Impression Materials

By
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What are Impression materials used to ?

Recording a detailed replica of the prepared teeth & surrounding structures in the oral cavity.

Classification

According to setting behavior:

Chemically set (irreversible)	Physically set (temperature) (reversible)
•Alginate	•Agar agar
•Zinc oxide and euginol	•Impression compound
•Plaster	•Wax
•Polysulphide	
•Silicone (addition & condensation)	
•Polyether	

According to wettability:

Hydrophobic	Hydrophilic
(Water dislike)	(Water loving)
(High surface tension)	(Low surface tension)
•Polysulphide •Condensation silicone •Old types of addition silicone •Impression compound	•Agar-agar •Alginates •Polyether •Recent types of addition silicone

Impression Material

- Non-Elastic
  - Plaster
  - Impression Compound
  - Zinc Oxide Eugenol
  - Impression Waxes
- Elastic
  - Hydrocolloids
    - Agar Reversible
    - Alginate Irreversible
  - Non-aqueous Elastomers
    - Polysulfides
    - Polyethers
    - Condensation Silicone
    - Addition Silicone

Elastomeric impression materials are further classified:

According to viscosity:

Very high viscosity
Putty

High viscosity
Heavy

Medium viscosity
Regular

Low viscosity
Light

Properties of an ideal impression material

1. Easy to mix and handle
2. Posses enough flow to record fine details (Fluidity)
3. Reasonable working time
4. Reasonable setting time
5. Non toxic and non irritant
6. Elastic when set to record undercuts without distortion
7. Material should adhere to the tray during removal
8. Dimensionally stable during setting and storage
9. Compatible with die materials (wettability) and Easy to pour without bubble formation
10. Acceptable to the patient (odor and taste)
11. Allows multiple pours
12. May be electroplated
13. **Accept addition and correction**
14. **Readily disinfected**
15. **Good shelf life**

Factors affecting impression accuracy

- High flow at beginning record fine details
- Dimensionally accurate during setting
- Dimensionally stable on storage
- Elastic when removed from undercuts
- Adherent to tray
- Compatible with gypsum products

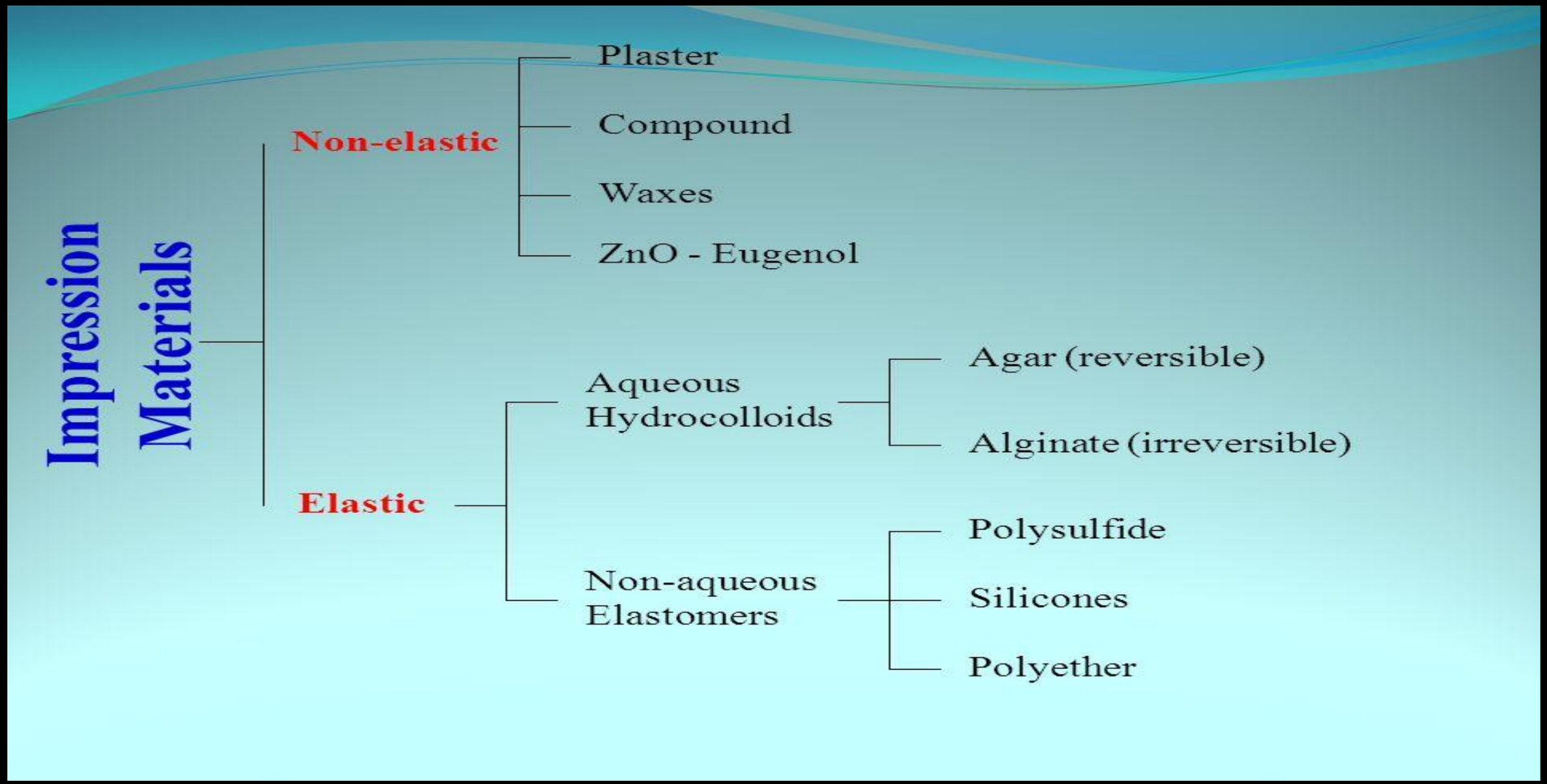
Hydrophilic:

1. Readily wettable by gypsum products
2. Easy to pour

Hydrophobic:

1. **Not really wettable (high contact angle)**
2. **Repelled by hemorrhage or moisture in the gingival sulcus. Therefore, moisture control is essential**
3. **Possible air bubbles during pouring of impressions to make casts**
4. **Require surfactants to reduce contact angle**

I. Non-Elastic impression materials:



Cannot record undercuts

1. Plaster of Paris:

Impression plaster is mixed with water to produce a smooth paste.

<u>Advantages:</u>

1. Very accurate
2. Excellent recording of fine details
3. Dimensionally stable
4. May be reassembled if fracture occurs during removal from undercuts

<u>Indication:</u>

Sectional impressions to produce ***solder assembly.***

2. Impression Compound:

Thermoplastic material i.e. softened by heating and hardened by cooling to mouth temperature.

Presented as sheets or sticks.

Advantages:

1. No gingival retraction is required
2. May be electroplated with Cu

Disadvantages:

Heat may cause irritation of vital teeth and soft tissues.

3. Zinc oxide and Eugenol:

- Used as an interocclusal recording material for bite registration using John's bite frame.

4. Waxes:

Inlay wax

Indirect wax pattern construction (i.e. in the laboratory).

Using Type 2 → Soft

Direct: Intraoral (direct) production of wax patterns of posts an inlays.

Using Type 1 → Hard

- ***Sticky wax:*** ***used during soldering procedure to join materials temporarily.***
- ***Molding wax:*** ***used for bite registration.***
- ***Boxing wax:*** ***used to form containers for pouring casts.***

Hydrocolloids:

- Colloids: Suspension of small solid particles (dispersed phase) in water (dispersion medium).
- When the dispersion medium is water they are called hydrocolloids.
- Material is 85 % water.

- Reversible = when the conversion of sol to gel is accomplished by change in temperature. ex agar

  Gel (heating) → Sol Sol (Cooling) → Gel

- Irreversible = when the change of sol to gel is accomplished by a chemical reaction.

  ex. Alginate

  Sol → gel

1. Reversible Hydrocolloids: (Agar)

These consist of an aqueous gel based on agar-agar.

