Denture processing

This is done in the following steps:

1. Flasking
2. Wax elimination
3. Mixing and packing
4. Curing
5. De-flasking
6. Finishing and polishing

Flasking of dentures

Flasking: Is the process of investing the cast with the waxed denture in the flask to make a sectional mold used to form the acrylic resin denture base.

Flask: Is a metal case or tube used in investing procedures **or** it is a sectional metal case in which a sectional mold is made of artificial stone or plaster of Paris for the purpose of compressing and processing dentures. The flask consists of:

1) The base
2) The bottom or lower half of the flask
3) The top or upper half of the flask
4) The lid or the cover

Before we start flasking procedure we must establish the posterior palatal seal area (p.p.s) of the denture by carving a v-shaped groove on the cast.

Purpose of determining p.p.s area:

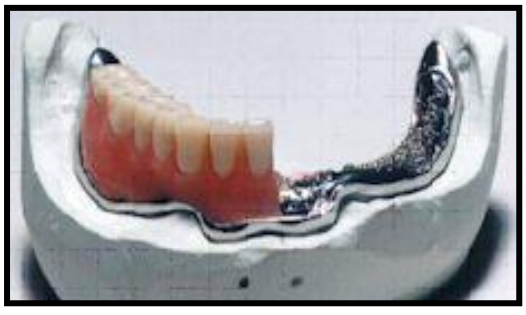
1. To enhance retention.
2. Maintain the peripheral seal of the maxillary denture base by compensating for Polymerization shrinkage and minor denture base movements during function.

Materials of denture base:

1. polymethyle methacrylate (pmma): The material that is most often used in making denture bases and is commonly called acrylic resin or just acrylic D.B. resins are supplied as liquid (monomer) and powder (polymer).

The strength of the available denture resins varies considerably. A denture base that have minimal thickness, will have a greater risk of fracture, a strong type of acrylic resin should be prescribed or else a metallic base considered.

2. Metallic D.B: It may be made from different materials such as gold, aluminum, manganese, platinum, cobalt-chromium alloys, titanium and stainless steel.



Advantage of metal D.B:

1. Better thermal conductivity as compared to resins.
2. Increase tissue tolerance because less irritant surface.
3. Reduced bulk across the palate result in more tongue space.
4. Increased accuracy of fit of the denture base on mucosa.
5. Increased weight, causing increased stability of lower denture.

Disadvantages of metal bases are:

1. Greater restorative cost.
2. Difficulty of rebasing and regrinding the occlusion.
3. Increase weight of maxillary denture.
4. Less margin of error permissible in the p.p.s area.

A-Flasking:

Flasking Techniques

1-Injection molding technique

It is a complicated procedure requiring special flask and equipment. In this technique the wax pattern is sprued and the material is injected into the mold. This process allows injection of further material during polymerization to compensate for the polymerization shrinkage

2- Compression technique

This technique is known as "open-pack'' method.

