

Bite Registration and Articulation



To fabricate fixed partial denture according to the patient's occlusion, the working cast plus the opposing cast should be mounted to an articulator.

Interocclusal Record (Bite Registration) :

To transfer the relation between the upper and the lower dental arch from the patient mouth to the articulator we need bite registration.

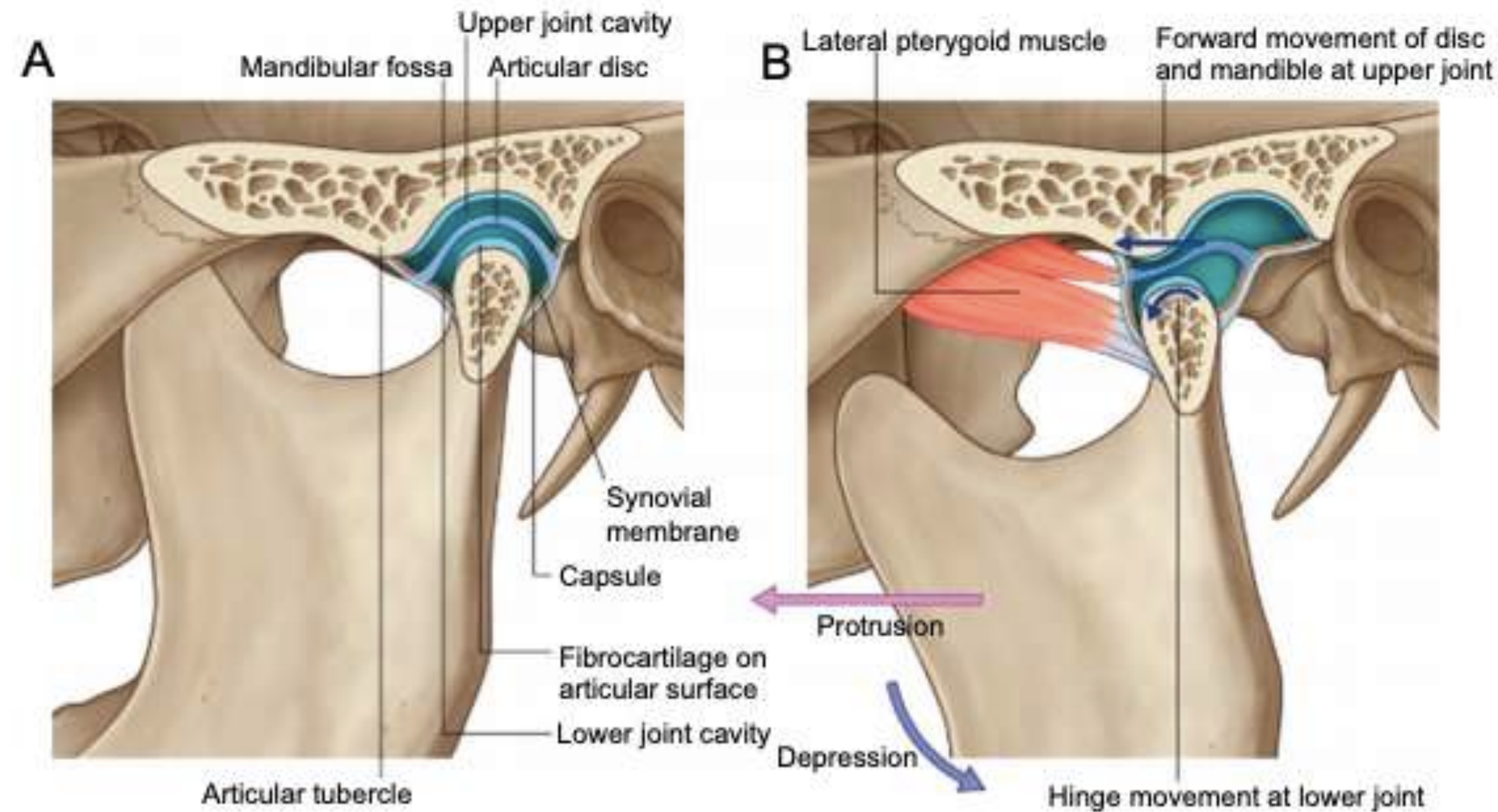
Proper interocclusal record is important to orient the die or dies of the same arch to the opposing arch.

