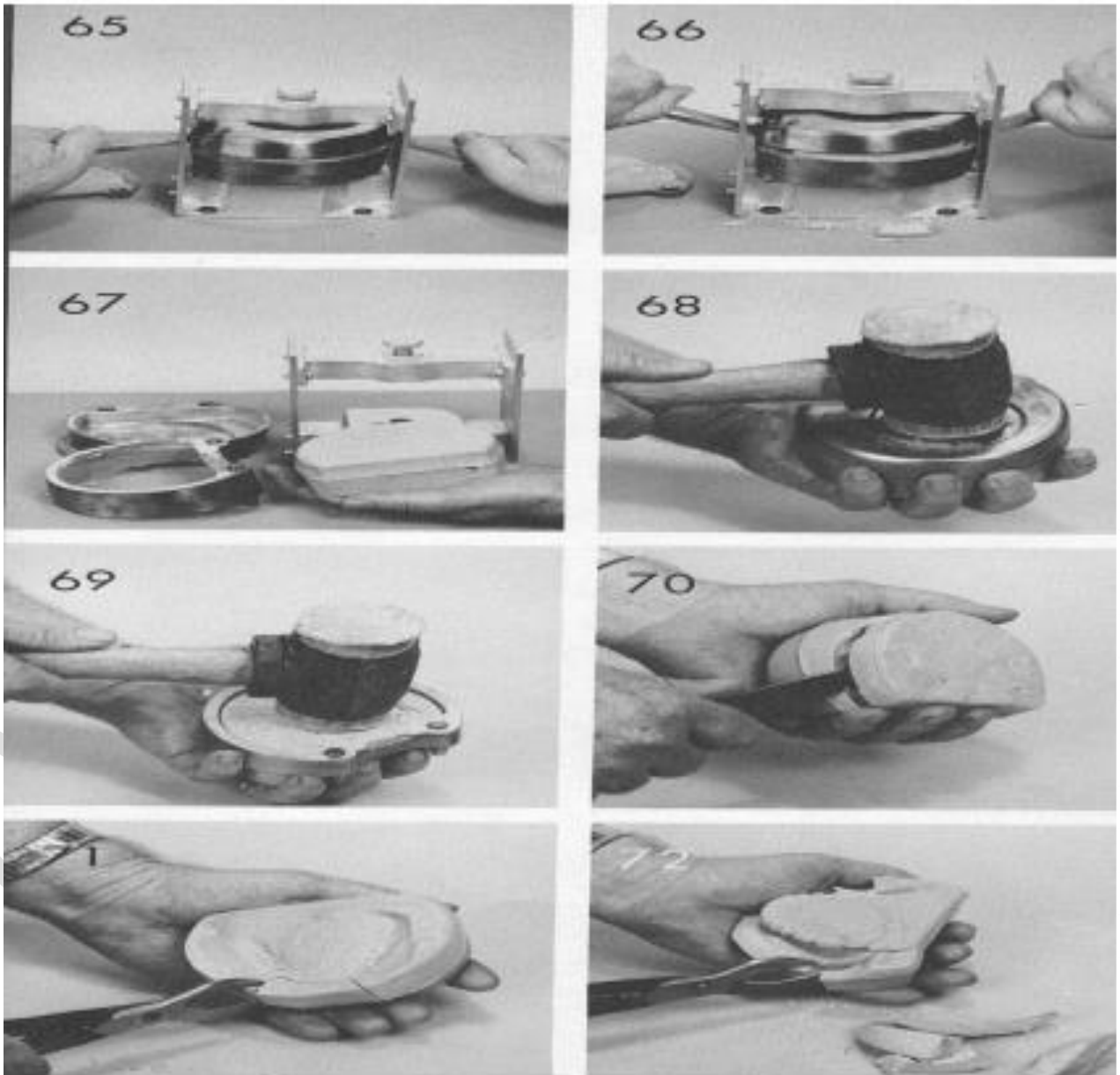
Curing

❖ **Curing Cycle:**

- ✓ Conversion of acrylic mix to hard structure by heat
 - ✓ Water temp must be maintained at (60° -70°) as its exothermic reaction for 1.5 hour
 - ✓ Water temp + reaction temp must not exceed 100° to prevent monomer boiling (prevent porosity)
- ❖ Most denture heat-cure resins are cured by one of two cycles:
1. **Slow processing** (long cycle): 9 hours at a constant 70° c
 2. **Rapid processing** (short cycle): 70°C for 1.5 hour then boil for 30 minutes