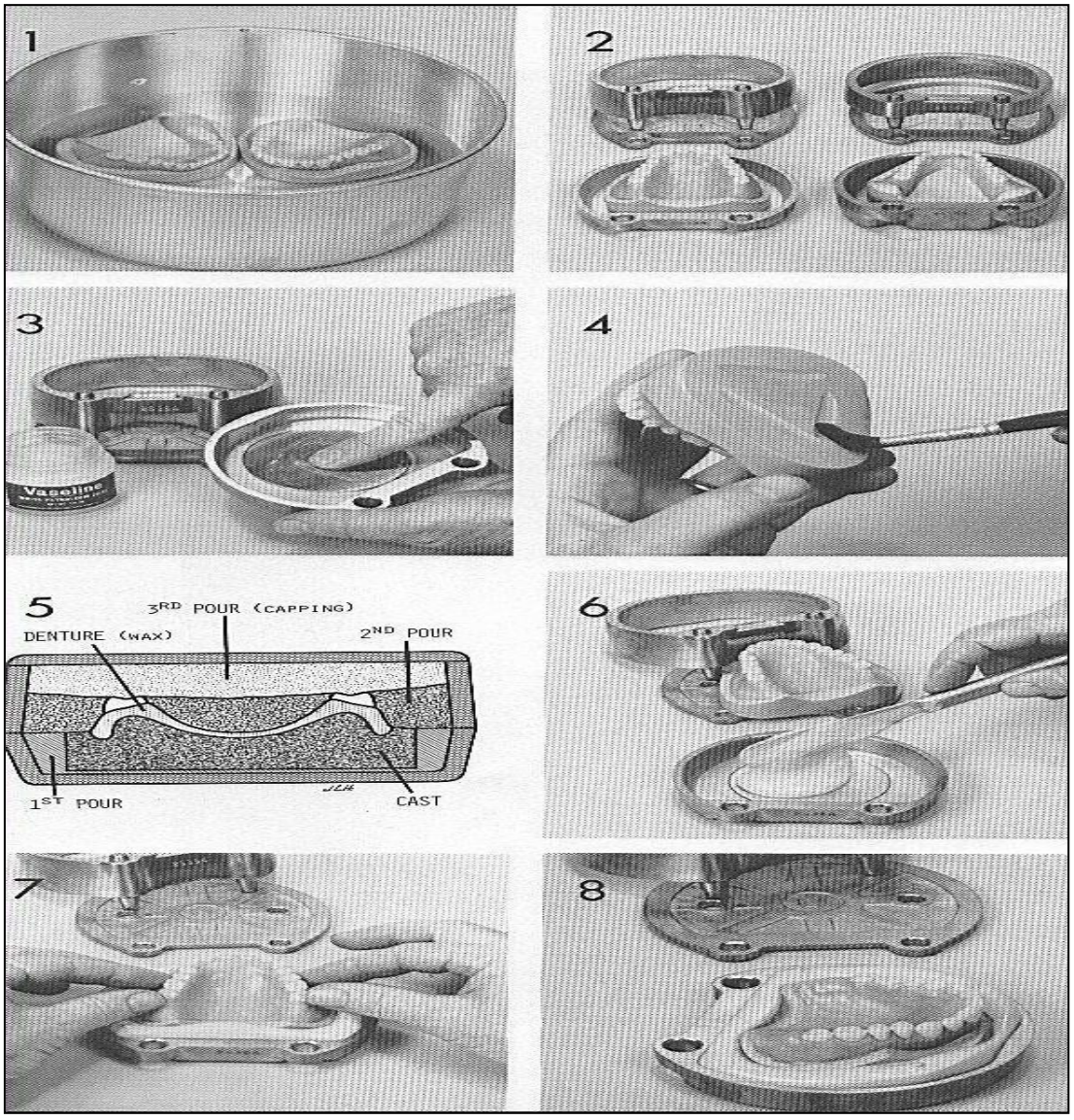
The procedure of flasking a denture in compression technique is as follows:

1. Sealing the upper and lower trial denture all over the border until the margin of the cast, while the casts on the articulator.
2. Soak the cast and the mounting in water a few minutes to separate the cast from the plaster articulator mounting.
Save the plaster mounting, as it will be used to reposition the cast on the articulator after the dentures are processed.

3. The cast with trial denture are tested into the flask to determine its height in relation to the height of bottom half of the flask.

The top half of the flask is placed in position to ensure that the teeth are not too high in relation to the top of upper ring of flask; approximately 3-6mm of space should be available between the teeth and the cover of the flask.

4. Invest the lower half of the flask first; apply a separating medium like liquid soap or Vaseline to the flask and casts, Or we can apply a layer of tinfoil to the base of the casts, slightly overlapping the edges to insure clean removal from the investment



5.<u>Flasking is done in three steps</u>.

<u>First step:</u> Mix of artificial stone or plaster and pour it in the base of the bottom half (lower half) of the flask, the cast is centered in the lower half and pushed downward into stone until the bottom of the cast touches the base of the flask and the rim of the cast is nearly level with the top edge of the flask.