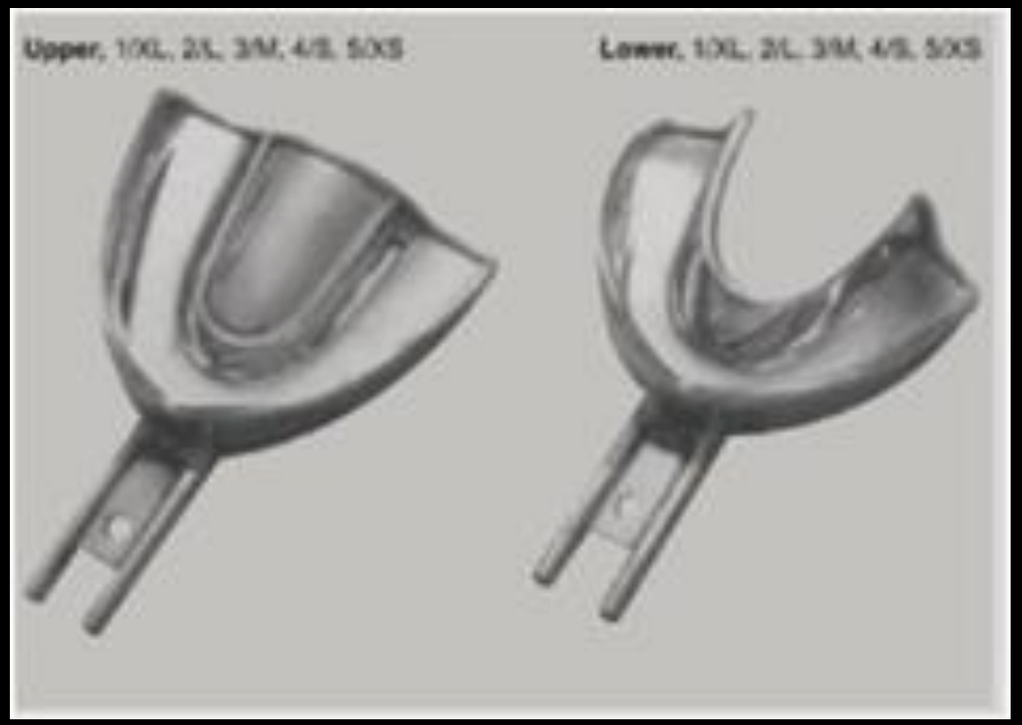
- It is a suspension of agar in water. i.e. water constitutes about 80 % of the body of agar.

Presentation: Packaged as a semi-solid gel

- **Heavy body:** for loading the tray
- **Light body:** for syringing around the teeth

Before use, the material is subjected to a controlled regimen with three water baths.

1. It includes a boiling water bath to **liquify** the hydrocolloid,
2. A second bath for **storing** the material at 63-66ºC, and
3. A bath for **tempering** the material at 44-46ºC.



Advantages

1. ***Tray should be removed with a sharp snap parallel to the long axis of the tooth***
2. **If poured immediately → excellent dimensional accuracy and good surface detail**
3. **Special tray is not needed**
4. **Hydrophilic-displaces moisture, blood and fluids**

Storage:

- **100% humidity, not more than 1 hour**
- **Immersion in 2% potassium sulphate solution**

Disadvantages

1. **Initial expense -** Complicated equipment and water cooled trays

2. Impression must be poured immediately as distortion may occur due to syneresis and imbibition

2. **Irreversible Hydrocolloids: (Alginate)**

- Potassium alginate + calcium sulphate→ Potassium sulphate & calcium alginate
- sol → gel

To avoid tearing:

A. Removal → Rapid
B. Tray material should be at least 3 mm
C. Wait 2-3 minutes after it sets to develop adequate tear strength

Indications:

1. Diagnostic study casts
2. Opposing arch impressions for mounting and occlusion
3. An alginate tray material may be combined with an agar syringe impression material. i.e. alginate is placed in a tray and agar is syringed around the preparation

Advantages:

1. Hydrophilic
2. Fast setting
3. Easily poured
4. May be used with stock trays
5. Inexpensive

Disadvantages:

1. Low flow, therefore **cannot record fine details**
2. **Low tear strength**; therefore thin margins may tear upon removal of impression intraorally
3. Low dimensional stability due to syneresis and imbibition
4. Single pour
5. Incompatible with epoxy die materials
6. Cannot be electroplated
7. **High permanent deformation**
8. **Difficult to disinfect**

1.Polysulphides:

- Condensation polymerization with water as a **byproduct**

Properties:

1. Supplied in 3 viscosities.
2. Presented as base and catalyst tubes
3. Better used with special trays
4. The effects could be minimized by using custom tray to reduce the bulk of the material
5. Setting reactions produces water as a byproduct

Advantages:

1. Highest tear strength of all rubbers and highly elastic,

therefore easier to use in:

- Subgingival margins to record sulcular area
- Record pinholes

2. They can be electroplated with Ag. (Ag plated)

3. Good flow and reproduction of detail → highly accurate

4. Snap removal as (0.45 % shrinkage after 24 hr)

5. Flexible i.e. set material is removed from the undercut areas with minimal stress

6. Long working time

7.Disinfected

Disadvantages:

1. Messy → stains clothes due to lead peroxide
2. Unpleasant odor (sulphide)
3. Long setting time (10-12 min.)
4. Loss of water as a byproduct, low dimensional stability due to (contraction), and
5. Custom tray reduces material shrinkage
6. Hydrophobic → therefore moisture should be controlled otherwise voids will occur
7. Single Pour

Pouring:

- Pour within 1 hour ,cannot be repoured as accuracy will be decreased.
- Dimensionally unstable after one hour from setting; due to its mode of polymerization is by condensation; releasing **water as a by-product.**

2.Silicones:

Types:

- Condensation silicone
- Addition silicone

- High viscosity materials (putty) were developed to overcome polymerization shrinkage.

Condensation Silicone:

- **Base:** Poly (dimethyl siloxane) e”OH
- **Catalyst (liquid or paste):** Stannous octate
- Ethyl alcohol is the byproduct of polymerization (volatile)

Properties:

1. Provided in all viscosities, good handling properties
2. Adequate working and setting time
3. Reasonable tear strength (Lower than polysulphides)
4. 99% elastic recovery i.e. more elastic, exhibit minimal permanent deformation and recover rapidly
5. Can be electroplated with Ag or Cu

Advantages:

1. Accuracy is improved by using special tray to minimize polymerization shrinkage
2. Snap removal
3. Use surfactant to improve wetting
4. Pour within 1 hour
5. Available in all viscosities
6. Highly accurate
7. good elastic properties
8. Good working and setting time
9. Easily disinfected
10. Compatible with die materials

Disadvantages:

1. Dimensional changes on storage due to loss of ethyl alcohol therefore pour immediately within 30-60 min
2. high shrinkage(0.6%): polymerization and evaporation of ethanol
3. Poor wetting, therefore difficult to pour
4. Limited shelf life
5. Low tear resistance, therefore snap removal is required
6. Hydrophobic i.e. require dry field (surfactant)

Addition silicone:

- No reaction by-product which makes this material very accurate (additional polymerization).

Advantages:

1. Provided in all 4 viscosities, Monophase available and Automix available
2. Excellent dimensional accuracy and stability
3. No distortion on removal from undercuts
4. Rapid removal improves tear strength
5. Hydrophilic materials containing surfactants exist
6. May be electroplated with Ag or Cu
7. Pouring may be delayed to 1 week
8. Multiple pours are possible
9. **Faster setting time will increase patient comfort**

Disadvantages:

1. Polymerization may be inhibited by contact with latex gloves, due to presence of sulphur in the gloves. Use vinyl glove.
2. Hydrophobic but recently surfactants were added to make them hydrophilic. Thus improving wetting and pouring
3. Recently Hydrophilic brands available:
   A. cannot be electroplated
   B. Absorbs water like polyether
4. Lower tear resistance, may tear off in subgingival areas

N.B. *Pouring had to be delayed earlier products due to release of H2 gas at the polymer cast interface producing bubbles.*

Recent products contain a scavenger, Palladium
Therefore, can be poured within 30 min

4. Polyethers

- No by-products during polymerization.

