

# Impression

An impression is a negative reproduction of an object, from which, a positive reproduction could be 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.
3. The impression must be free of air bubbles, tears, thin spots that might induce inaccuracy.

## Classification of impression materials

### 1. Non-elastic impression materials:

- a. Impression compound.
- b. Impression plaster.
- c. 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.
  - Polyether impression material.
  - Condensation silicone impression material.
  - Addition silicone impression material.



## Addition silicone impression material

The main difference between the addition silicone and the condensation silicone is that it has much greater dimensional stability than the condensation type. The material is also supplied as a two-paste system (base and catalyst) in extra low, low, medium, heavy, and very heavy consistencies. The set material is less rigid than polyether. Like other materials, adverse tissue responses have been reported.

## Final impression

To take a final impression, we need a tray, impression syringe, and an impression material.



## Gingival retraction

In cases when the finishing line is located below the level of the gum (sub-gingivally) or with the level of the gum, we need to do gingival retraction, which is a procedure by which the finishing line is temporarily exposed by enlarging the gingival sulcus so that we can take a good impression which involves the details of the end margin of the preparation that is located sub-gingivally.



## Objectives of gingival retraction

1. To create an access for the impression material to the area of the preparation that is located subgingivally.
2. To provide enough thickness of the impression material at the area of the finishing line to prevent tearing and distortion of the impression material.
3. To control the amount of fluid in the gingival sulcus that will cause voids in the impression.

## Techniques of gingival retraction

1. Mechanical.
2. Chemo-mechanical.
3. Gingival retraction paste (cordless technique).
4. Electrosurgical.
5. Laser.

### 1. Mechanical:

In this technique, we apply pressure on the gingival to open the gingival sulcus. It might be done by either of the followings:

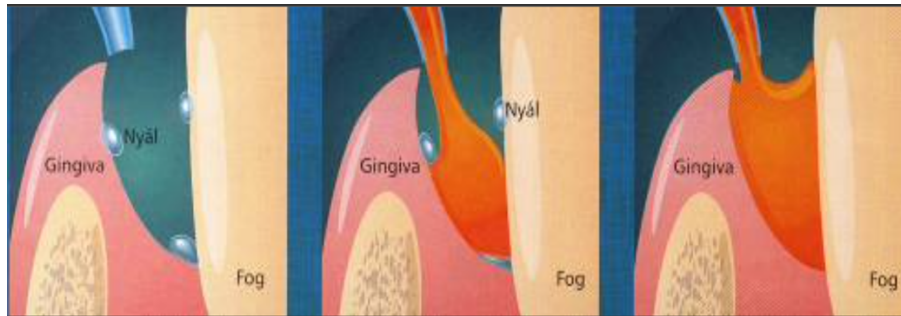
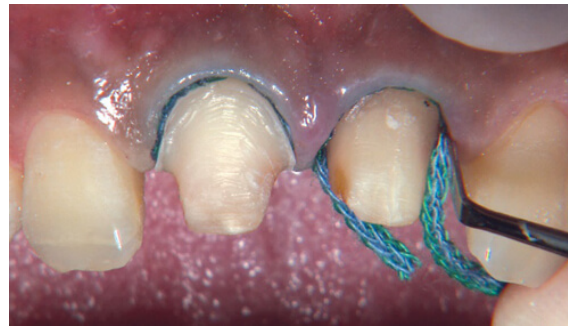
- A. Construction of a temporary crown with a slightly long margin leaving it in place for 24 hours,
- B. Using a plane retraction cord which is the most common. The retraction cord is a special cord made of cotton (free of medicament), Using a plane retraction cord is considered as a mechanical means only.



