

TISSUE MANAGEMENT AND IMPRESSION MAKING

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impression, or negative likeness of the teeth and surrounding structures, is necessary to obtain a cast. This cast is then used to make a restoration in the laboratory. To obtain the cast, an elastic impression material is mixed and loaded in a tray that is inserted into the patient's mouth. When the material has set, it remains elastic; the impression is then poured into the "negative" impression, and a positive likeness or definitive cast is obtained.

The impression must be **free of air bubbles, tears, thin spots**, and **other imperfections** that might produce inaccuracies.

When the preparation margins extend subgingivally, the adjacent gingival tissues must be displaced laterally to allow access and to provide space for adequate impression material thickness. This may require enlarging the gingival sulcus through mechanical, chemical, or surgical means and must be done without jeopardizing periodontal health. Improper manipulation of impression material and poor tissue displacement technique can lead to permanent soft tissue damage.

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TISSUE MANAGEMENT AND IMPRESSION MAKING PREREQUISITES

Tissue Health

the focus must shift from the teeth to the soft tissues, which must be returned to a state of optimum health before impression making is even considered.

Saliva Control : using cotton roll and saliva ejector to get dry field during the impression making.

Displacement of Gingival Tissues:

Tissue displacement is commonly needed to obtain adequate access to the prepared tooth to expose all necessary surfaces, both prepared and not prepared. This can be achieved by mechanical, chemical, or surgical means. Mechanical displacement is most effectively achieved by placement retraction cord Alternatively, paste systems can be used, often in conjunction with directed pressure. Chemicals such as aluminum sulfate or epinephrine cause localized soft tissue shrinkage. Surgical tissue removal can be accomplished through curettage, excision with a scalpel, or electrosurgery.

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Displacement cord (retraction cord)

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Some enlargement of the gingival sulcus can be obtained by placing a nonimpregnated cord and leaving it in place for a sufficient length of time. The cord is pushed into the sulcus and mechanically stretches the circumferential periodontal fibers. Better sulcus enlargement can be achieved with a chemically impregnated cord or by dipping the cord in an astringent (e.g., Hemodent+). These materials contain aluminum or iron salts and cause a transient ischemia, shrinking the gingival tissue. Cords with metal filament reinforcement have been developed to help maintain their intra-sulcular position.



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Displacement paste

as an alternative to cord consists of an aluminum chloride-containing paste that is injected into the dried sulcus with a special delivery gun. Advantages of the system include good hemostasis with less discomfort than traditional cord.

Electrosurgery

An electrosurgery unit may be used for minor tissue removal before impression making. In one technique, the inner epithelial lining of the gingival sulcus removed, thus improving access for a subgingival crown margin

The following facts should be considered before electrosurgery is attempted:

1. It is contraindicated on or near patients with any electronic medical device (e.g., a cardiac pacemaker, transcutaneous electrical nerve stimulation [TENS] insulin pump) or patients with delayed healing as a result of debilitating disease or radiation therapy.
2. It is not suitable on thin attached gingiva (e.g., the labial tissue of maxillary canines).
3. It should not be used with metal instruments, because contact could cause electric shock. (Plastic mirrors and evacuation tubes are available.)
4. Profound soft tissue anaesthesia is mandatory.
5. A thin wire electrode is best for sulcular enlargement. Gingival contouring is usually performed with a loop electrode.
6. The instrument should be set to unmodulated alternating current mode.
7. The electrode should be passed rapidly through the tissue with a single light stroke and kept moving at all times.