Presentation:

1. Supplied in low, medium and heavy body consistency
2. Two paste tubes: base and catalyst. Several viscosities are present though regular is the most popular to clinicians
3. Regular (medium) viscosity therefore needs special tray
4. **Automix** available, which provides quick & bubble free, mixes

Advantages:

1. High accuracy
2. Dimensional stable (no byproducts)
3. High tear strength, less than polysulphides
4. Highest stiffness → greater force is needed to remove the impression
5. Short setting time
6. May be Ag plated
7. Remain dimensionally stable for 1 week i.e. pouring may be delayed if short dry multiple pours
8. Hydrophilic
9. Kept dry
10. Good surface detail

Disadvantages:

1. Very stiff material
2. Difficult to remove from undercuts
3. Caution when separating stone casts from impressions to avoid breaking die fracture
4. Stable when stored dry as it **may imbibe water,** if stored in humidity or water distortion may occur
5. Should not be left long (more than 10 min) periods in disinfectant solutions due to imbibition
6. Short working time
7. Bitter taste
8. Cannot be electroplated

Recent Impression Materials

Alginate substitutes

- Its an addition silicone provide detailed impression with out hand mixing
- Double barrel cartriges for automatic mix machines

Advantages:

- Excellent elastic recovery
- High tear strength
- High dimensional stability
- Hydrophilic

Disadvantages:

- Much more expensive than traditional alginate
- Difficult to separate from the model

Hybrid Impresson Material

Hybrid polyether – vinyle polysiloxane

It combines the benefits of both

Advantages:

- Hydrophilic properties
- High tear strength

Disadvantages:

- Incomplete material mixing
- Loss of detailed impression

Visible light cured polyether Urethane Dimethacrylate

Composition:

- Polyether urethane dimethacrylate – elastomer resin
- Chloroquinone – photoinitiator
- Silicon dioxide – filler

Viscosity:

Light body – syringe & Heavy body – tubes

Visible light cured polyether Urethane Dimethacrylate

1. Hydrophilic
2. Dimensionally accurate & stable
3. Elastic recovery
4. Tear resistance: (Highest among elastomers)
5. Biocompatible
6. Working time & setting time: Long controlled working time and short setting time
7. Resistance to disinfectant solutions: Ease of cold disinfection without loss of quality
8. Compatibility with die and stone materials: Compatible with gypsum and can be electroplated
9. Ease of handling & manipulation
10. Acceptable for the patient

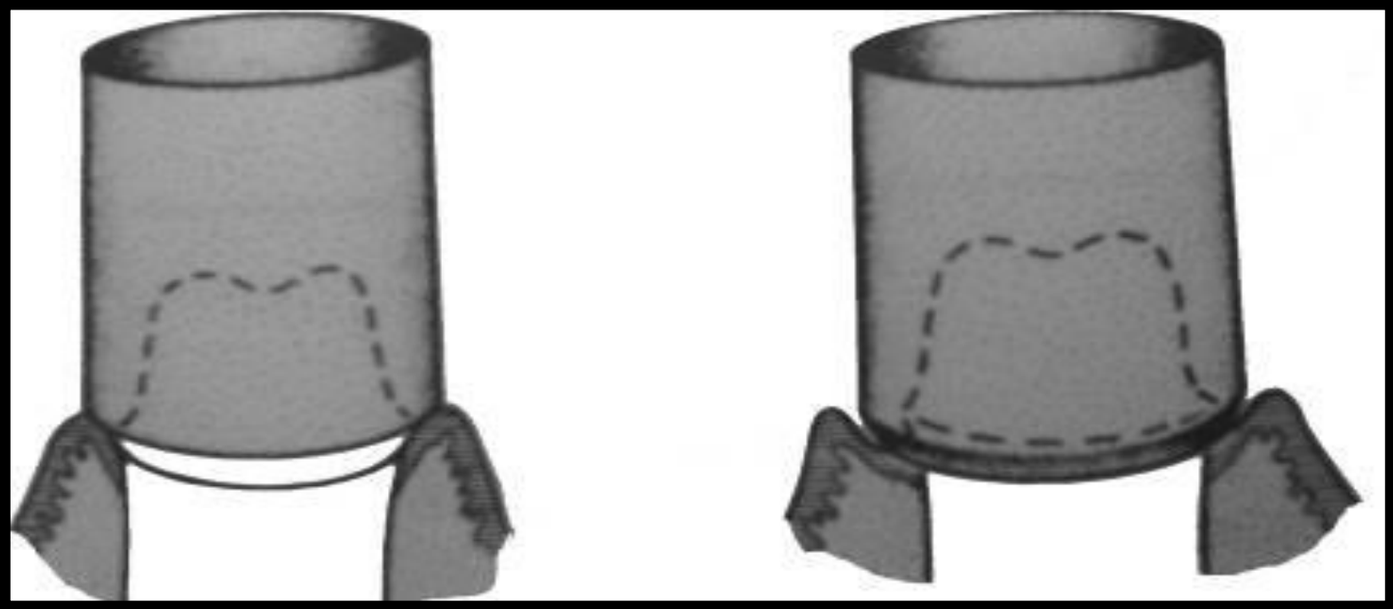
Tray requirements:

1. Tray itself should be 2-3 mm thick to provide adequate rigidity.
2. Tray should be done with a spacer to provide 2-3 mm of impression material thickness.
3. Tray should be stable with stops as uniform thickness minimizes distortion.
4. Tray should be provided with a handle.
5. To avoid distortion from continued resin polymerization, the tray should be made 9 hours before use Or placed in boiling water for 5 minutes to minimize distortion due to polymerization.

Stock Trays

Copper band or Tube Method impression

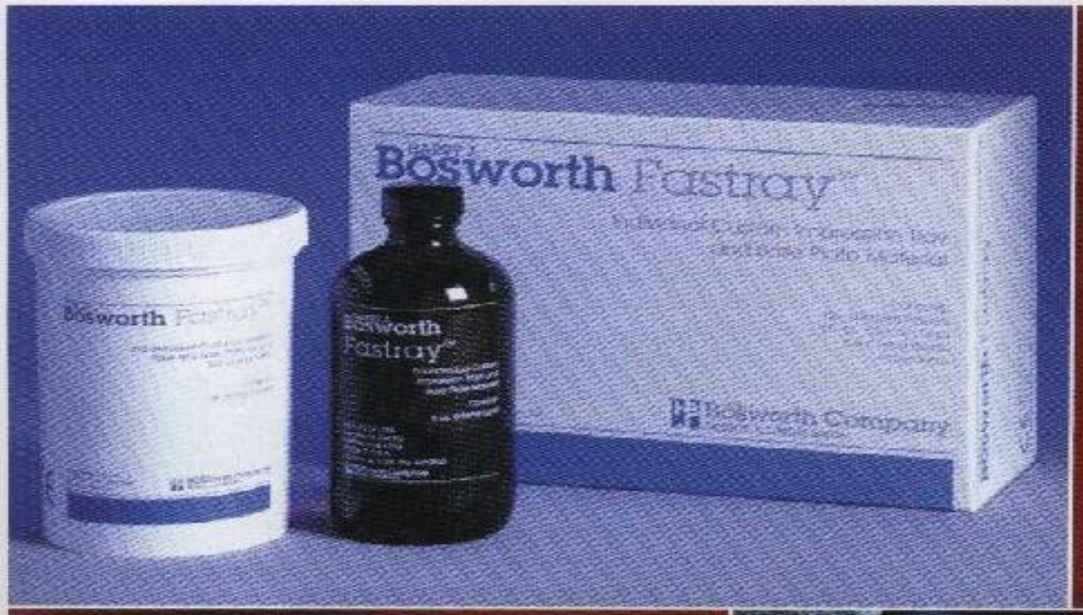
It is not used nowadays except in complete mouth rehabilitation when the whole impression is perfect except for some abutments ,making single tooth impression for the defective abutments.



Custom Resin Trays

They are used with elastomeric impression materials, because these materials are more accurate in uniform, thin layers of 2-3 mm.

