Final impression objectives and materials
Final impression

Objectives

- To obtain an impression from which a retentive, stable and comfortable denture base can be constructed.
- To record as accurately as possible the shape of the mucosa overlying the alveolar ridges and hard palate together with functional depth and width of sulci.
Requirements

The denture base should satisfy the following requirements:

1. It must be extended until its borders lies on displaceable tissue where a seal can be developed.
2. The tissues adjacent to the border should be activated enough to achieve a seal but not so much that they tend to displace the denture or suffer injury. Muscles related to the border must not be prevented from free activity.
3. It should have the closest possible contact with the surface of the mucous membrane lying beneath it.
4. Extension to provide retention ensures the maximum coverage of the jaw, and this in turn ensures that the minimum force per unit area is transmitted to the supporting tissues by the denture during function.
The function of an **impression material** is to make a –ve copy, which records the dimensions of the oral tissue and their relationships.

The **impression** must be accurate so that the model, cast, or die will be **accurate**. That is the positive copy of the oral structure will be accurate.
Requirements of impression material

- Must be a *semi-liquid* material that will *flow* and adapt itself around the structure of interest.
- It must set and *harden* into a solid that is rigid enough to be removed from the mouth without becoming *deformed*.
- Copy details accurately
- Dimensional stability after removal from the mouth
- Appropriate working time (from the start of mix)
- Appropriate time to harden in the mouth (setting time)
- Bio-compatibility/Aesthetic, odor/taste
- Chemically compatible with material used to pour cast
## Classification

<table>
<thead>
<tr>
<th>By Setting Mechanism</th>
<th>By Application or Mechanical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>By Application or Mechanical Properties</td>
</tr>
<tr>
<td></td>
<td>non-elastic</td>
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<tr>
<td>Chemical reaction</td>
<td>Plaster of Paris</td>
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<tr>
<td>(irreversible)</td>
<td>ZOE</td>
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<tr>
<td>Temperature changes</td>
<td>Compound</td>
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<tr>
<td>(reversible)</td>
<td>Wax</td>
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Impression materials for complete denture:

1. Primary impression:
   a) impression compound
   b) Alginate

2. Secondary impression:
   a) Rubber base
   b) Zinc oxide Eugenol
   c) plaster of paris
Impression plaster

- Impression plaster used to record final impression for completely edentulous arch.
- Impression plaster is similar in composition to the dental plaster used to construct models and dies.
- The material is used at a higher water/powder ratio (approximately 0.60) than is normally used for modelling plasters.
- The fluid mix is required to enable fine detail to be recorded in the impression and to give the material *mucostatic properties*.
- Freshly mixed plaster is too fluid to be used in a stock impression tray and is normally used in a special tray, constructed using a 1–1.5 mm spacer.
- Before casting a plaster model in a plaster impression, the impression must be coated with a separating agent (soap), otherwise separation is impossible.
The mixed impression material is initially very fluid and is capable of recording soft tissues in the uncompressed state.

In addition, the hemihydrate particles are capable of absorbing moisture from the surface of the oral soft tissues, allowing very intimate contact between the impression material and the tissues.

The fluidity of the material, combined with the ability to remove moisture from tissues and a minimal dimensional change on setting, results in a very accurate impression which may be difficult to remove.

The water-absorbing nature of these materials often causes patients to complain about a very dry sensation after having impressions recorded.

Disinfection of a plaster impression can be achieved with a 10 minute soak in sodium hypochlorite solution.

The material is, therefore, not suitable for use in any undercut situations (rigid material).
Zinc oxide/eugenol impression pastes

- These materials are normally used to record the final impressions of edentulous arches.
- These materials are normally supplied as two pastes which are mixed together on a paper pad or glass slab.
- The zinc oxide paste, typically, being white and the eugenol paste, a reddish brown colour.
- This enables thorough mixing to be achieved as indicated by a homogeneous colour, free of streaks, in the mixed material.
- The pastes are normally dispensed from toothpaste- like tubes and are mixed in equal volumes.
- The proportioning is achieved, simply, by expression equal lengths of each paste onto the mixing pad or slab.
- The impression is normally recorded in a close-fitting special tray, constructed on the model obtained from the primary impression.
- Defects sometimes arise on the surface of the impression but these can be corrected using an impression wax.
- (rigid material).
Impression waxes