Soft tissue laser

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3MTM ESPETM Retraction Capsule



lec:4

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electrosurgery

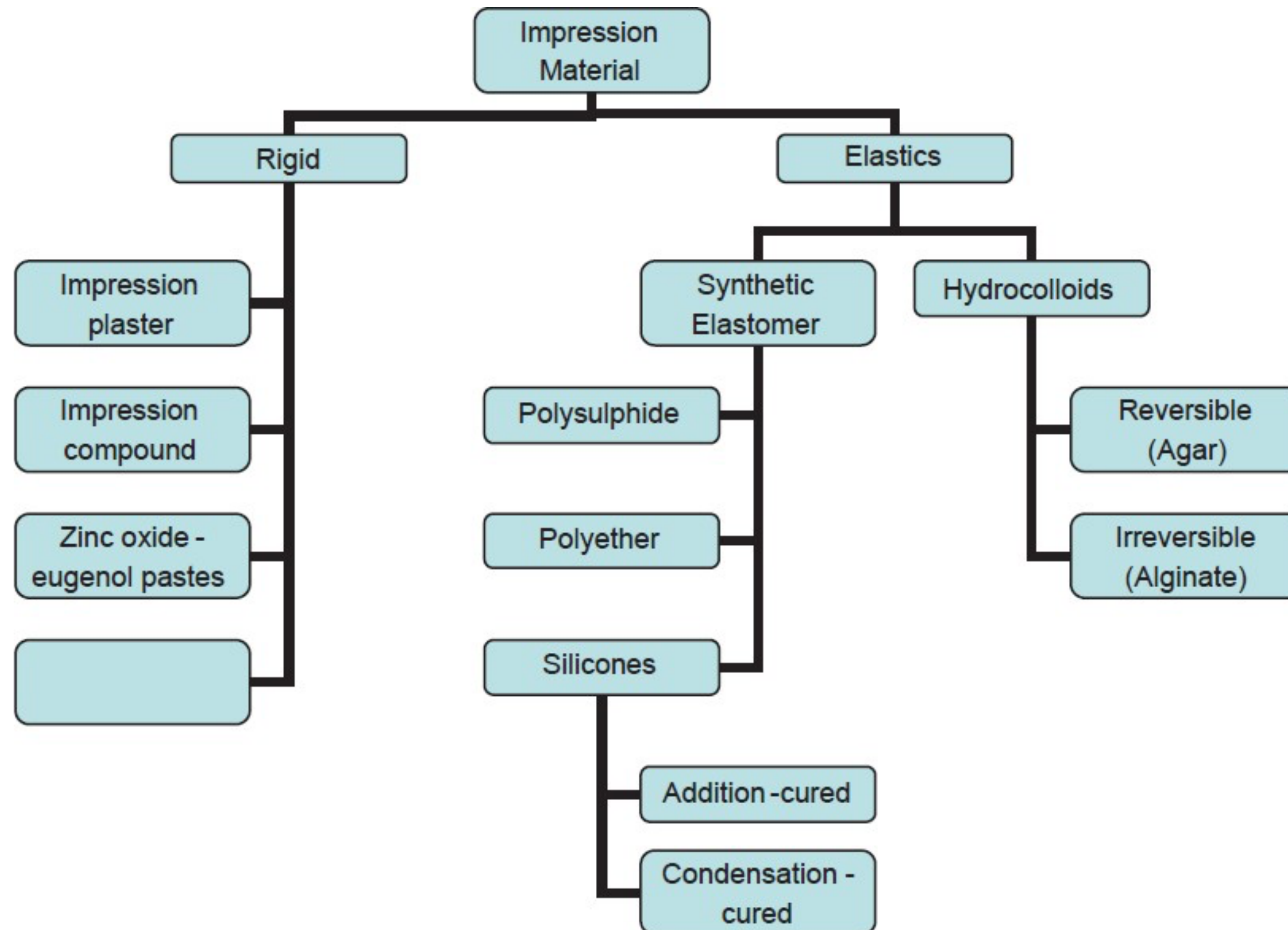
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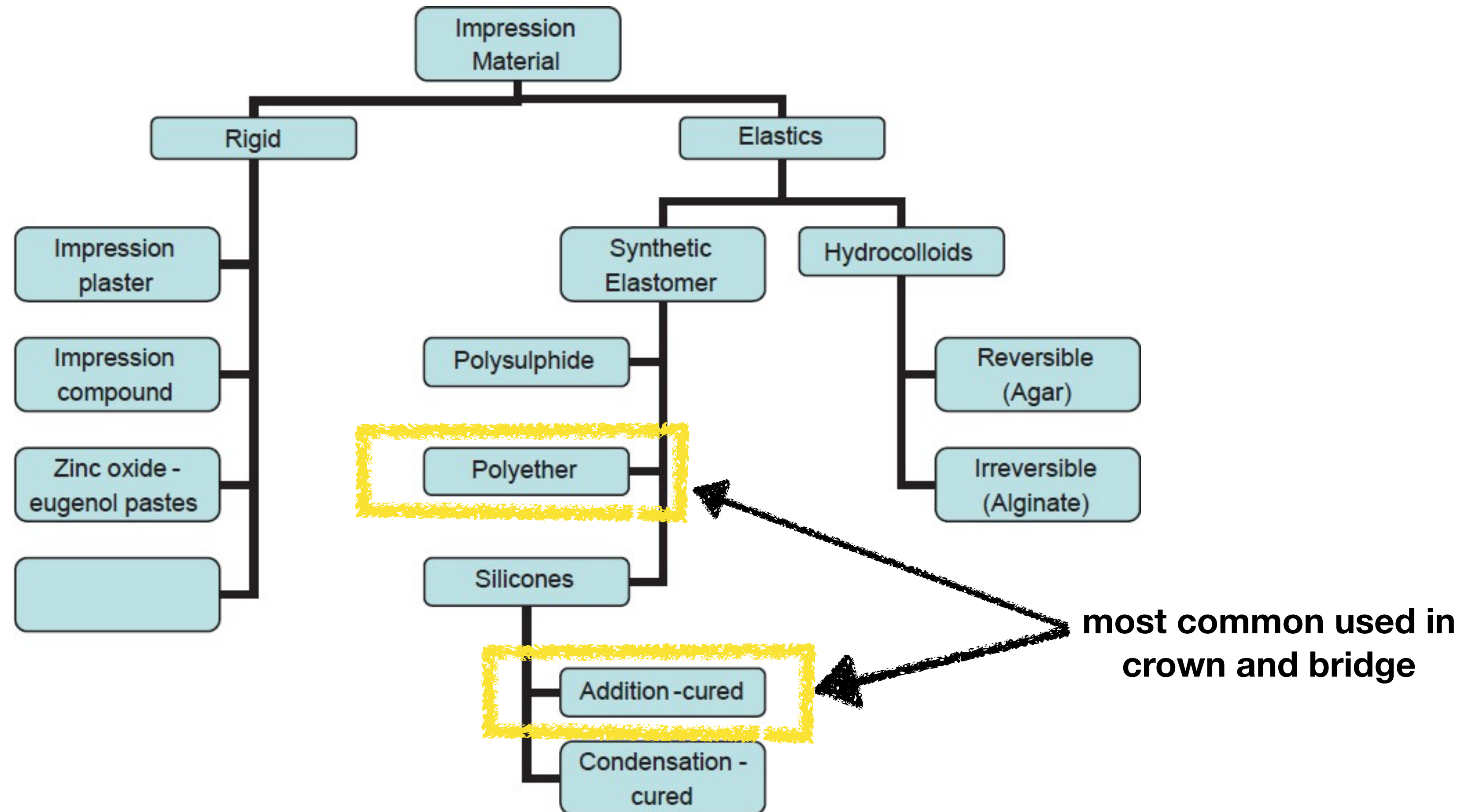