When enough teeth are present in both upper and lower arches we can transfer the relation by hand articulation of the cast. (No bite record is needed in such case). So we can occlude the opposing casts by hand, then we mount them on the articulator, however, if the remaining teeth are insufficient to produce hand articulation of the cast we have to record the bite by:

- 1. Pink base plate wax.*
- 2. Bite registration paste.*
- 3. Bite rim or occlusal rim.*

JAW MANIPULATION

centric occlusion : achieved when the condyle in the most posterior superior position in relation to the glenoid fossa



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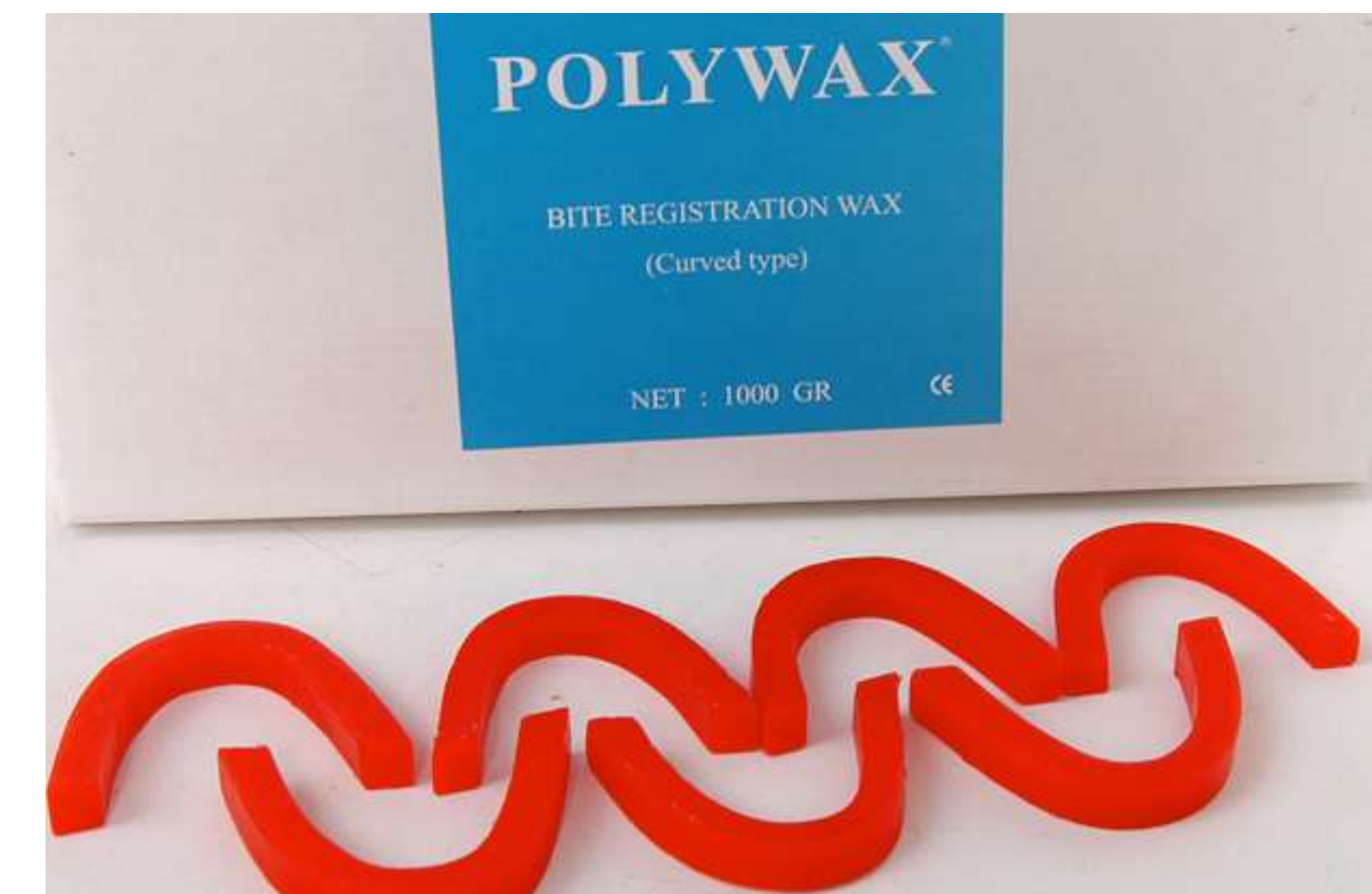
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JAW MANIPULATION

Accurately mounted casts depend on precise manipulation of the patient's mandible by the dentist.

The Biomanipulation Technique is recommended as a reproducible technique in this technique, the dental chair is reclined and the patient's head is cradled by the examiner. With the both thumbs on the chin and the fingers resting firmly on the inferior border of the mandible, the examiner exerts gentle downward pressure on the thumbs and upward pressure on the fingers, manipulating the condyle-disk assemblies into their fully seated positions in the mandibular fossae. Next, the mandible is carefully hinged along the arc of terminal hinge closure.