### 2. Chemo-mechanical:

In this technique, we use a retraction cord that is pre-impregnated with a medicament, usually a vasoconstrictor (adrenaline, aluminum chloride, or ferric sulfate). By packing this cord with a plastic instrument (Ash No.6 or Ash No.49) in the gingival sulcus between the gingival tissue and the prepared tooth, the cord will mechanically push the gingiva away from the finishing line, and the combination of the chemical action of the medicament and the pressure exerted by the cord will cause a transient gingival ischemia. This will lead to shrinkage of the gingival tissue and control the fluid seepage from the gingival sulcus.

The retraction cord is left inside the gingival sulcus all around the tooth for 10 minutes. The working area should be kept dry during this period. Then the cord can be removed leaving the gingival tissue in an expanding state. This will provide a space to inject the impression material all around the tooth at the area of the finishing line by the use of an impression syringe.



### 3. Gingival retraction paste (Cordless technique):

In most cases, gingival retraction cord is the most effective method for retracting tissue to the depth of the sulcus. Unfortunately, gingival retraction cord may injure the gingival sulcular epithelium and the gingival bleeding is difficult to control when packing a cord into the sulcus making impression difficult or impossible. Using a retraction cord requires proper tissue manipulation and is technique sensitive. For this reason, a new class of gingival retraction materials has been introduced in the form of retraction paste like Expasyl (Aluminum chloride 15%) and Magic Foam Cord (Polyvinylsiloxane, addition type silicone elastomer).

The advantage of cordless retraction technique is providing a non-traumatic, non-invasive tissue management and excellent hemostasis in the gingival sulcus for fixed prosthodontic impressions.



#### 4. Electro-surgical:

In this technique, an electro-surgical unit could be used to remove the gingival tissue from the area of the finishing line with the advantage of controlling the post-surgical hemorrhage. However, electrosurgery is contraindicated when there is gingival inflammation or periodontal disease. In this case, gingivectomy could be performed.



#### 5. Laser: For gingival retraction, Nd- YAG lasers are used.

Advantages of laser:

1. Not require anesthesia.
2. Minimize bleeding because the high-energy light beam aids in the clotting of exposed blood vessels, thus inhibiting blood loss.
3. Bacterial infections are minimized because the high-energy beam sterilizes the area being worked on.
4. Damage to surrounding tissue is minimized.
5. Wounds heal faster and tissues can be regenerated.

Disadvantages:

1. Slow technique.
2. Expensive.



## **Impression Techniques**

1. Single mix 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.

In this technique, after mixing the material, part of the material is loaded in the tray and the remaining part is loaded in the impression syringe. i.e., the same mix of the material is used to load the tray and the syringe. The impression material is injected from the impression syringe around the preparation area starting with the most critical parts such as the finishing line, then the prepared teeth and the other teeth in the dental arch. Then the special tray loaded with the impression material is inserted inside the patient's mouth and seated over the whole dental arch. After complete setting of the material, the impression tray is removed from the patient's mouth.

### **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. We start to inject the light body on the dental arch starting with the prepared tooth, and then the tray loaded with the heavy body is inserted inside the patient's mouth and seated over the dental arch. The pressure created by the heavy body after seating of the tray will cause a direct flow of the light body into the details of the preparation including the finishing line.



Take equal quantities of FLEXCEED base & catalyst using the prescribed scoop.



Knead the FLEXCEED base & catalyst until a uniform blue color is achieved



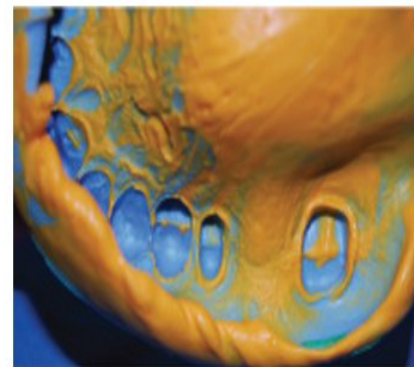
Load the FLEXCEED putty mix on the tray



Inject the FLEXCEED light body onto the putty mix making sure that the nozzle remains immersed to prevent air entrapment



Using the intra-oral tips, inject the FLEXCEED light body directly around the prepared tooth



Final impression is easy to read due to the contrasting colour of FLEXCEED

### 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:

**-Before preparation:** we take a preoperative impression with the heavy body only prior to tooth preparation, and after complete setting of the heavy body we remove the impression tray from the patient's mouth and leave it aside. Then we do tooth preparation. After completion of tooth preparation, we mix the light body and load it in the syringe and inject it over the preparation area. Then we reseat the impression tray inside the patient's mouth and wait for the complete setting of the light body.