Retraction Past

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There is an extensive variety of materials for making a precision negative mold of soft and hard tissues. Irreversible **hydrocolloid** is not sufficiently accurate for cast restorations. Each material has advantages and disadvantages, and none is entirely free of shortcomings. However, they all share one important characteristic: when handled correctly, they can produce casts of sufficient accuracy and surface detail for the fabrication of clinically acceptable fixed prostheses.

there are reasons for selecting one material over another: If it becomes necessary to store the impression before a cast is made, the **polyethers** and **addition silicones** are preferable because they exhibit sufficient long-term **dimensional stability**; the other materials, particularly the reversible hydrocolloids, must be poured immediately.

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1. Polysulfide impression material :

The polysulfides, commonly known as "**rubber bases**" were introduced in the early to

middle 1950s and used widely by dentists because of their better dimensional stability and tear strength than hydrocolloids, nevertheless, it was important that the polysulfide impression be poured as soon as possible after impression taking since delay of over an hour resulted in clinically significant dimensional change.

Advantages of polysulfide impression material :

1. It has high tear resistance and high elastic properties which facilitate impression making in sulcular areas and pinholes.
2. It has improved dimensional stability over hydrocolloids but inferior to polyether .
3. It is the least expensive of elastomers

Disadvantages :

1. Must be poured as soon as possible after taking the impression.
2. It has long setting time (about 10 min.) so it's uncomfortable for the patient.
3. High temperature and humidity reduce its working time.
4. Lead dioxide (catalyst) gives brown color for the material and the material after polymerization is sticky so we should be careful in handling this material because it may stain the clothes.

Chemical composition of polysulfide impression material :

The material is supplied as a two- paste system (base and accelerator or catalyst) in three consistencies (heavy, medium, and high bodies) which differ only in the amount of filler loading.

The base is composed of polysulfide polymer, titanium dioxide, zinc sulfate, copper .

carbonate, or silica.

The accelerator or catalyst is composed of lead dioxide, dibutyle or dioctyl phthalate, sulfur and other ingredients as magnesium stearate and deodorants.

Water is a by- product of polysulfide polymerization. Its evaporation results in a slight contraction of polymerized material, which can be minimized through the use of a special tray as this reduces the material's thickness

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2-Condensation silicone impression material:

Chemical composition: The material is supplied as a base and an accelerator in a low consistency and putty-like consistency. The base composed of a linear silicone called polydimethylsiloxane and fillers (either calcium carbonate or silica). The accelerator may be a liquid that consists of stannous octoate suspension and alkyl silicate, or it may be supplied as a paste by adding a thickening agent

Advantages:

1. It is odorless and can be pigmented to virtually any shade.
2. It has relatively short setting time in the mouth (typically 6-8 minutes).
3. It is also less affected by high operator temperatures and humidity.
4. its dimensional stability greater than that of reversible hydrocolloid.

Disadvantages:

1. The main disadvantage of condensation silicone is its poor wetting characteristics because it is extremely hydrophobic; therefore, the prepared teeth and gingival sulci must be completely free of moisture for a defect-free impression.
2. It has dimensional instability which is due to the mode of polymerization which is of condensation type which gives off ethyl alcohol as a by-product, whose evaporation from the set material causes dimensional contraction.
3. Pouring the impression made of condensation silicone without trapping air bubbles is more difficult than with other impression materials.

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3. Polyether impression Material :

Polyether impression material has a polymerization mechanism unlike those of the other elastomers. No volatile by- product is formed, and thus it has excellent dimensional stability.

Chemical Composition :

The material is also supplied as a two- paste system ((base and accelerator or catalyst)) in three consistencies' (low, medium, and heavy bodies).

The base paste consists of a long- chain polyether copolymer, silica fillers, compatible plasticizers of a non-phthalate type, and triglycerides.

The catalyst paste consists of an aliphatic cationic initiator (as a cross- linking agent), silica fillers, and plasticizers.

Coloring agents are added to the base and catalyst to aid in the recognition of different

material types.

Advantages :

1. It has high dimensional stability since no volatile by- product is formed and its polymerization shrinkage is unusually low compared with most room temperature- cured polymer systems.

Therefore, an impression made of polyether can be poured more than a day after the impression has been made and still having accurate casts. This is especially useful when it may be impossible or inconvenient to pour the impression immediately. The new polyether material can be poured up to fourteen days after impression taking.

2. It has short setting time in the mouth (typically 5 minutes, or less than half the time required for polysulfide).

Disadvantages :

1. These materials are stiff. This causes problems when separating a stone cast from the impression, especially in thin and single teeth as in the mandibular incisors.