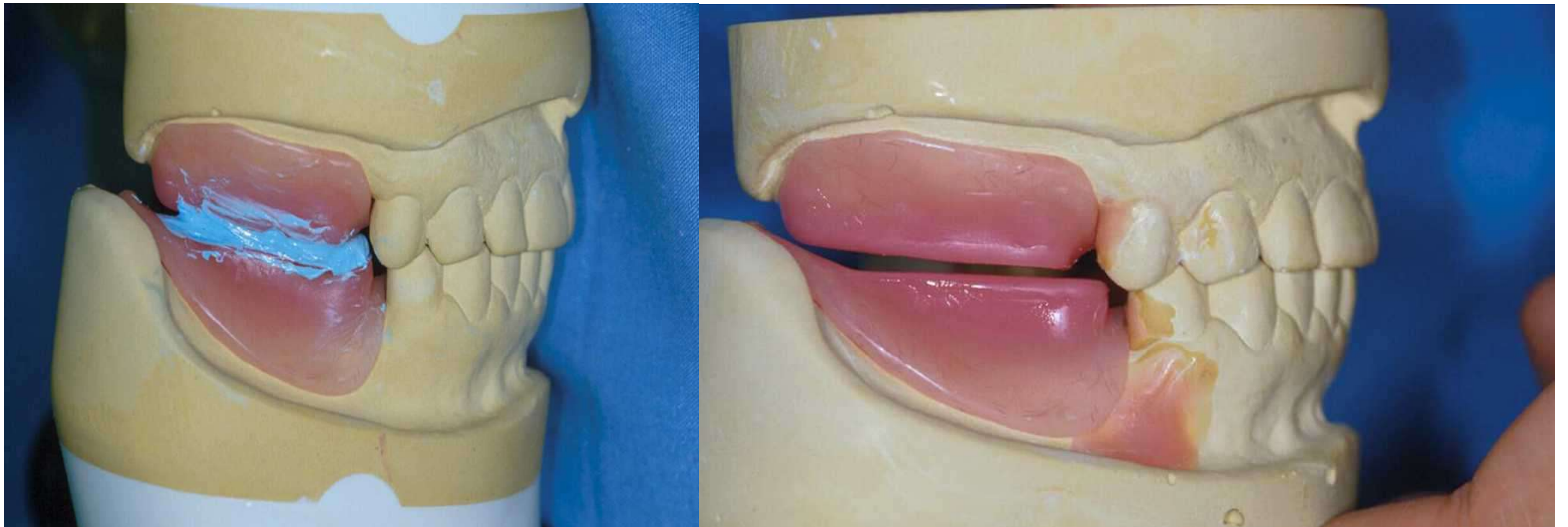
Then the record is taken by softening the wax at first, then applies the soft wax over the occlusal surface of the **prepared teeth**, then, ask the patient to bite on it, keeping in your mind that you have to guide the mandible of the patient to the reference point that you mark it, to have the correct registration.



Bite Registration and Articulation

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JAW MANIPULATION



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JAW MANIPULATION

Articulator Selection :

The articulator is a mechanical device that simulates mandibular movement. Articulators can simulate the movement of the condyles in their corresponding fossae.



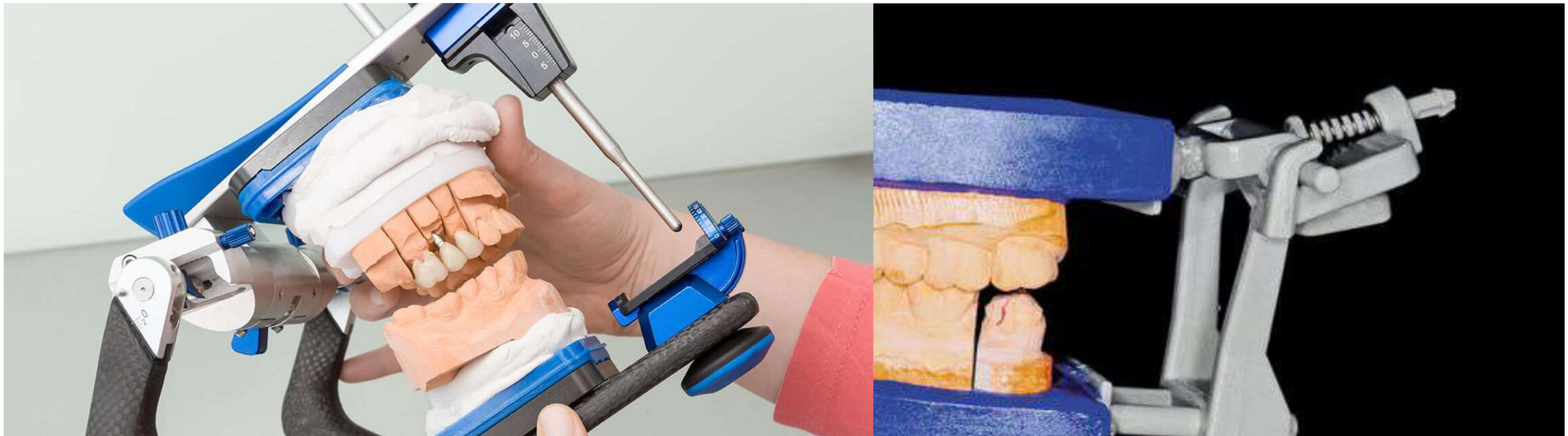
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PURPOSE OF AN ARTICULATORS