Acrylic Special Tray



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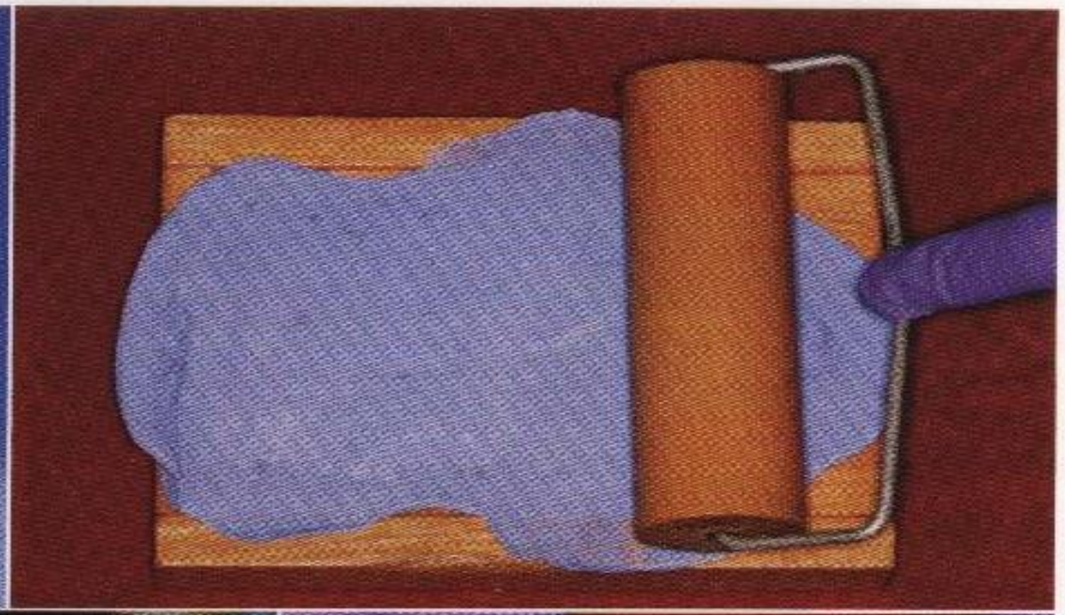

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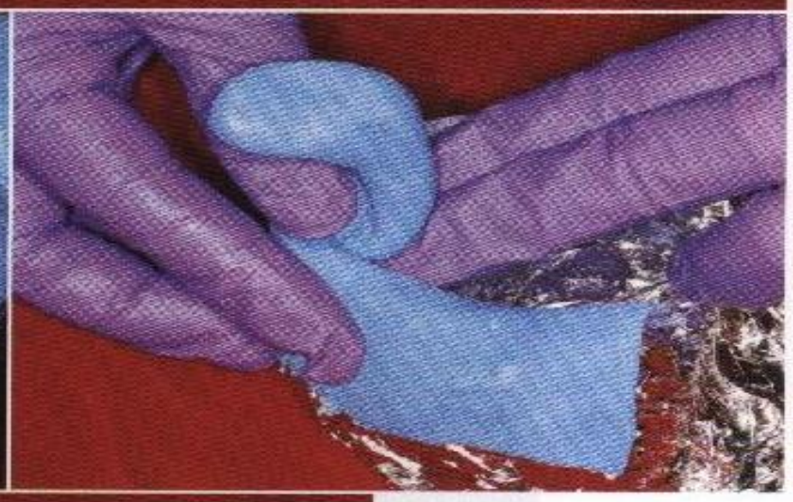

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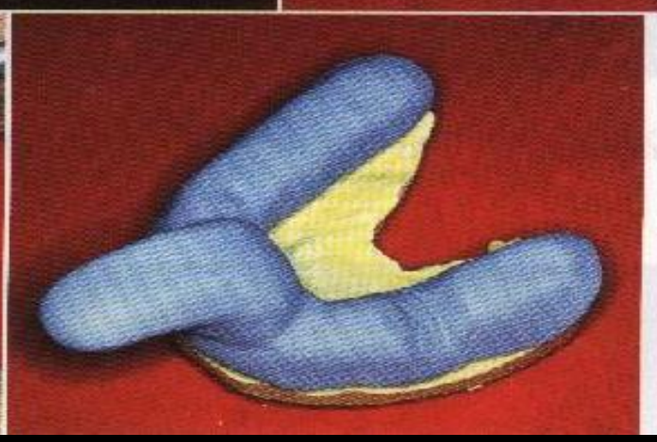

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Thermoplastic Custom Tray

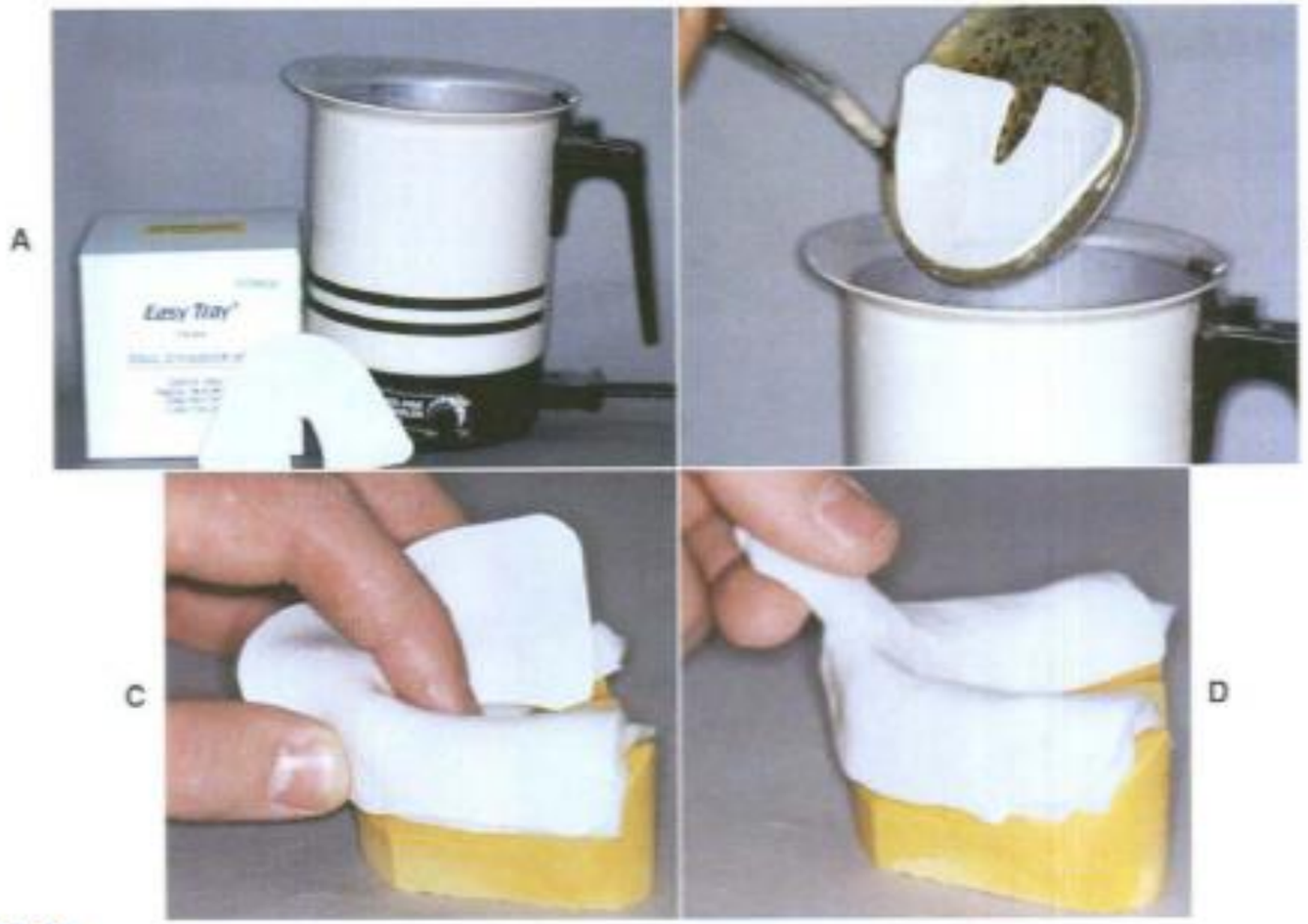


Fig. 14-19
Thermoplastic custom tray material. **A** and **B,** The material is softened in hot water. **C** and **D,** The material has been adapted to the spaced cast.

Fig. 14-20
Vacuum-formed custom tray material. **A,** The thermoplastic sheets are much thicker and more rigid than those used for making interim restorations (see Chapter 15), but the same equipment is used (B).