However; this problem has been recently solved with the introduction of soft polyether materials such as Impregum Penta Soft.

2. The polyether is stable only if stored dry since it will absorb moisture (imbibitions) and significantly change dimensionally.

3. There are reported cases of allergic hypersensitivity to polyether, manifested as sudden onset of burning, itching, and general oral discomfort

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4- Addition silicone impression material (poly vinylsiloxane):

The main difference between the addition silicone and the condensation silicone is that it has **much greater dimensional stability** than the condensation type as its

polymerization reaction does not give off any by-product.

Chemical composition:

The material is also supplied as a two-paste system (base and accelerator or catalyst) in extra low, low, medium, heavy, and very heavy (putty) consistencies. The

base paste consists of dimethylsiloxane with

vinyl terminal groups, plus fillers. The accelerator (catalyst) also contains dimethylsiloxane with vinyl terminal groups, fillers, and platinum catalyst.

Advantages:

1. It has high dimensional stability.
2. The set material is less rigid than polyether.

Disadvantages:

1. Like other materials, adverse tissue responses have been reported.
2. Setting inhibition by some brands of latex gloves.

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condensation silicon



addition silicon

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final impression

IMPRESSION TRAYS

- they must have adequate rigidity
- tray design should provide for control of impression material thickness.
- Retention is provided by perforations, rim locks, and/or tray adhesives

CUSTOM TRAY FABRICATION(special tray) Custom trays can be made from autopolymerizing acrylic resin, thermoplastic resin, or photopolymerized resins.

Advantages of special tray:

- 1) It allows the use of impression material in minimum thickness to reduce its dimensional changes.
- 2) It reduces the discomfort of the patient because it is well fitted to the patient's mouth.
- 3) Its small size prevents the forcible opening of the mouth.
- 4) It allows free snap-removal of the impression (without applying rotary movements).

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IMPRESSION MAKING

According to the Viscosity Of impression Materials used during impression registration we have;

1. One step Impression technique

I. Monophase Single Viscosity

II. Heavy-Light.

2. Two steps Impression technique

I. Spaced Putty Wash

II. Un Spaced Putty Wash.

1) One step (monophase Single viscosity) technique.

Most of the time, we use this technique when we have impression material with single viscosity (medium body with polyether impression material) after we mix the material, part of the impression material is loaded in the syringe from the mixing slab, the other mixed part of the material is loaded into the tray. The impression material is injected from the syringe around the preparations starting with the most critical parts (pin holes, finishing lines then, the preparations and the remaining part of the dental arch then), the special tray loaded with impression material were then inserted inside the patient mouth and seat over the whole dental arch., wait for complete setting of the impression material then, it can be removed from the patient's mouth.

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2) One step (heavy light or Double mix) technique.

Usually used with materials that have two viscosities (heavy and light bodies), we mix the heavy and light bodies at the sometime then, the light body is loaded in the syringe while, the heavy body is loaded in the special tray. We start to inject the light body on the dental arch starting with the prepared tooth then, the special tray with heavy body is inserted inside the patient's mouth and seated over the dental arch. The pressure created by the heavy body will create:

- a- An intimate contact of light body with the prepared tooth surface.
- b-make direct flow of the light body into details of the preparation

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. 3) Two steps (Putty wash technique).

This technique uses a high viscosity putty material, we start taking the impression with the putty body which could be before or after tooth preparation. Putty impression be:

1) Unspaced putty impression; putty impression is recorded first after tooth preparation, then, after setting it relines with a thin layer or wash of light body impression material.

