Ashur University College
Crown and Bridge
2nd year Prosthodontics
Technology dept.
Lect 6

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Impression for crown and bridge work

Impression: is a negative reproduction or likeness of an object; from which, a positive reproduction (cast) could be obtained.

Impression: is a negative reproduction of the prepared teeth, adjacent teeth and surrounding soft tissues.

Objective of taking an impression:

Because it is neither possible nor desirable to make patterns for fixed prostheses directly in the mouth, an impression 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 placed in a tray that is inserted into the patient's mouth. When the material has set, it is removed from the patient's mouth. A suitable dental stone is then poured into the "negative" impression, and a positive likeness or working cast is obtained.

Requirements of an acceptable impression:-

1. An acceptable impression must be an exact record of all aspects of the prepared tooth.

2. All teeth in the dental arch and the soft tissues immediately surrounding the prepared tooth must be reproduced in the impression. This will allow the cast to be accurately articulated and contribute to proper contouring of the planned restoration.

3. The impression must be free of air bubbles, tears, thin spots, and other imperfections that might induce inaccuracy.



Requirements of an impression material:-

1. **It should be *elastic* after its placement in the patient's mouth so that it can be removed from the undercut areas that exist on the external tooth surfaces adjacent to the prepared tooth without distortion or fracture.**

2. **It should have adequate *strength* to resist breakage or tearing on removal from the patient's mouth *(adequate tear strength).***

3. **It should have adequate *dimensional stability* over temperature and humidity ranges normally found in clinical or laboratory procedures for a period long enough to permit the production of a cast or die.**

4. **It should have adequate *accuracy* for the production of the fine details so that it is an exact negative reproduction of the prepared and unprepared teeth.**

5. **It should be *easy to use with the minimum of equipment.***

6. **It should be *free of toxic or irritating components.***

Classification of impression materials:

1. Non-elastic impression materials: (e.g. Impression compound, Impression plaster, Zinc-oxide eugenol paste).

These materials are not used routinely in crown and bridge work because when they set they become rigid, so upon removal from the undercut areas they will fracture.

2. Elastic impression materials:

a. Hydrocolloids (water-based systems):

-Reversible hydrocolloids (agar impression material).

-Irreversible hydrocolloids (alginate impression material).

b. Elastomers:

-Polysulfide impression material.

-Condensation silicone impression material.

-Polyether impression material.

-Addition silicone impression material.

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 is 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 operatory 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.



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.

Steps for a successful impression

1-soft tissue management

2-saliva control

3-hemosatsis

4-gingival retraction

5-tray selection and impression technique.

Impression trays

Must be sufficiently rigid to;

- Carry impression materials into intra oral cavity.
- Hold the material in close to the teeth.
- Avoid breaking during removal.



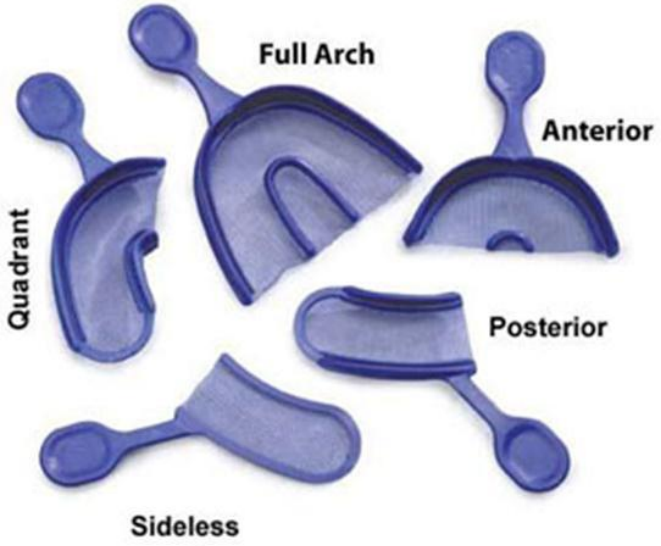
Two type of trays are used:

1.Ready made (Stock) trays

Made from stainless steel, aluminum or plastic. May be full arch or sectional tray.

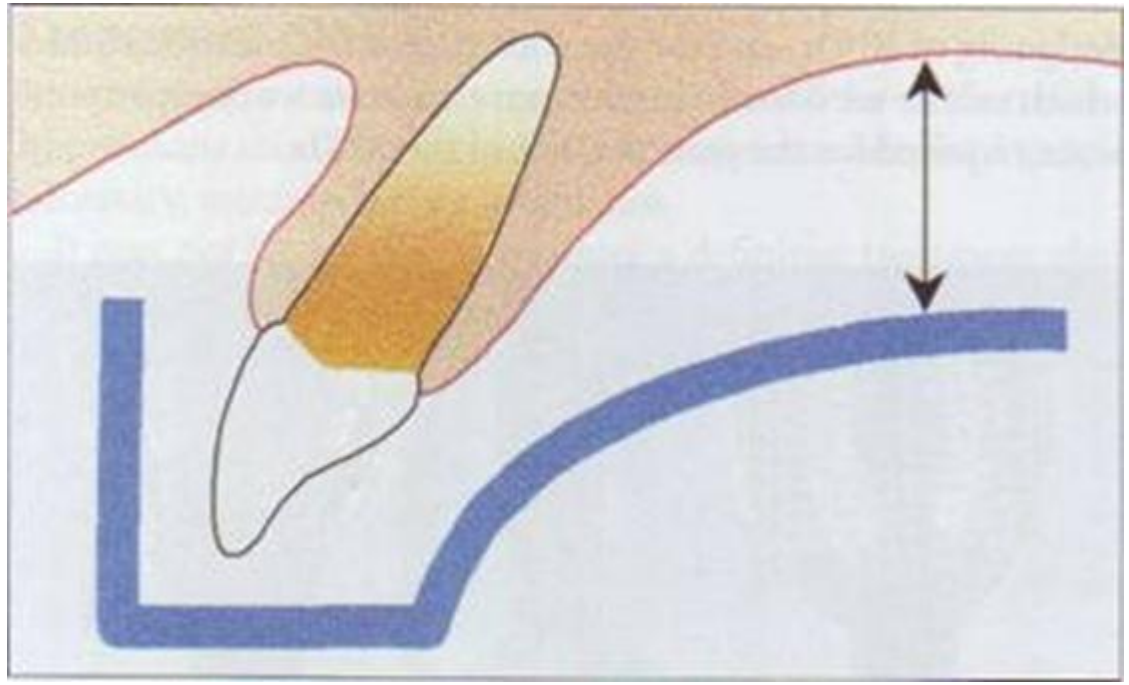
2. Custom made trays fabricated in the dental laboratory.