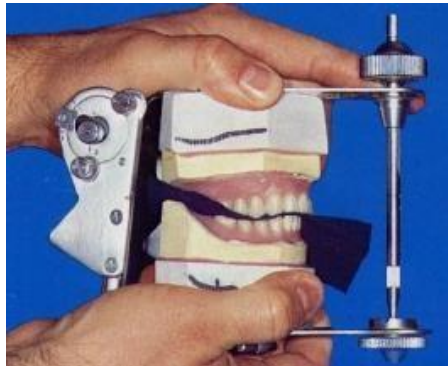
Deflasking of dentures

- ✓ After curing allow flask to cool at room temperature (slowly)
- ✓ Rapid cooling induces dimensional changes
- ✓ The lid (cover) of the flasks removed.
- ✓ Separate flask from stone investing the denture using flask ejector or hammer to strike knock-out plate.
- ✓ Stone cap removed by knife and expose the cusp tips and incisal edges of the teeth.
- ✓ A saw is used to make three cuts in the investing stone
- ✓ Stone sections separated gently, and removed from palate or tongue area using a knife.
- ✓ A tooth brush is used to clean the index grooves for accurate (remount)



Remounting

- a) **Laboratory remount:** (split cast technique) for lab errors
- ✓ Many processing errors may occur so we make lab remount step for correction
 - ✓ The recovered dentures are luted to their original mountings with sticky wax or compound and then replaced on the articulator.
 - ✓ Occlusion is checked -- common fault is increased vertical dimension due to slight excess in flask.
 - ✓ An occlusal error up to 3/4mm can be corrected by occlusal alteration (incisal pin is again flush on the incisal table) and balanced occlusion is obtained.
 - ✓ This correction done by selective grinding technique
 - ✓ Using articulating paper. If the cusp is high in both centric and eccentric positions, it must be reduced.
 - ✓ If the cusp is high in centric position only, the fossa is deepened.



❖ **Clinical remount: (for clinic errors)**

- ✓ Occlusal errors may be removed by making corrections while the dentures are in the patient's mouth or by making new maxillomandibular relation records and replacing the denture on an articulator.

De-casting

- ✓ Cast are strategically cut away from the denture to prevent their fracture

Finishing complete denture

FINISHING

of complete denture is the process of perfecting the final form of the denture by removing any flash, stone remaining around the teeth, and any nodules of acrylic resin on the surfaces of the denture base resulting from processing.

Flash: It is the excess of acrylic resin at the denture border, the acrylic resin that was forced out between the two halves of the flask by the pressure applied during the processing procedure.

PROCEDURE OF FINISHING

Take care to preserve the border and contour of the denture during the finishing process. If the impression was correcting molded and boxed, and the trial denture was carefully

waxed contoured into the form desired in the finished denture, little finishing will be necessary.

- 1- Carefully remove remaining stone around the neck of teeth with a small sharp knife.



- 2- To remove the flash of acrylic resin from the denture border, press the denture base lightly against a slowly revolving arbor band mounted on the dental lathe. An alternate but less satisfactory to use a large acrylic bur or stone bur mounted in a straight hand piece to remove the flash. Take care not to change the form of the denture border but only remove the excess resin on the border of denture.



- 3- Remove nodules of acrylic with small stone or acrylic carbide burs.
- 4- The posterior area of the palate has been thinned to its proper thickness.

Polishing: is a process of removing scratches. Polishing consists of making the dentures smooth and glossy without changing the contours.

Principle of polishing:

- 1- The tissue surface of a denture is never polished as a polishing destroys the details necessary for good fit and retention.
- 2- The polished surface extends just over the border, but the borders are not reduced in height and width during polishing.
- 3- Care must be taken when using pumice (it should be used as wet slurry) as this material is very abrasive and may obliterate the details placed on the denture when they were waxes (festooned).
- 4- Resin teeth have approximately the same hardness as the denture base, so polishing a denture with resin teeth requires some precautions not necessary with porcelain teeth.
- 5- When polishing, only the denture base and not the teeth are polished.
- 6- During the finishing and polishing we should minimize the reduction of bulk because this cause warpage.

Procedure of polishing:

A. Smoothing

- 1- Polish labial, buccal, lingual, and palatal external surfaces of the denture with wet pumice on rag wheel attached to dental lathe running at slow speed. Keep plenty of pumice on the denture surface and keep the denture moving at all times; press the denture lightly against the wheel.



