The steps for construction complete denture

“Lecture notes”

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Construction complete denture should follow procedures of two main phases which are the clinical phase and the laboratory phase.

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Objectives of complete denture

Always be realized to provide the following during construction complete denture:

• To restore masticatory function.

• To restore contour & dimension.

• To correct the speech defect.

• To preserve the remaining tissue e.g.; T.M.J, residual ridge.

• To provide patient comfort and toleration.
Primary Impression
A positive likeness of the part(s) of the oral cavity for the purpose of study, treatment planning, and/or fabrication of final impression trays.

It plays a vital role in the planning and construction of complete denture for the following important considerations:
1- It is used to prepare the study casts by pour the impression with plaster of Paris.

2- The study casts are important to make the record base of occlusion relationship.

3- The study casts are used to establish the special tray to use it in making the final impression.

4- The construct of special trays for final impression are made on the study cast.

So that the primary impression should be consider as exact copy of the oral tissues.
Types of impression trays

**Special tray**
- which is almost made of auto polymerized acrylic resin or sometimes could be made of heat cure acrylic resin by using heat pressure machine with special technique.
- Each type of tray provides a specific types of impression materials in respect to the whether it is partial or complete or fixed denture.
- fabricated with space and stoppers or close fit to the tissue without space.

**Stock tray**
- Uses for primary impression
- it is made of either stainless steel, aluminum, or plastic.
- This type of tray have more than shape ,it is oval in case of complete denture and box or square in shape in partial denture.
- It may be perforated or non-perforated or may be in a rim-lock form for the purpose of providing retention to the impression in order to not separate from the tray during removing the impression from the patient mouth.
Box shape perforated trays

Oval shape perforated tray

Stoppers
Preparation of the tray

- Almost stock tray used for primary impression in complete denture, is oval in shape and they are made of either:
  • metal material (Aluminum or stainless steel).
  • plastic material.

- They are perforated, non perforated or rim lock type and available in different range of sizes.

- It is necessary to use the correct type and size of tray for each case.
Modification of the tray

It is rare to find a stock tray that meets the exact size of providing space to the tissue, many cases need to modify stock tray prior to their use in order to be cover all the denture foundation area, as following:

1- Impression compound or modeling wax is added to the peripheral extension to fulfill the requirements of full coverage to the tissue (e.g. labial region, posterior sulcus...).
2-Whenever there is need to modify the border of the flange of the tray.

3-In case of excessive space between tray and the tissue we also should add modeling wax e.g.: palatal region. The addition wax should be well soften before inset to the patient mouth.
Landmarks of Maxillary Impression

a. incisive papilla
b. palatal rugae
c. median palatine raphe
d. maxillary tuberosity
e. pterygomaxillary notch
f. fovea palatini and vibrating line area
g. buccal space
h. zygomatic process
i. residual alveolar ridge
j. buccal frenum
k. labial frenum
Common faults and solutions for maxillary impression

1. shortage impression of the palate due to insufficient material or failure to seat the impression completely. Correct by adding stick compound or remake the impression.

2. Under-extended in tuberosity regions. Correct by adding stick compound.


4. Insufficient impression material. Remake impression or correct with stick compound.

5. Deficiency in the labial sulcus because the lip was not lifted forward to allow the compound to flow into the sulcus. Correct with stick compound
Landmarks of Mandibular Impression

a. labial frenum
b. residual alveolar ridge
c. retromolar pad
d. lingual frenum
e. mylohyoid (interior oblique line)
f. external oblique line
g. buccal frenum
h. masseteric notch
Common faults and solutions for mandibular impression

1. Under-extended tray. Select new tray or modify existing tray.

2. Excess impression material in the floor of the mouth and the labial sulcus. Trim with sharp knife. Reheat compound and replace in mouth.

3. Insufficient impression material in the labial sulcus. Add stick compound.

4. Inadequate extension into the retromylohyoid space. Add stick compound.

5. Folded impression surface. Remake impression or re-flame area and replace in mouth.

6. Tray showing through the impression material. Select new tray or modify existing tray if large.
Bonding of stock tray

Bonding between the tray and the impression material is necessary to provide good retention to the impression with the tray and withstand separation from the tray during removal from the patient mouth after clinical setting time. There are many method of bonding:

1-mechanical lock by using perforated tray or rim lock tray.

2-Adhesive may be applied to the tray before the tray is filled with impression material (special medical adhesive).

3-Combined use of mechanical and adhesive.
Selection of impression material for complete denture

Impression of complete denture need special consideration that in some cases e.g.; presence of undercut area related to natural surrounded oral tissue. So that elasticity of the impression material is an essential factor to determine the choice of the impression material in this tasks.

For that reason we should use elastic impression material because the selection of other impression material can not be useful in registration impression especially in case of multiple undercuts therefore it is preferable to use alginate or rubber base impression material in such cases.
Impression compound with stock tray is the most famous impression can be used in primary impression for complete denture due it could be modified or repeatable.

For final impression we use one of the following material with special tray:

- Zinc oxide impression paste.

- Irreversible hydrocolloid impression material (Alginate).

