

*Second stage*

**The working casts and Dies**

**The working (or master) cast** is the replica of the prepared teeth, ridge areas, and other parts of the dental arch.

**The die** is the positive reproduction of the prepared tooth and consists of a suitable hard substance of sufficient accuracy (usually an improved stone, resin, or metal).



Working cast with Removable die system.

**Type of dies materials:**

1. Gypsum dies.
2. Resin dies.
3. Electroplated dies.
4. Flexible die materials.

**Requirements of die material:**

- 1-Dimensional stable or accuracy.
- 2-Have ability to reproduce the shape of prepared tooth in good manner.
- 3-Have good strength to resist or withstand lab work.
- 4-Easy in manipulation.

5-Compatible with impression materials.

6-Short production time.

7-Good flow index (flow of material depend on viscosity).

8-Good color contrast with wax.

9-Cheep material.

### **1-Gypsum dies:**

#### **Characteristics of this type of die:**

1. This material is inexpensive.
2. Easy to use, and produces consistent results.

#### **Disadvantage of this material is:**

1. Its relatively poor resistance to abrasion and low strength.
2. Undergo dimensional changes (expansion).

### **2- Resin dies:**

#### **Characteristics of this type of die:**

- 1- Most available resin die materials are epoxy resins but polyurethane is also used.
- 2- It can be cured at room temperature without expensive or complicated equipment.
- 3- Its abrasion resistance is many times greater than that of gypsum products.
- 4-Detail reproduction is better on resin die than gypsum die.
- 5-Prostheses fabricated on resin dies will fit more tightly than those made on gypsum.
- 6- It is more expensive than gypsum.
- 7- It undergoes some shrinkage during polymerization.

### **3- Electroplated die:**

This technique involves the deposition of a coat of pure silver or copper on the impression. The areas to be plated are first coated with finely powdered silver or graphite to make them conduct electricity, and the impression is then placed in an electroplating bath. A layer of pure metal is deposited on the impression and is supported with Type IV stone or resin.

#### **Characteristics of this type of die:**

1. Superior abrasion resistance.
2. Excellent surface details.

#### **There are several problems remain:**

- 1-The technique must be performed slowly.
- 2-Long production time, the time required to produce a cohesive film of metal (typically 8 hours) is ample for the development of dimensional changes in the impression.
- 3-Distortion of wax pattern due to conduction of heat of metal die.
- 4- Expensive in production.
- 5- Difficult in trimming.

Note:

The main drawback of silver plating is the use of a cyanide solution, which requires special precautions because of its extreme toxicity.

### **4- Flexible die materials:**

Flexible die materials are similar to heavy- bodied silicone or polyether impression materials and have been used to make provisional restoration or indirect composite resin inlay

or only chairside. The advantages of the flexible material over a stone die include more rapid setting and the ease of removal of the provisional or inlay.