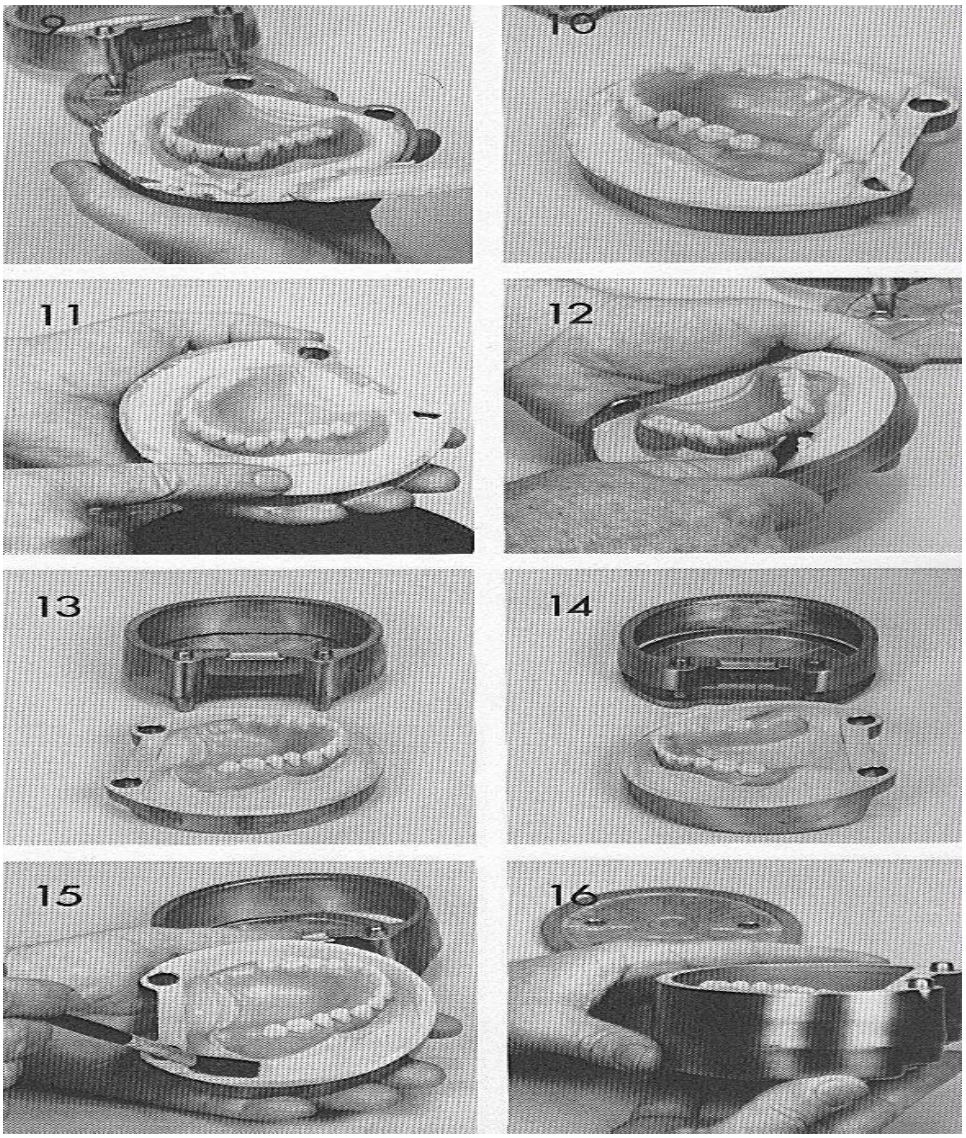
The stone or plaster is leveled between the rim of the cast and the edge of the flask, remove any undercuts in the stone or plaster and smooth it. Undercuts will prevent the separation of the upper ring from the lower portions of the flask. Note that the posterior portion of the maxillary cast is level with the edge of the flask, while for mandibular cast the posterior portion of the lower flask is higher to accommodate the mandibular cast; the stone has been brought up around the posterior portion of the cast.

The stone or plaster allow to set to begin with the second step of flasking (investment the upper half of the flask)

<u>Second step (investment the upper half of the flask):</u> After the final setting of stone or plaster has been occurred it will be coated with separating medium. The upper half of the flask is put into a place and the second mix of stone or plasters is done and allows to flow and reach all surfaces of teeth.
The flask is resting on a vibrator to be sure that the stone reaches around the teeth without any air bubbles. The stone or plaster is wiped off the occlusal surfaces and incisal edge of teeth leaving teeth exposed. This mix allowed to set.