- 1) *To hold the maxillary and mandibular casts in a determined fixed relationship.*

- 2) *To simulate the jaw movements like opening and closing.*

3) *To produce border movements (extreme lateral and protrusive movements) and intra border movements (within the border movement) of the teeth similar to those in the mouth.*

USES OF AN ARTICULATOR

- ➤ *To diagnose the state of occlusion in both the natural and artificial dentition.*

- ➤ *To plan dental procedures based on the relationship between opposing natural and artificial teeth eg; evaluation of the possibility of balanced occlusion.*

- ➤ *To aid in fabrication of restorations and prosthodontic replacement.*

- ➤ *To correct and modify completed restoration.*

- ➤ *To arrange artificial teeth.*

TYPE OF ARTICULATORS;

1. Nonadjustable articulator;

- ➤ *·They can open and close in a fixed horizontal axis.*
- ➤ *·Have a fixed condylar path along which the condylar ball can be moved to simulate lateral and protrusive jaw movement.*

2. Semi adjustable articulator

They have adjustable condylar path, adjustable lateral condylar paths, adjustable incisal guide tables and adjustable intercondylar distances.

Semi adjustable articulator types: Arcon vs. Nonarcon

- ➤ *·Arcon: in this type the condylar element (condylar spheres) is attached to the lower member of the articulator and the condylar guidance (mechanical fossae) is attached to the upper member. This articulator resembles TMJ.*
- ➤ *·Nonarcon: in these, the articulators have the condylar element (glenoid fossae) attached to the lower member, condylar elements on the upper. This articulator is the reverse of the TMJ.*

3. Fully adjustable articulator

Capable of being adjusted to follow the mandible movement in all direction. These articulators have a number of readings which can be customised for each patient. They do not have condylar guidance, instead have receptacles in which acrylic dough can be contoured to form a customised condylar and incisal guidance.

**TEMPORIZAZION
PROVISIONAL RESTORATION**



TEMPORIZATION PROVISIONAL RESTORATION

*A crown **OR** bridge restoration that is used in fixed prosthodontics during the interim between tooth preparation and final placement of the definitive crown restoration.*

Objectives of Provisional Restoration :

- 1. To protect the tooth from pain stimuli as a result of thermal (hot and cold), chemical, and osmotic changes in the mouth.*
- 2. To prevent sensitivity and further irritation to the pulp since a certain degree of pulp trauma is inevitable during tooth preparation because of the sectioning of the dentinal tubules.*
- 3. To prevent movement of the prepared, adjacent, and opposing teeth. i.e., to prevent supra-eruption and drifting.*
- 4. To protect the gingival tissue from irritation and food impaction.*
- 5. To provide esthetic, phonetic, and function.*
- 6. To prevent tooth fracture.*

TEMPORIZATION PROVISIONAL RESTORATION

Requirements of an Optimum Provisional Restoration :

- 1.A provisional restoration must seal and insulate the prepared tooth surface from the oral environment to prevent sensitivity and further irritation to the pulp.*
- 2.A provisional restoration must have good marginal fit, proper contour, and a smooth surface to maintain the health of the gingival tissue and facilitate plaque control by the patient.*
- 3.A provisional restoration should maintain proper contacts with the adjacent and opposing teeth to prevent supraeruption and horizontal movement (drifting).*
- 4.A provisional restoration should have enough strength and retention to withstand the forces to which it is subjected without fracture or coming off the tooth. In addition it should remain intact during its removal so that it can be reused again-if necessary.*
- 5.A provisional restoration should provide esthetic, phonetic, and function.*

TEMPORIZATION PROVISIONAL RESTORATION

1. Preformed temporary crowns.

Generally, preformed temporary crowns consist of a shell of plastic or metal that could be cemented directly on the prepared tooth following adjustment, or after its lining with a resin material. They could be used for single or multiple preparations.