- Silicone impression -light body (low viscous material).
Final impression techniques

Impressions are described in regards to the way or technique of exerting pressure:

1- closed mouth, muco-compresive or pressure technique.
2- selective pressure technique.
3- mucostatic, minimal pressure, non pressure, or open mouth technique
The tissue will always be stressed when the denture produce forces during function and the tissue will distort or displaced, while it is return to its condition during resting when there is no forces action. So that the idea of using pressure or not during the impression technique consider the above points.

By other hand the denture using the pressure technique may tend to be dislodge under rest conditions.
• The 2nd technique aim to distribute the transmitted forces selectively over the basal tissues to be withstand the applied forces.

• The 3rd technique depend the idea of exerting minimal and functional pressure to record the tissue in the resting relationship.
1-The impression should cover all the supported tissue distally, maxillary tubrosity and retromolar pad area in the mandible.

2-Pressure should be applied without cause displacement of the soft tissue.

3-Choice of the material should be of adequate flow to reach all the tissue and stable material.

4-Special tray should be used to carry the impression and not depend only on primary impression with stock tray.
Boxing Final Impression

Boxing form can be developed around the impression for C.d to. give the proper form of the cast.

A strip of beading wax or boxing wax is attached all around the outside of the impression border about 1 to 2 mm below the border and sealed to it by wax knife (hot).

Then a vertical walls made of modeling wax attached to the strip wax.

For the lower impression the tongue space should be filled with sheet of wax.

The length of box wall is about 15mm above the impression and the boxing wax should extend all around the impression completely and must be sealed with the strip wax to prevent any escape of stone mixture outside the impression.

Sufficient space must be available posteriorly between the impression and the boxing to provide suitable thickness for the cast.

After boxing, stone is mixed correctly and poured into the impression (with box), and it should be left for 30 mint to be set and separate the cast from the impression.
The stress bearing areas for complete denture are:

- The buccal shelf and the retromolar pad area of mandible.
- Palate of maxilla.
- Crest of the ridges for maxilla and mandible.
Record Base and Occlusion Rim

**Denture base**
Is a part of a denture that rests on the oral mucosa and to which artificial teeth are attached.

**Record base**
An interim denture base used to support the record rim material for recording maxillo-mandibular records.

**Occlusion record**
A registration of opposing occluding surfaces made at any maxillomandibular relationship.
Occlusion rim

- Occluding surfaces fabricated on interim or final denture bases for the purpose of making maxillomandibular relation records and arranging teeth.

- Occlusion rims are used to record both the neutral zone and maxillo-mandibular relation.

- It consists of multiple layer of wax to form a dense folded layers are adapted to form U-shape form to adapted on the record base to take the shape of the ridge of the upper and lower arches.
Fabrication of record base

Record base must be accurate, stable and made of rigid material (cold cure, hot cure acrylic resin or shellac base plate),

It may be made of wax (enforced wax), in case of using wax as a record base it should be enforced either by double layer of wax or by lining it with Z.O.E imp.paste, and lining it from the cast side i.e the tissue side,

While the using of cold cure acrylic resin it should be used in a usual method or sprinkle-on method to manipulate the acrylic on the cast and in case of using hot cure acrylic resin it should be cured by heat pressure machine or bath container.

In all cases the record base should be smooth, polished uniform borders, accurate and stable during recording maxillo-mandibular relations.
Denture base produced by **Acrylic** or **Metal** resin material.

### Advantages of acrylic resin denture base:
- Cheap
- Light in weight
- Good adaptation
- Easily constructed, rebased, repaired & added.
- Easy contouring

### Disadvantages of acrylic resin denture base:
- Low strength (easily broken)
- Easily scratched & abraded
- Not rigid enough for ideal connection
- It has a tendency to warp during recurring, rebasing, repairing & during polishing, if overheated.

### Advantages of metal base:
- Their thermal conductivity is stimulates blood circulation, so maintains the health of the tissue (prevent some alveolar bone resorption)
- No tendency to permanent deformation, no internal strains, no abrasion when cleaned regularly.
- Strong & light in weight, Resist bacterial growth.
- The fitting surface can be polished with good adaptation

### Disadvantages of metal base:
- Expensive & difficult to manipulate and difficult repair or addition.
- Relining is not possible.
- The denture is consequently heavier.
Neutral zone

- It is a potential space between the lips and cheeks on one side and the tongue on the other side.

- The occlusion rims are made on the stone cast which represent the supporting tissue and the denture foundation area and it consists of:

  \[ \text{Record base} + \text{wax rim} = \text{bite rim or occlusion rim.} \]
Uses of Occlusion rims

The occlusion rim can be used to establish:

1) The level of occlusal plane.

2) The arch form (according to the lip activity, check and the tongue).

3) To record of vertical and horizontal jaws relationship.
The procedures that lead to develop the upper and lower occlusion rims are:

A- Incisal plane should be parallel to interpupillary line (upper occlusal rim).

B- Posterior occlusal plane should be parallel to the ala tragus line (upper occlusion rim.)

C- The lower occlusion rim is adjusted to meet evenly with the upper occlusion rim that anteriorly should indicated by the corners of the mouth and posteriorly by the retromolar pad area.

D) The arch form should be established in respect to the consideration of the bone resorption and the residual ridge after extraction.
Thank you