Visible light cured custom tray

Material is removed from the packet and adapted to a spaced cast

Assembly is placed in a curing unit

3D Printing

Impression Techniques

1- ONE Step impression techniques

- Single copper band impression
- Monophase technique; One-step single mix technique
- One-step Double mix technique; Heavy body/light body technique
- One-step putty/wash impression or Sandwich impression technique
- Reversible hydrocolloid technique
- Optical Impressions

2- TWO Step impression techniques

- Two-step putty/wash technique
- Two step Double mix technique

- The 3-way tray technique

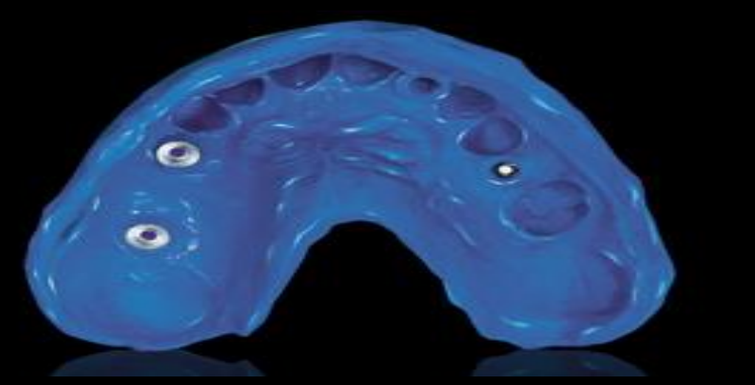
Single Monophase/Single-mix technique

(One Viscosity)

1. It is employed with impression materials supplied only in one viscosity.

2. The same steps are performed as for the heavy-light body technique, yet, one mix is used to load the syringe and the other to load the tray.

3. Since the material loaded in the syringe undergoes shear thinning when subjected to high shear forces; leading to a lower viscosity material.



One step Monophase technique

Disadvantages:

It is the *easiest* to perform, but it has been reported to be the *worst* in terms of *dimensional accuracy* and *surface defects*

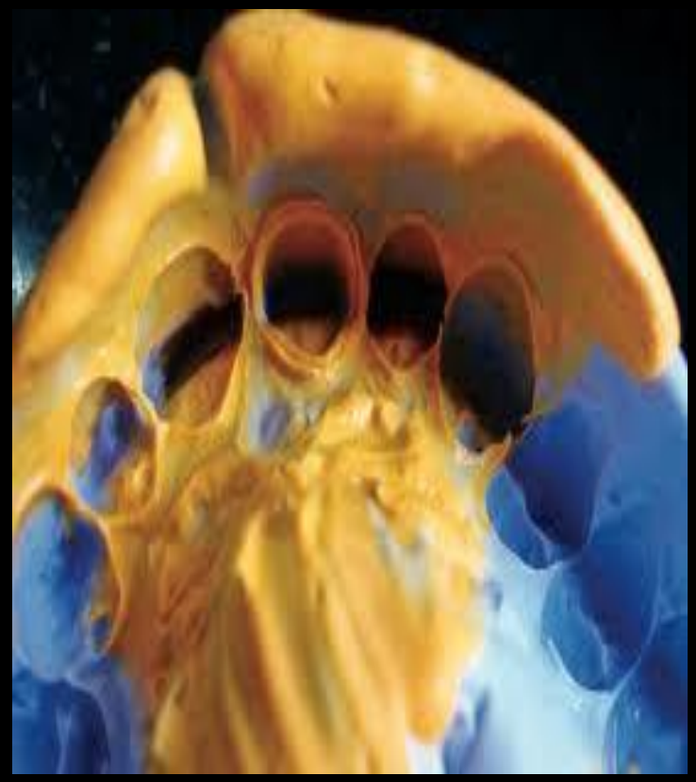
Use Manual:

When monophasic regular body Polyether is used so custom acrylic resin tray is used, when monophase PVS is used as the impression material, stock trays can be used.

One-step Double** mix **impression

It employs mixes of impression materials with two different viscosities.

- **They are simple and fast, they are 4 handed techniques.**
- **Both viscosities of material are mixed simultaneously and inserted as soon as possible to avoid premature setting and distortion.**
- **The longer the time delay, the greater the error.**



- **They can be divided into:**

1. One-step Double mix technique:

a- One-step regular body/light body technique (use custom tray since stock trays usually create less pressure upon insertion

b- One-step heavy body/light body technique (better use custom) or (stock tray)

2. Sandwich impression technique (use stock or custom tray)

Problems

- Using **plastic stock trays**, outward flexion of tray on insertion & → residual stresses within the material → rebound inwards on removal & release of internal stresses, distorting the impression & undersized dies bucco-lingually (use rigid metallic stock tray not aluminum or plastic).
- The **putty tends to push** the light body wash off the prepared tooth.
- The **uncontrolled bulk** of the light-body material.

2-step-double phase technique
2-step putty/wash technique or 2-step double mix technique

The two-step impression technique resulted in better accuracy and dimensional stability compared to the one-step impression technique when using PVS impression material.

It can be divided into:

-2-Step putty/wash technique using stock tray

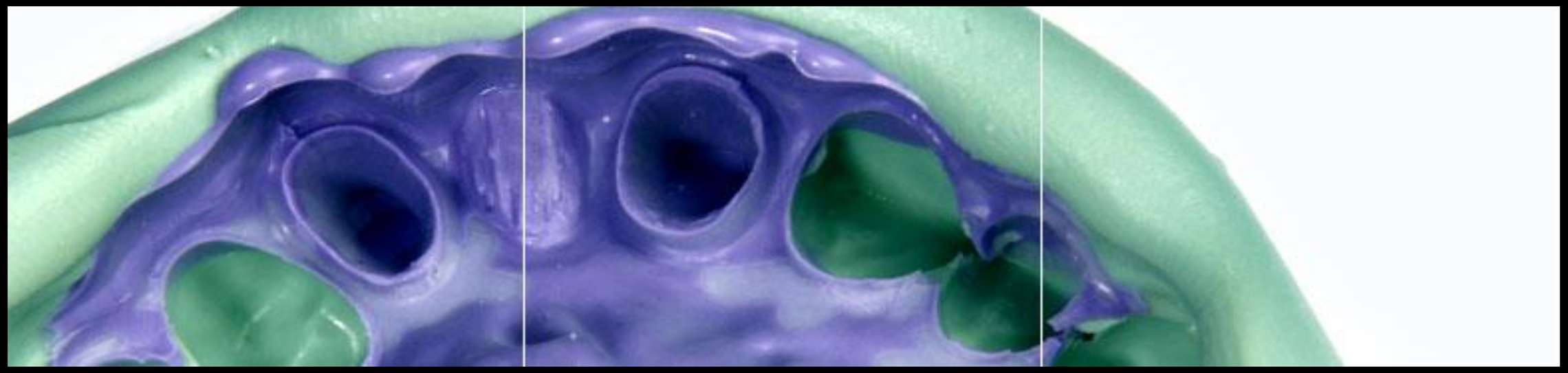
-2-Step double mix technique:

a-2-step regular body/light body technique (better use custom) or (stock tray)

b-2-step heavy body/light body technique (better use custom) or (stock tray)

Dimensional accuracy of 2-stage putty-wash impressions

- A **lower-viscosity** wash material contributes to more precise impressions.
- **Tray rigidity and control of the bulk** of the impression material improved impression reliability.



Disadvantages:

1. **Additional time** of having to wait for two materials to set.
2. **Contamination of the putty** with saliva which may prevent light body adhering to it.
3. **Difficulty in reseating** the set putty in the mouth.
4. Sluices are usually cut into the putty running away from the prepared tooth regions.
5. **Accuracy depends on the creation of controlled & uniform space** for wash material.

Different ways to create space for wash material

1.Take putty impression of teeth or temporary restoration, before teeth preparation.

2. Carving the putty and providing escape channels for the wash.

3.Polythene spacer over the teeth prior to making the putty impression.

4.Foil technique (e.g. Plicafol) over the teeth prior to making the putty impression.

Automix technique:

Some impression materials are offered in pre-packed cartridges to which a disposable mixing tip is attached.

1. The cartridge is inserted in a gun-like device, and the base and the catalyst are extruded into the mixing tip, where mixing occurs as they progress to the end of the tube.
2. The mixed material is then introduced directly into the tray or the prepared teeth.