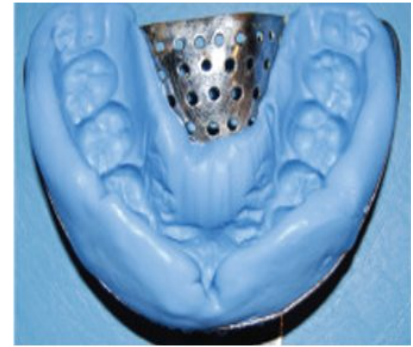
**-After preparation:** in this technique, after mixing of the heavy body and loading it in the tray and the tray is inserted inside the patient's mouth. After complete setting of the heavy body, the tray is removed and using the putty cutter, to create a space for the light body. The light body is then mixed and part of it is 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 resealed inside the patient's mouth. After complete setting of the light body, the tray is removed from the patient's mouth.



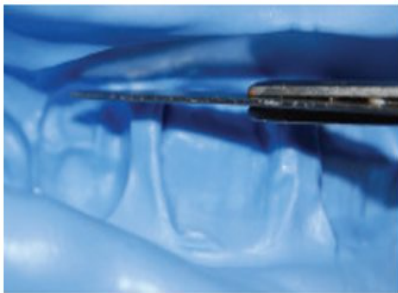
Prepared tooth for crown



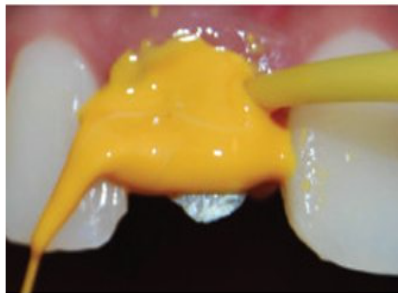
After applying GC tray adhesive, FLEXCEED putty is loaded on the stock tray



Putty impression is taken



Using the putty cutter, create a space for the light body



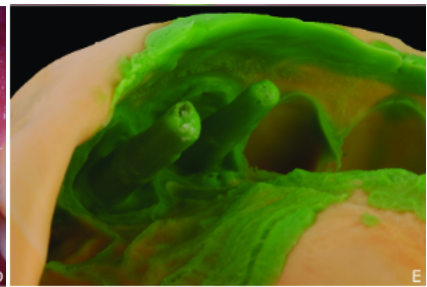
Inject the FLEXCEED light body around the prepared tooth, then immediately re-seat the putty tray impression



Final impression using FLEXCEED

## 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. After injection of the light body inside the root canal, the impression post or the stainless-steel wire is inserted inside the canal. This will support the impression material and prevents its tearing or distortion during removal of the impression.



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.



## Disinfection of the impression

Disinfection of the impression is a concern with respect to viral diseases such as hepatitis B, AIDS, and herpes simplex, because the viruses may be transferred to the gypsum models and present a risk to dental laboratory and operating personnel. The most common form of disinfection is spraying or immersion in disinfectants like 1% sodium hypochlorite or 2% potentiated glutaraldehyde solutions and iodophor.

## Digital impression

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 (crowns, bridges, inlays/onlays, and veneers) with a special computer software, which is connected with a milling machine. This procedure is termed CAD-CAM (Computer Aided Designing - Computer Aided Manufacturing).

## 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 mounting, bite registration, and stability of the dies create a model that allows the laboratory technician to fabricate a final restoration that has excellent marginal fit and incredibly accurate occlusion.
4. The ability to see if proper occlusal reduction has been achieved.