<u>Third step (capping)</u>: A separating medium is painted on the second layer of stone or plaster after setting and smoothing. A third mix is done and placed in the top half of the flask. This is referred to as the capping, the flask is slightly over-filled, Excess stone exclude through the holes in the cover and around the edges, it is essential to have metal-to-metal

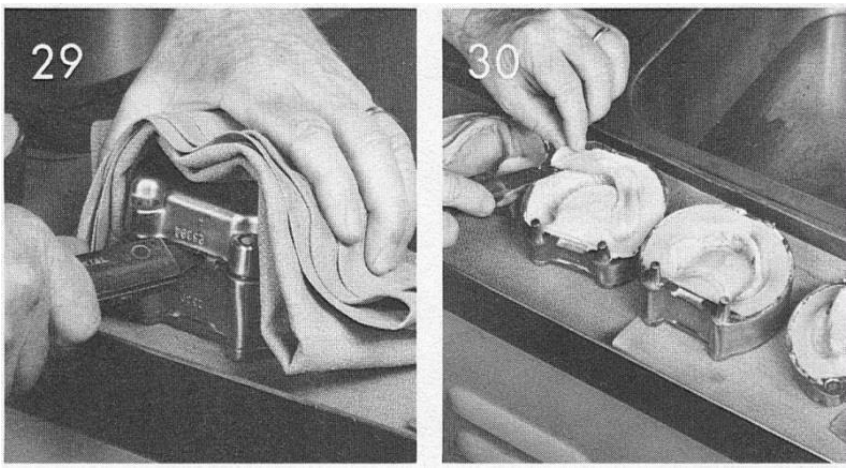
contact. The lid is placed on the flask and is tapped firmly to place. The stone left to set completely for about 45 minutes. These methods are called (three layers methods)



B-Wax elimination:

After flasking, let the stone completely set, the wax must be eliminated to form a mold into which resin may be packed. This is done by using wax solvent with stiff brush can dissolve any remaining wax on teeth, also placing the flask into boiling water for 5 minutes. This will soften the waxed denture base, which can then be easily removed from the mold when the flask is opened.

After 5 minutes, remove the flask from the boiling water and gently open it, do not force it to open. But insert an instrument (like the blunt end of a plaster knife) between the upper and lower halves and gently separate them. Remove the semisolid pieces of the waxed denture base.



All the teeth should remain in the top half of the flask. Flush out all the remaining wax and any residue that may be present. The mold is washed again with clean boiling water to clean it very well then leave the flask on its side and allow it to drain, dried and cooled.

It is essential to remove all wax residues, because acrylic resin will not adhere to a surface or to a tooth coated with wax.

Keep in mind, the denture teeth are imbedded in (upper half) of the flask While the master casts are imbedded in the (lower half) of the flask.

C-Packing:

The maxillary and mandibular molds are now clean and ready to be coated with a separating medium, large brush may be used to cover the cast and the open areas of the upper half of the flask. Care should be taken not to paint the teeth with a separating medium. The flask is left to dry and another coat is painted and also left to dry.

The objectives of applying a separating medium are:

1. To prevent water from the mold entering into the acrylic resin. This may affect the rate of polymerization and color.
2. To prevent monomer penetrating into the mold material causing adherence of plaster to the acrylic resin.

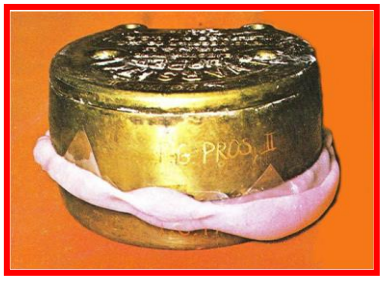
A hot or heat cure acrylic resin is made by mixing the powder (polymer) and liquid (monomer) in accordance to manufacturer's instructions. Usually 10 CC of monomer and 30 CC of polymer will be enough to pack an average-sized denture. When material mixed in clean jar and reached dough stage, the material is ready for packing.