- Impression waxes are rarely used to record complete impressions but are normally used to correct small imperfections in other impressions, particularly those of the zinc oxide/eugenol type.
- They are thermoplastic materials which flow readily at mouth temperature and are relatively soft even at room temperature.
- They are applied with a brush in small quantities to ‘fill in’ areas of impressions in which insufficient material has been used or in which an ‘air blow’ or crease has caused a defect.
Elastomers

- Often called rubber materials since they have properties similar to rubber.
- **Clinical uses:**
  - Bridges
  - Implants
  - Partial dentures and complete dentures
  - Indirect esthetic restorations

Four types of elastomers are in general use:
- Polysulphides.
- Silicone rubbers (condensation curing type).
- Silicone rubbers (addition curing type).
- Polyethers.
Polysulfides

- These materials are generally supplied as two pastes which are dispensed from tubes. One paste is normally labelled base paste whilst the other is labelled catalyst paste.
- Setting times of 10 minutes or more particularly for light-bodied materials.
- The polysulphide elastomers have very good tear resistance.
- It has an unpleasant odour.
- The colour contrast between the two pastes is an aid to efficient mixing, which is continued until a homogeneous colour, with no streaks, is achieved.
- An adhesive is used to promote adhesion between the impression material and tray.
Clinical considerations when used

- Used with custom trays
- Allow 2mm thickness
- Use tray adhesive
- Setting time 10 min.
- Have very good tear resistance.
Silicon rubber
Condensation silicon

- Developed as alternative to Polysulfides
- Has more desirable qualities in comparison:
  - Easy mix
  - Better taste and odorless
  - Shorter setting time (5-7 minutes)
- Proportioning of the paste/liquid materials is by mixing a given volume of paste with a fixed number of drops of liquid.
- For paste/paste materials equal lengths of pastes are mixed together. A colour contrast between the pastes enables the operator to see when proper mixing has been achieved.
- In order to obtain optimum accuracy, the models should be cast as soon as possible after recording the impression.
Addition silicon

- Desirable clinical qualities:
  - Dimensional stability
  - Accuracy
  - Clean
  - Easy to mix
  - No foul odor or taste

However, they are among the most expensive

- Proportioning is carried out by extruding equal lengths of each paste onto the mixing pad. A good colour contrast between the pastes enables thorough mixing to be achieved.

- The standard disinfection regime of a 10 minute immersion in sodium hypochlorite will have no effect on the dimensional stability of these materials.
Polyethers

- Also used for crown and bridge work since they are very accurate and also more hydrophilic than other silicons.
- The two pastes are proportioned by volume.
- Equal lengths of paste are extruded onto a mixing pad giving a base paste/catalyst paste volume ratio of about 8 : 1.
- The good colour contrast between the pastes aids mixing.
- Very good dimensional stability.
- A ‘standard’ disinfection routine of 10 minutes immersion in sodium hypochlorite is unlikely to have a deleterious effect on the accuracy of these materials.
Properties

- Stiff, difficult to remove from undercuts
- Short working and setting times
- Setting time 3-5 minutes
- Accurate
Disinfection of impressions

• The *disinfectant* should be compatible with the impression materials.
• After taking the impression, it should be rinsed with water, excess water shaken off, and disinfectant *sprayed* or impression *immersed* in disinfectant.
• Protective gloves should be worn.
• Rinse after disinfection is complete.
<table>
<thead>
<tr>
<th>Property</th>
<th>Polysulphides</th>
<th>Condensation silicones</th>
<th>Addition silicones</th>
<th>Polyethers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity</td>
<td>Available in three viscosities (no putty)</td>
<td>Available in four viscosities including putty</td>
<td>Available in four viscosities including putty</td>
<td>Available in a single viscosity (regular) + diluent + putty</td>
</tr>
<tr>
<td>Tear resistance</td>
<td>Adequate</td>
<td>Adequate</td>
<td>Adequate</td>
<td>Adequate</td>
</tr>
<tr>
<td>Elasticity</td>
<td>Viscoelastic material</td>
<td>Very good</td>
<td>Very good</td>
<td>Adequate</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Good with special trays</td>
<td>Acceptable with stock trays</td>
<td>Good with stock trays</td>
<td>Good with special trays</td>
</tr>
<tr>
<td>Dimensional stability</td>
<td>Adequate, but pouring of models should not be delayed</td>
<td>Models should be poured as quickly as possible</td>
<td>Very good</td>
<td>Very good in low humidity conditions</td>
</tr>
</tbody>
</table>
THANK YOU