Advantages:

1. This system eliminated the variables of hand-mixing and produces fewer voids in the impression.
2. It is not available for polysulfide polymers as they are too sticky for proper combination.

Mechanical Mixing

Pentamix™ system

The 3-way tray technique

(Closed-mouth impression, dual-arch impression, triple-tray or double-arch impression)

Special considerations

Post Space

Silicone impression material produced more dimensionally accurate impression of intra-radicular post space when compared to inlay casting wax and self cured acrylic resin.

Impression for Pin-retained Restorations

- Impressions of pinholes are obtained using a Lentulo Spiral instrument to carry and direct a low-viscosity elastomeric material to the bottom of the pinhole.
- The remainder of the prepared surfaces are then syringed.
- A plastic pin, with a smaller size than the holes, is placed into the pinhole.

  The pin should possess a head so it can be grasped by the impression material.

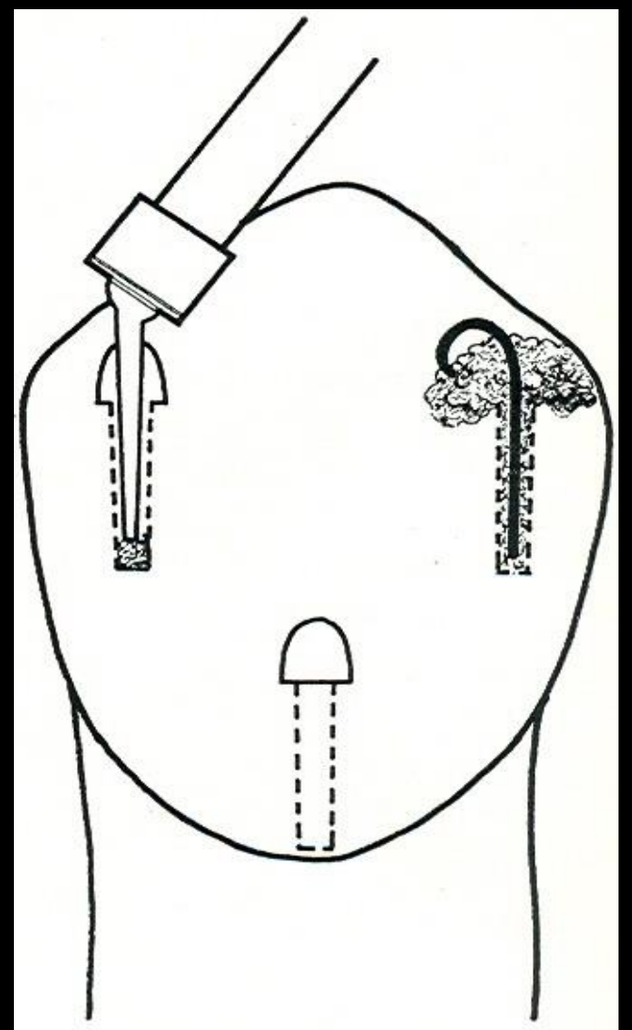


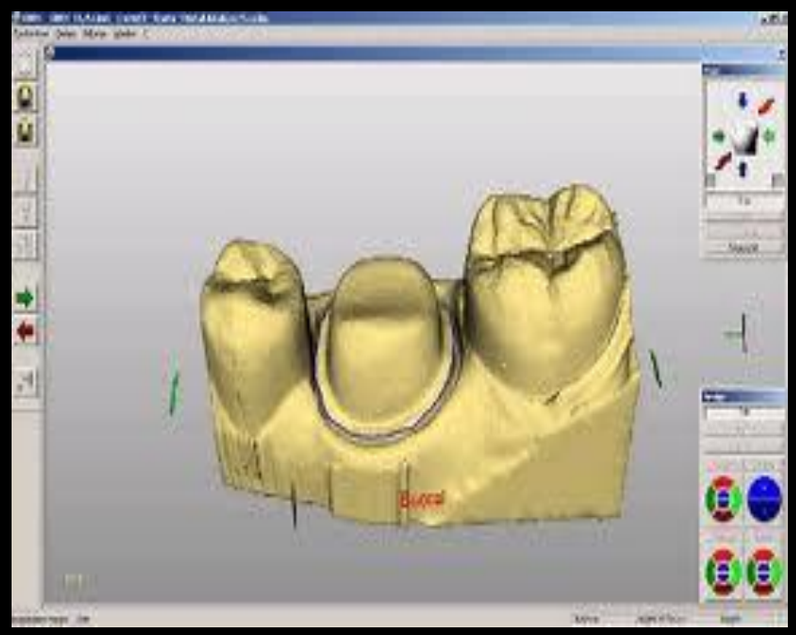
Fig. 205 *Rubber base impression material being injected down pinholes, after which stainless-steel wire is inserted.*

Disinfection

After removal from the mouth all impressions should be rinsed under tap water and air dried then sterilized to prevent cross infection.

Disinfection should not affect the accuracy and surface reproduction of the impression.

Irreversible hydrocolloid	Diluted bleach Iodophor spray Distortion from prolonged immersion
Reversible hydrocolloid	Diluted bleach Iodophor spray Distortion from prolonged immersion
Polysulfide	Immersion in Iodophor or 2% gluteraldehyde
Addition silicon	Immersion in 2% gluteraldehyde
Condensation silicon	Immersion in 2% gluteraldehyde
Polyether	Iodophor spray or chlorine dioxide Distortion from prolonged immersion



Digital intraoral acquisition systems allow the dentist to capture the surface of the prepared teeth intraorally in three dimensions, enabling an almost completely digital workflow.

Currently, all of the various chairside intraoral digital scanning devices are based on optical principles such as blue light-emitting diodes, blue laser, red light laser, infra-red light to produce optical images.

Chairside CAD/CAM Units

- **In- office scanning , designing and milling**
- **CEREC (Sirona).**
- **E4D (D4D).**
- **CEREC Omnicam**
- **CEREC Primscan**

Chairside Digital Impression Units

- **Scan only & capture sent to a laboratory**
- **iTero (Cadent)**
- **Lava (3M ESPE)**
- **Trios (3 Shape)**

Advantages of digital impression

1. Both the patient and the dentist **save valuable time**.

2. An advantage in the case of a patient who is **a gagger** or cannot tolerate impression material in his or her mouth for several minutes, or if mandibular or maxillary **tori** or other **undercuts** are present that would make removal of a traditional impression difficult.

3. **Insufficient clearance** is detected immediately through a color-coded bite registration allowing corrections.

4. Sending the impression to the laboratory is a digital transfer which saves time and **prevent cross infection**.

Disadvantages of digital impression

1. The **tooth preparation** is critical and demands limitations specific for each system.

2. **Size of the camera head** of some systems is large (e.g. iTero) and the camera weight may pose an issue as well.

3. The **precision and marginal fit** of the restorations are less than restorations fabricated by the indirect technique, however modified CAD/CAM systems have improved precision.

4. **High cost.**

Impression Defects

Inhibited or Slow Setting

Visual Appearance:

- Impression not completely set
- Sticky, shiny, no detail of site

Result:

- Unset parts may stick to cast
- Inadequate surface detail on stone cast
- Poor fitting restorations

Causes

For PVS Materials

• Sulfur inhibition due to contact of latex gloves with tissue/tooth/retraction material or impression material
• Contamination due to temporary materials or composite

For PVS and PE Materials

- Expired impression material does not set properly
- Elastomeric properties are insufficient
- Inadequate mix

Inadequate Mix

Visual Appearance:

Non-homogeneous mix

Result:

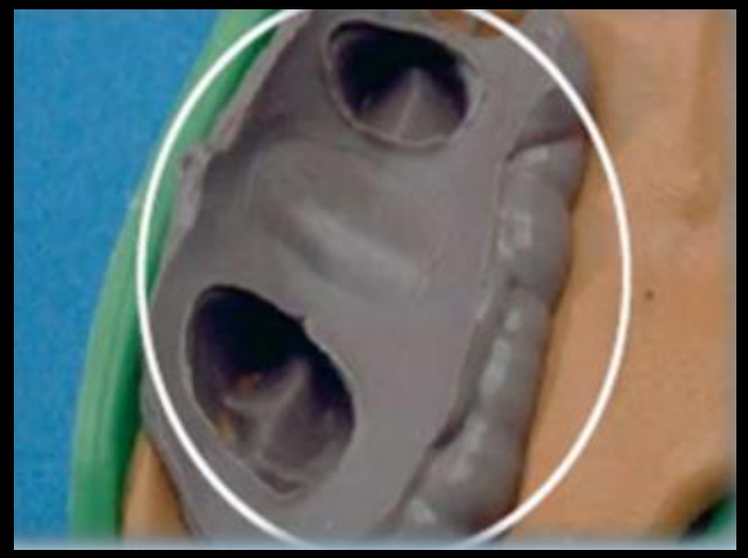
Slow-setting impression material

Causes

- Improper hand mixing
- Improper ratio of catalyst to base
- Mix tip not attached correctly