2) Spaced putty impression :a space is created inside the putty impression for the wash (light body) layer. Space could be created by:

I. Record with putty before teeth preparation

II. Record with putty after teeth preparation. Create space using polyethylene spacer .

III. Record with putty after teeth preparation. Create a space and escape channels using a scalpel or burs.



IMPRESSION TWO STEP



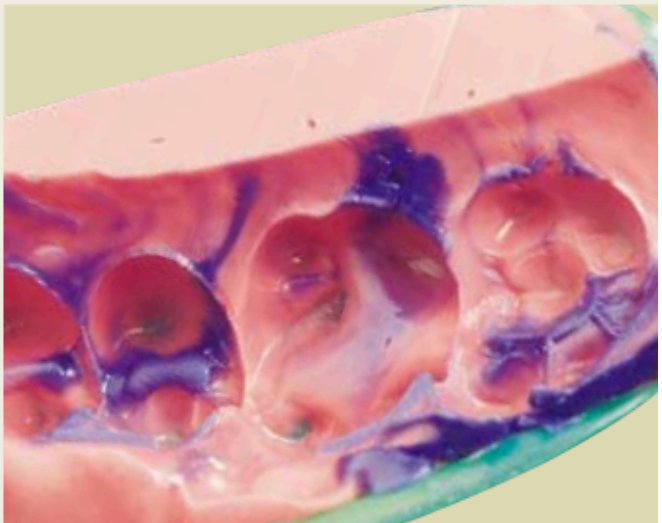
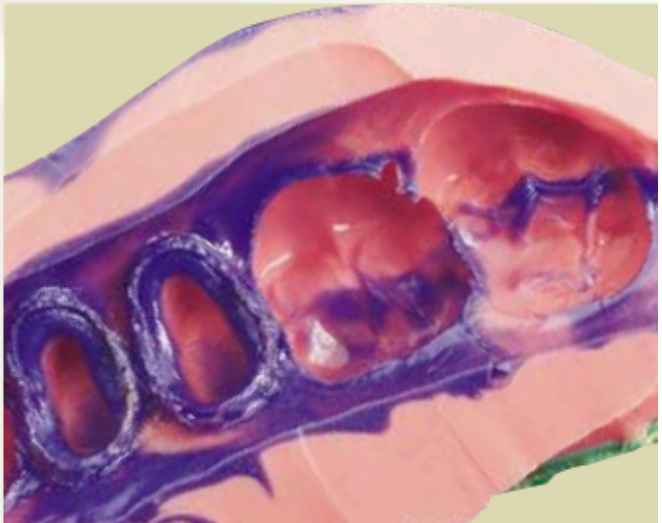
crowns and bridge

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- 1 Uniform, homogeneous mix
- 2 Tray adhesive applied thoroughly
- 3 Rigid, sturdy impression tray
- 4 No voids or pulls on margin detail
- 5 Detailed margins with no tears or rough surfaces
- 6 No burn-through of heavy body material
- 7 Strong bond between heavy body and light body material
- 8 Strong bond between impression material and tray
- 9 No tooth contact with tray



indication of good impression

crown and bridge

lec:4

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Digital Impression :

Digital impression represents the most recent development in dentistry. The basics of digital impression start with capturing an image of the prepared teeth. This system uses an intra-oral camera (scanner) to capture the desired image (optical impression) this image is then electronically transferred to a manufacturing facility which fabricates a working, articulated model. On this model, a multitude of different restorations can be designed (crown, bridges, inlays/ onlays, and veneers) with a special computer software, which is connected with a milling machine. This procedure is termed CAD-COM (Computer Aided Designing- Computer Aided Manufacturing).

Advantages of The Digital Impression :

- 1. Digital impression eliminates the uncomfortable experience of making a physical impression.*
- 2. The image on the monitor shows you if you have captured all the needed details before sending it to the lab.*
- 3. The accuracy of the mounting, bite registration, and stability of the model that allows the laboratory technician to fabricate a final restoration that has excellent marginal fit and accurate occlusion.*
- 4. The ability to see if proper occlusal reduction has been achieved.*

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STUDY QUESTIONS

Discuss the prerequisites to successful and predictable impression making with elastomeric impression materials?

Discuss three ways to ensure access to prepared tooth structure for impression making. What are the respective indications and contraindications?

Name three classes of impression materials for fixed prosthodontics, and discuss their advantages and disadvantages. Illustrate their indicated use with three clinical scenarios?

Describe 10 issues to consider before electrosurgery is implemented?

What are the requirements for a successful custom impression tray?