Processing the denture

After the trial dentures (Acrylic base, wax and teeth) have been waxed, they are prepared for denture processing to substitute the acrylic record base and the wax with a hot cure denture base attached to the teeth. This is done in the following steps:

1) Flasking.
2) Wax elimination.
3) Mixing.
4) Packing.
5) Curing.
6) De-flasking.
7) Shaping and Polishing.

**Flask:** Is a metal case or tube used in investing procedures.

**Flasking:** The process of investing the cast and a waxed denture in a flask to make a sectional mould used to form the acrylic resin denture base.

The flask is made of 3 major parts, (1) lower half (which contains the cast), (2) upper half and (3) the cover or lid. The lower half may have a round plate, covering a round hole in the base of the lower half.
1) *Molding or flasing Techniques:*

1- *Compression technique:*

The stone cast with the record denture base, wax and teeth are secured to the lower half of the flask with gypsum investment material (plaster or stone). Then the upper half of the flask is put in place and gypsum is poured to the occlusal surfaces of the teeth. Finally the top portion of the flask is poured with investment and the lid is placed on the flask.

2- *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.

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

1) The master cast and the wax dentures are placed in the flask, to insure that the cast fit in the flask.

2) The Inner surface of the flask is coated with Vaseline, while the base of the cast is painted with separating medium (cold mold seal). To prevent the investment material (plaster of Paris) from attaching to the cast.
3) The first layer of gypsum investment is poured in the lower half and the cast is placed on top of the investment.

4) After the set of the first gypsum investment layer, a plaster separating medium is painted on it, to prevent the sticking of the second layer of gypsum investment to the first layer.

5) A mix of dental stone is placed over the surface of the teeth in the invested trial denture, which is referred to as coring.

6) The upper half of the flask is put in place, then the second mix of gypsum investment is placed on the first layer and covers the wax, denture base and teeth.
7) Before the second layer sets the lid or flask cover is put in place and tapped to sit properly allowing the excess gypsum to flow out of the holes in the lid.

2- *Wax elimination:*

After the complete set of the gypsum the flask is ready for the next step which is "Wax elimination", in which the flask is placed in boiling water for 4 to 6 minutes. Then it is removed from the water and opened. Then the wax is washed away with boiling water. After that the mold is washed with boiling water containing detergent, then finally washing it with clean boiling water.

After the stone of the flask is dry, the inner side of the mold and the cast are painted with a separating medium by a camel's hair brush and allowed to dry. The separating medium must not come in contact with the teeth because wax residue on the teeth is contaminant and causes adhesion failure with the denture resin. A second layer of separating medium is applied on the inside of the mold and the flask is allowed to cool to room temperature.
3- **Mixing:**

Acrylic resin dough is made by mixing the powder (polymer) and liquid (monomer) to form 'dough' which is packed into a gypsum mold for curing. The ratio of powder to liquid is important since it controls the workability of the mix as well as the dimensional changes on setting. The mixing should be done in a clean jar which should be covered to prevent evaporation of the monomer.

4- **Packing:**

It should be done when the mixture reaches dough stage, as the dough is rolled into a rod-like form and placed in the upper half of the flask then a polyethelen (nylon sheet) is placed over the dough in the upper half and then the two halves of the flask are closed until they are almost in approximation, this is done to spread the dough evenly throughout the mold. Then the two halves of the flask are separated, the excess material at the borders of the denture is removed by a wax knife, and additional resin is added at any places that are deficient. At least two trial closures are done and before the final closure a thin layer separating medium is applied on the cast and the polyethelen sheet is removed and then the two halves of the flask are closed under pressure by bench press of about 100 Kg/cm². Then the flask is put in a spring clamp and the clamp is closed tightly.
5- Curing:

It is polymerization of the hot cure acrylic to produce the final denture. The material is cured by heating in a water bath; pressure is applied during curing for the following reasons:

1. To decrease the effect of thermal expansion.
2. To decrease the polymerization shrinkage.
3. To increase the evaporation of monomer thus decreases porosity.

**Types of curing cycles for heat cure acrylic:**

1. Short curing cycle.
2. Long curing cycle.

**1- Short curing cycle:**

The denture is placed in water at room temperature and the curing temperature is programmed to 74 °C for one and half hour followed by 100 °C for one hour.

**2- Long curing cycle:**

The curing temperature is programmed to 100 °C for 8 hours. Polymerization can occur at any temperature but it is very slow at temperature below 70 °C, the best curing cycle is the long curing cycle because most of the conversion of monomer to polymer occurs during the period at 70 °C and during this time the dough itself may approach 100 °C because the polymerization reaction exothermic. The monomer boils at 100.3 °C so the dough must be kept below this temperature to avoid boiling of the monomer; on the other hand rapid curing cycle usually results in some gaseous porosity.

6- Deflasking:

Deflasking is the process of removal of the processed denture from the flask and investment mold. Before deflasking of the processed denture begins the flask is left to cool to room temperature. If not, increased distortion of the acrylic may occur.

**Laboratory remount**

The denture should be remounted on the articulator as dictated by the indices with sticky wax. The incisal pin discrepancy should be noted. If the discrepancy is less than 2 mm, it is acceptable. If the discrepancy is between 2-5 mm, occlusal correction can be accomplished. If the discrepancy is more than 5 mm, the entire treatment should be repeated.
7- Shaping and Polishing:
In this step any excess acrylic is removed from the processed denture by the use of stone wheel burs, stone burs, and steel burs. Care must be taken not to heat the denture during grinding, because this may cause distortion of the denture base. Finally, the denture should be smooth and clean, as no plaster and no deep scratches should remain after the preparation for polishing.
In polishing a rag wheel with pumice is used for smoothing the denture. Then a final high polish is given to the denture with a rag wheel and polishing material (Rouge).