Lack of Impression Details

Visual Appearance: Muted detail reproduction



Result:

- Crowns may be too tight, or loose, and not fit correctly
- Occlusal adjustments may be required

Causes:

- Blood/saliva contamination around the preparation
- Inadequate retraction of sulcus around the preparation
- Impression material stored at elevated temperature
- Impression material stored at too low a temperature (prolongs the setting reactions, changes viscosity and requires higher extrusion forces for automix materials) - Premature set
- Set time of wash/tray material not compatible
- Exceeding the working time

For Polyether Materials

- Incorrect storage conditions of the final impression affects surface quality (detail reproduction) and dimensional stability
- Inadequate disinfection effects surface quality (detail reproduction) and dimensional stability

Voids on the Margin

Visual Appearance:

- Voids on margin of the prepared teeth
- Incomplete margin

Result:

- The fit and function of the final restoration may be compromised
- Short crown margins and/or open margins

Causes

- Air trapped in intraoral syringe
- Blood and saliva contamination around preparation
- Air trapped while filling impression tray
- Tray not seated straight
- Improper syringe technique
- Inadequate coverage of marginal area with light body impression material
- Exceeding the working time
- Impression material stored at elevated temperature

Tearing at the Margin

Visual Appearance:

- Rip, or visible tearing on the margin of the preparation.
- Lack of flash extending apically around entire preparation

Result: Short crown margins and/or open margins

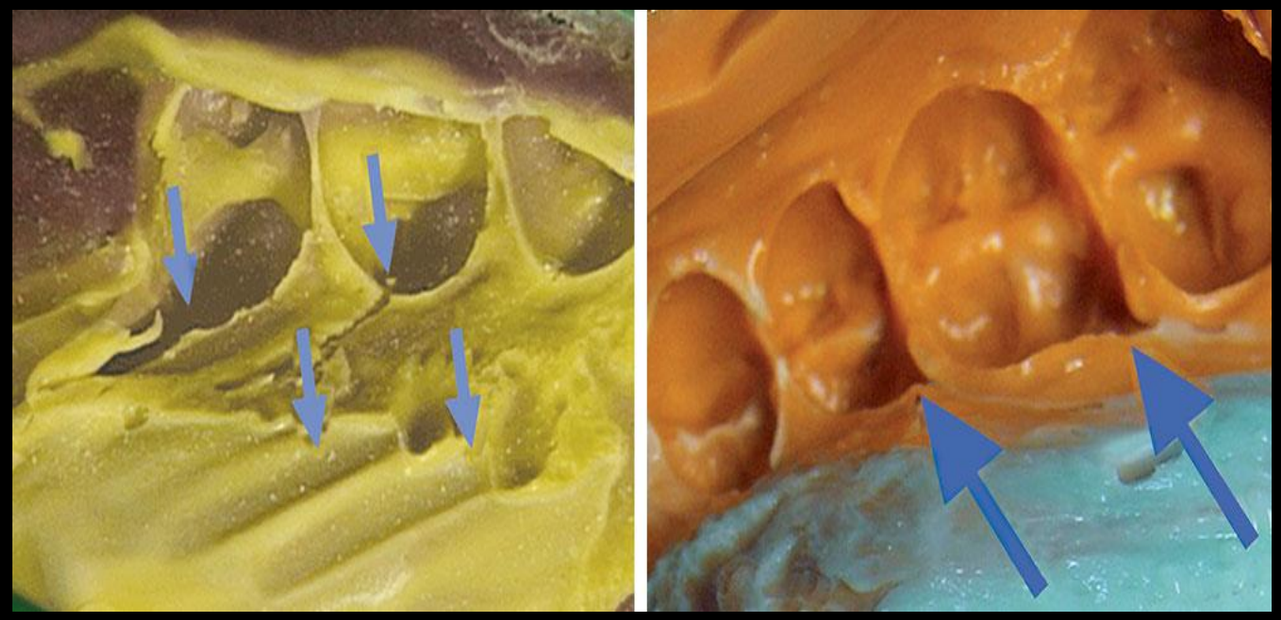
Causes

- Expired impression material
- Inadequate mix
- Insufficient retraction
- Impression material with poor tear resistance
- Premature removal of the impression

For PVS Materials

- Sulfur inhibition due to (latex gloves or rubber dam)
- Residues from temporary materials or composite

Facial-Lingual Pulls / drags



Visual Appearance: V-shaped void, trough-like

Result: Failure to capture complete and accurate dentition

Causes

- Exceeding the working time
- Tray movement or repositioning after seating
- Insufficient amount of impression material used
- Impression tray does not support flow of impression material

Tray-Tooth Contact

Visual Appearance:

Show-through the tray. Impression tray exposed

Result:

Restoration may have slight distortion at marginal area, or rocks

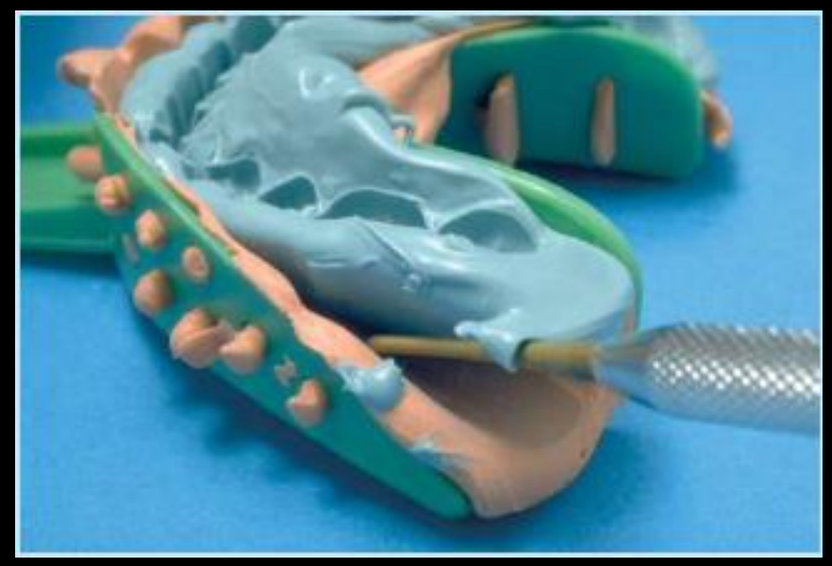
Causes

- **Prepared teeth contact the sides or bottom of impression tray**
- **Insufficient impression material used**
- **Tray seated too quickly or forcefully**
- **Tray movement or rocking during the impression**

Delamination

Visual Appearance: Heavy body and light body materials not blended, or mixed together

Result: Restoration will not seat or fit properly



Causes

- Exceeding the working time
- Impression material stored at elevated temperature
- Relining of impression material with wash material

2-step technique:

- Initial impression not completely cleaned and dried

2-step technique:

- Sulfur or acrylic contamination of set initial impression

Wash material displaced/washed away from preparation area

Visual Appearance:

- Insufficient amount of wash material covering preparation margins
- Wash material pushed to sides of tray

Result: The fit of the final restoration may be compromised

Causes

1-step technique:

• Contrast in viscosity between tray material and wash material too high

1-step technique:

•Working time of tray material exceeded when tray is seated.

• Insufficient amount of wash material applied

Distortions

Visual Appearance: Mostly not identifiable upon inspection of the impression

Result: Restorations may be too tight/too short/open contact require excessive adjustment

Causes

-2-step technique:
Too high pressure applied upon seated second impression.
-2-step technique:
Highly viscous wash material used for second impression that displaces set tray material.
-Putty-wash technique in plastic tray, allow deflection, which can cause rebound upon removal.
-Inadequate mix
-Impression removed too early
-Lack of support of the tray by operator during the initial phase of polymerization
-Using excessive force during setting
-2-step technique:
No space or uncontrolled space for wash material.