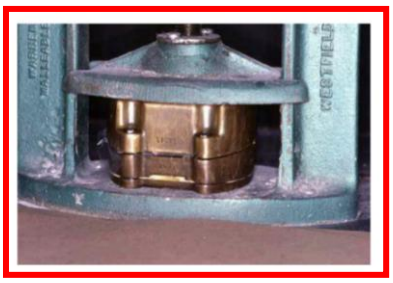
Packing the material around the buccal, labial and palatal surfaces in the upper half of the flask of the maxillary mold, and around the buccal, labial, and lingual surfaces in the upper half of the mandibular mold.

Being sure to press enough acrylic resin material well into these areas around the teeth to insure over packing on the

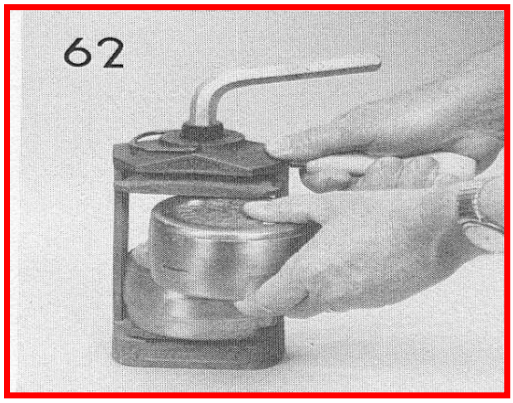
closure. Pack in one direction to avoid trapping air between the material and mold.

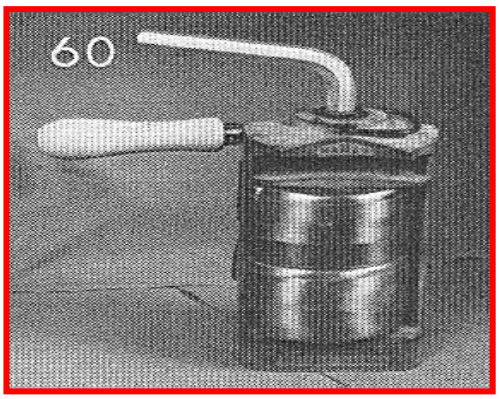
A plastic sheet of cellophane or nylon sheet placed between the two halves; the flask is then closed over the sheet using hand pressure and then place the flask in a bench press and gradually closed, At least two trial closures done before the final closure. Remove the flask from the press, open the flask carefully, the excess material is cut away precisely at the denture border with sharp instrument like scalpel, and additional resin is added at any places that are deficient.





This trial packing procedure is repeated until the mold is filled and no flush is formed then the flask is closed completely without a separating sheet (metal edges of two parts of the flask are in complete contact) and place the closed flask in the processing press for 30-60 minutes press of about 100 kg/cm2 **(This is known as bench cure)** and finally transferred to the clamp before curing.





The introduction of too much material termed "over packing" lead to a denture base that has excessive thickness and malpositioned prosthetic teeth.
The introduction of little material termed "under packing" leads to noticeable denture base porosity

D-curing:

The processing or polymerization of acrylic resin is the conversion of the monomer to the polymer when a mixture is subjected to heat. The amount of heat must be controlled while processing acrylic resin.

Methods of curing

1. Slow cycle curing method

This is the preferred method to cure the acrylic resin. The flask and clamp are placed in a curing unite. The flask is heat to 70°C for 7 hours then to 100 °C for 3 hours (the total 10 hours), or heated to 75 °C for 6 hours then to 100 °C for 1 hour or to 74 °C for 8 hours.

2. Rapid cycle curing method:

The flask is heated to 140 °C for 10 minutes with 40 P.S.I. pressure.

The best curing cycle is the slow curing cycle because most of the conversion of monomer to polymer occurs during the period at 70 °C.
(This method may induce greater dimensional changes in the denture than the slow cure.)
The flask must cool to room temperature before deflasking begins. It is crucial that sufficient time allowed for cooling inside the flask. If this precaution is not taken, increased distortion of the acrylic will occur.