Tray selection criteria:

1. Comfortable to the patient.
2. Extends slightly beyond the facial surfaces of the teeth.
3. Extends approximately 2 to 3mm beyond the third molar, retromolar pad, or tuberosity area of the arch.
4. Is sufficiently deep to allow 2to 3mm of material between the tray and incisal or occlusal edges of the teeth.



Impression Techniques

1. Single mix technique (monophase technique).
2. Double mix technique.
3. Putty-wash technique.

1. Single mix technique

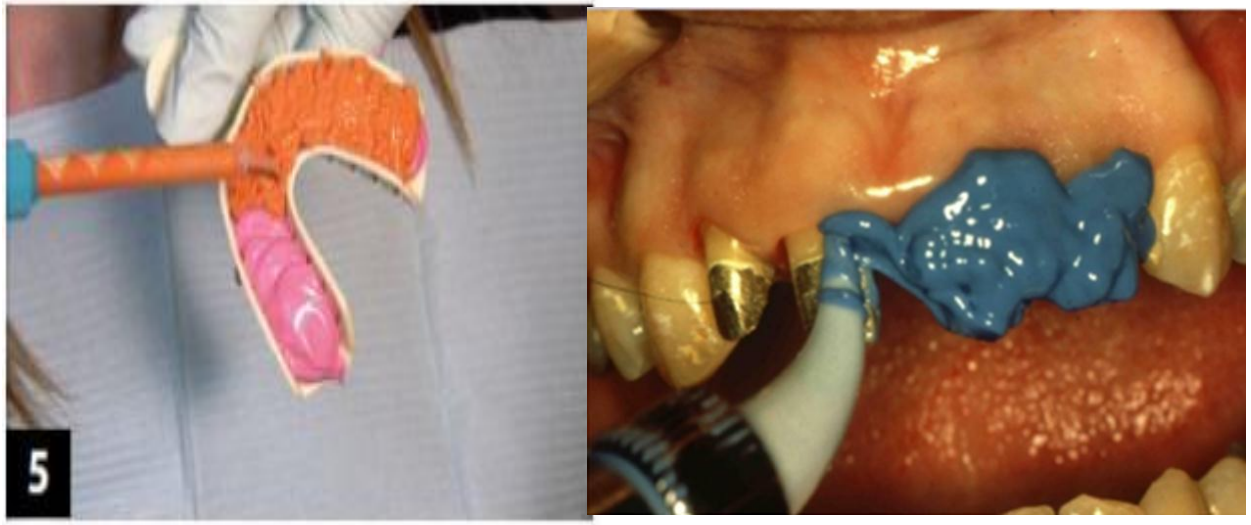
Most of the time, this technique is used when we have an impression material with single viscosity (such as the medium body consistency of polyether or addition silicone impression materials).





2. Double mix technique:

This technique is usually used with materials that have two viscosities (heavy and light bodies). We mix the heavy body and the light body at the same time. The light body is loaded in the syringe, while the heavy body is loaded in the tray.



3. Putty-wash technique:

This technique requires the use of a high viscosity material. We take an impression with the heavy body either before or after tooth preparation.

After complete setting of the heavy body, the tray is removed and the spacer is removed. The light body is then mixed and part of it is loaded in the syringe and the other part loaded in the tray over the heavy body. Then the light body is injected over the whole dental arch starting from the area of tooth preparation, and the tray is reseated inside the patient's mouth.





Impression for post crown:

In case of post crown, we need to take an impression for the inside of the root canal. Most of the time, it is difficult to insert the impression material inside the tiny root canal, and even when it is inserted inside the canal it might tear during removal or become distorted during pouring of the impression. Therefore, the impression material needs a type of reinforcement. Such reinforcement could be obtained either by the use of a plastic post (impression post) or by using a stainless steel wire.



In general after removal of the impression from the patient's mouth, it should be inspected for the following:

1) The finishing line should be continuous all around the prepared tooth.

2) No air bubbles should be present at the area of tooth preparation.

3) The impression material should be attached well to the impression tray.



Digital impression:

It 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.



Advantages of digital impression:

1. Digital impressions eliminate 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 impression 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.