- 2- Polish acrylic around the teeth with wet pumice and a brush wheel attached to dental lathe moving at slow speed. Be careful not to remove previously developed contours.



- 3- Polish the border, lateral and palatal surfaces of denture by using wet muslin buffing wheel attached to dental lathe.

B. Making the denture glossy:

- 1- Use Rouge (greasy material) this material is applied to dry muslin buffing wheel, this differs in that the polishing compound is applied to the wheel not as pumice to the piece of work being polished.



A- Muslin buffing wheel attached to dental lathe. B- Rouge

- 2- After the denture completely polished with rouge, it is scrubbed thoroughly.
- 3- Final polish is obtained by placing high shine material on the denture.
- 4- Store the polished dentures in water until they have been delivered to the patient. Store the dentures in water all the times otherwise they will undergo dimensional changes and shrinkage.

N.B Every new set of complete dentures should be tested in mouth for tissue adaptation and retention and any pressure area should be indicated by using pressure indicating paste, and overextended borders should be indicated by using disclosing wax.

Processing errors or Troubleshooting

1) Porosity:

- ✓ Rapid rise of temperature in initial stage of curing
- ✓ Lack of dough in the mold (sticky stage)
- ✓ Lack of adequate pressure during polymerization

2) Tooth movements

- a) The use of plaster instead of stone in investing the trial denture.
- b) Incomplete closure of the flask.
- c) Excessive and rapid pressure during trial closure.
- d) Over packing of the mold with resin material before final closure.

3) Denture base and teeth breakage during deflasking.

- a) Careless deflasking (knife blade hit teeth when removing stone cap).
- b) Lack of dough (rubbery stage)
- c) Excessive pressure during closure
- d) Hammer used to tap denture out of the flask.

4) Bleaching (Whitish coloration)of acrylic resin:

- a) Contamination of the acrylic resin with some acrylic solvents.
- b) Under cured acrylic resin due to incorrect time and temperature of curing.
- c) Incorporation of the tin foil substitute with the acrylic resin.
- d) Incorporation of the jelly like material of wet cellophane into the resin.

5) Color streaks in the resin material:

- a) Improper mixing of the monomer and polymer.
- b) Contamination of the resin mix with dirty hands or instrument.
- c) Adding resin material in layers during trial packing.

6) Sandy appearance of the resin material

- a) Insufficient monomer in the mix (packing of a dry mix).
- b) Evaporation of the monomer liquid.
- c) Too much delay in curing after packing [more than 1/2 hour].

7) Stone adhere to the surface of the denture

- a) Incomplete elimination of wax during washing out thus rendering separating medium ineffective.
- b) Insufficient separating medium on the mold before packing.
- c) The application of separating medium contaminated with stone.

8) Space between the teeth and resin base:

- a) The application of separating medium on the teeth.
- b) Delayed curing leaving the flask without curing for a long time.

9) Fractured or cracked teeth

- a) Setting the teeth directly on the stone cast.
- b) Packing in the rubbery stage the material too stiff.
- c) Excessive and rapid application of pressure during trial packing.
- d) Improper deflasking (use hammer).

10) Crazing of acrylic resin base or acrylic teeth : Crazing of resin consists of the formation of small cracks which may vary in size from microscopic dimension to the visible size. It indicates beginning of fracture. Cross linking of resin reduces this fault considerably.

- ✓ Causes
 - a) Stresses induced by the contraction of the resin around the tooth by rapid cooling.
 - b) The use of solvents to remove wax from the mold before packing.
 - c) Continuous stresses due to repeated drying and wetting of the denture which cause alternate contraction and expansion

➤ Types of porosity**a) Contraction or shrinkage porosity:**

- ✓ Site: On the surface of the denture.
- ✓ Shape: Irregular voids
- ✓ Causes
 - Under packing: It is therefore important that sufficient dough is packed in the mold to ensure that the material is under pressure during curing.
 - Packing before dough stage: The high flow causes rapid loss of pressure.

b) Gaseous or internal porosity:

- ✓ Site: Inside the denture especially in thick parts.
- ✓ Shape :Fine uniform rounded voids
- ✓ Causes:
 - Over or prolonged curing temperature: On polymerization, there is an exothermic reaction which causes the temperature of the resin to rise above its boiling temperature which is 100.30C. If this temperature is exceeded, gaseous monomer will be formed.
 - Rapid increase in temperature

c) Granular Porosity:

- ✓ Causes:
 - Packing in sandy stage
 - Decrease monomer in mix