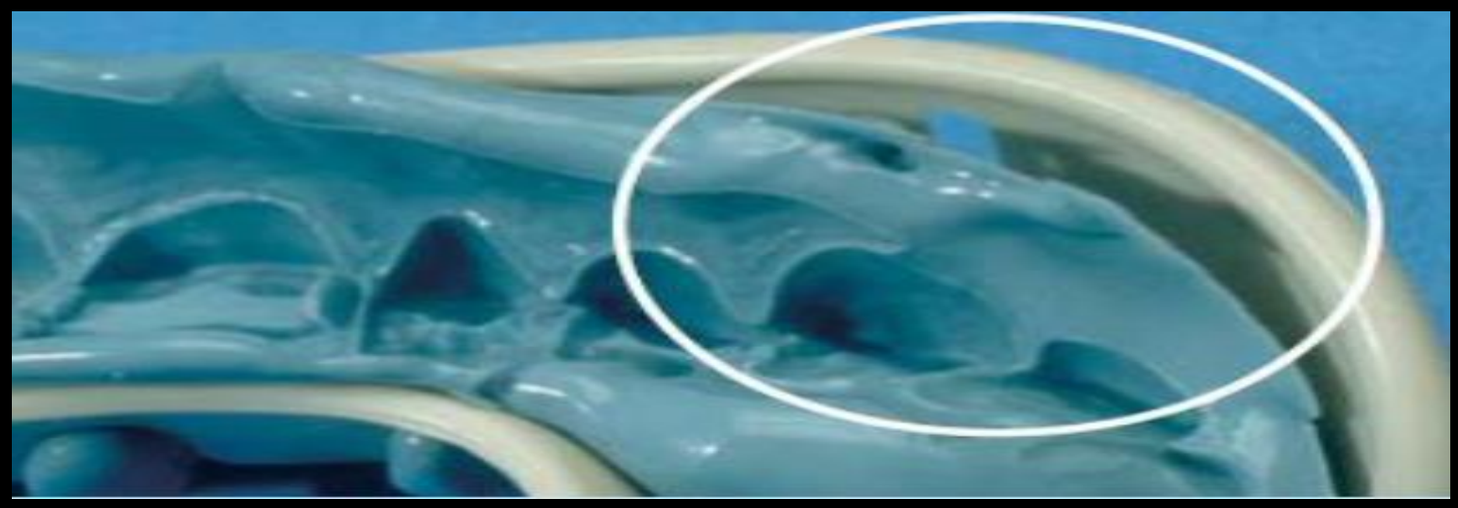
Poor Bond of Impression Material to the Tray

Visual Appearance: Impression pulling away from the sides/bottom of tray

Result: Crown(s) may be tight and not seat fully, or require excessive internal adjustment

Causes

- No tray adhesive used
- Incompatible tray adhesive used with the impression material
- Inadequate drying time for tray adhesive
- Tray distortion upon removal (thin plastic trays)



Stone Model Discrepancies

Visual Appearance: Voids on margin, powdery cusp tips on incisal edges on prepared tooth.

Result: Incomplete seating of indirect restorations.

Causes

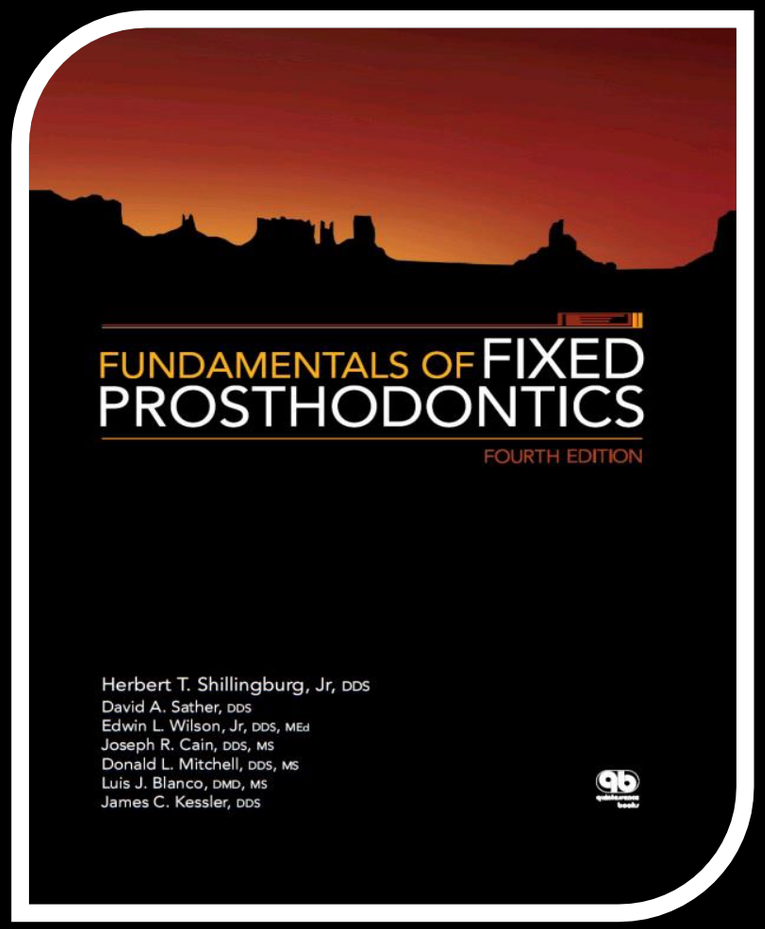
- Cast not made according to model preparation guidelines and lacks detail.

VPS
- Hydrogen gas emission.

Errors of digital impressions

- Improper handling of the scanner
- Irregular powder application on the tooth
- Irregular scanner Positioning in O-G direction
- Irregular scanner. Positioning in B-L & M-D direction
- Lack of powder in some parts
- Irregular powder arrangement
- In-stabilized scanner
- Excessive amount of the powder on the bottom of the cavity

References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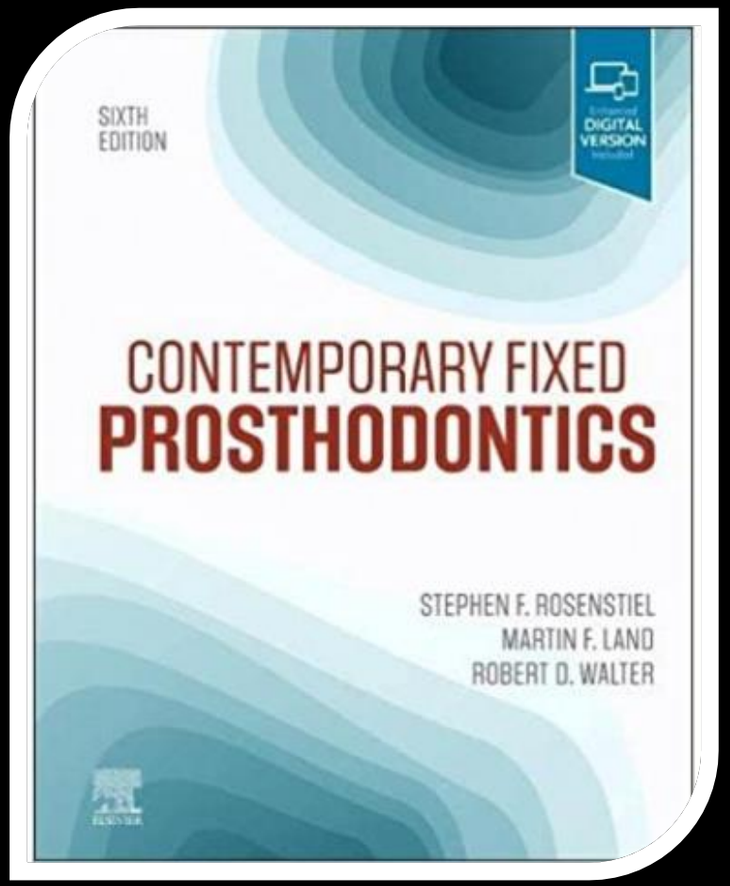
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