A. Metal Temporary Crowns.

mainly indicated in the posterior teeth made from the stainless steel , chromium and aluminium

1- non - anatomical flat surface

2- anatomical - functional surface

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Clinical Procedure :

- 1. Select the proper size and shape of the temporary crown according to the prepared tooth.*
- 2. Trim the cervical margin of the temporary crown using a scissor to conform to the gingival margin of the preparation (finishing line) and to accommodate the vertical height of the prepared tooth.*
- 3. Seat the temporary crown on the prepared tooth and ask the patient to bite on it. Check the margins and the occlusion (centric and eccentric).*
- 4. Smooth the margins with a stone bur.*
- 5. Cement the temporary crown on the prepared tooth using zinc oxide-eugenol cement.*

TEMPORIZATION PROVISIONAL RESTORATION

B- Plastic temporary crown

Plastic temporary crowns are used mostly for the anterior teeth. The clinical procedure for the use of plastic temporary crown is nearly the same as that for metal temporary crown.

Types of plastic crown

- 1. Polycarbonate Temporary Crowns :** these are made from polycarbonate plastic combined with micro glass fibers. Preformed polycarbonate temporary crowns are available for the anterior and posterior teeth.
- 2. Acrylic Temporary Crowns :** these are made from acrylic resin and are available in different sizes and colors. Preformed acrylic temporary crowns are used for the anterior teeth.

TEMPORIZATION PROVISIONAL RESTORATION

B- Celluloid crown form

They are mainly used for the anterior teeth, but can be used for the posterior teeth also. They are made from a very thin translucent layer of cellulose acetate. They act as a mold for the construction of the temporary crown. They come in different sizes.

Clinical Procedure :

- 1.Coat the prepared tooth with Vaseline to facilitate removal of the temporary crown.*
- 2.Select the proper size and shape of the celluloid crown.*
- 3.Make two holes in the corners of the temporary crown to provide an escape way for the excess material.*
- 4.Cut the gingival margin of the crown to accommodate that of the prepared tooth.*

TEMPORIZATION PROVISIONAL RESTORATION

B- Celluloid crown form

5.Fill the celluloid crown with a provisional crOWD material (acrylic resin or composite resin) of the same shade of the tooth and seat it over the prepared tooth until setting.

If acrylic resin is used as a provisional material, the celluloid crown should be removed at its semi-plastic stage so that the polymerization reaction of the acrylic resin will occur outside the mouth to prevent pulpal irritation since the polymerization reaction of the acrylic resin is exothermic.

6.Take the crown out and remove the excess material. Then place it again on the prepared tooth and check the occlusion, contact with the adjacent teeth, fitness, and extension.

TEMPORIZATION PROVISIONAL RESTORATION



TEMPORIZATION PROVISIONAL RESTORATION

2- customized temporary crown and bridge:

The fabrication of customized temporary crowns requires the construction of a mold of the patient's teeth before their preparation. This may be obtained from any type of elastic impression material, into which resin polymer material (acrylic or composite) is placed and the mold is held either directly on the prepared tooth or teeth) or indirectly against a cast of the patient's teeth.

Indications of Customized Temporary Restoration :

- 1. Coverage of multiple individual crown preparations.*
- 2. Coverage of a single tooth preparation which is usually large or of a special design. i.e., when a preformed temporary crown is not fit to the tooth.*
- 3. Abutment preparations for fixed partial denture to construct a temporary bridge.*

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Methods of Construction of Customized Temporary Restorations :

1. *Template method.* direct or indirect

2. *Impression method (the most commonly used method).* direct or indirect

TEMPORIZATION PROVISIONAL RESTORATION

Impression method (the most commonly used method).



TEMPORIZATION PROVISIONAL RESTORATION

Impression method (the most commonly used method).

A.Indirect impression method (indirect chairside technique).

B.Direct impression method (direct chairside technique).



TEMPORIZATION PROVISIONAL RESTORATION

A. Clinical Procedure of the Indirect Impression Method :

- 1. A preoperative over-impression with alginate or silicone impression material is made from the patient's teeth or from a study model and carefully stored until completing tooth preparation.*
- 2. After completing the preparation of teeth, another alginate impression was then taken and poured with fast-setting plaster or stone. After setting of the piaster or stone, the cast is separated from the impression.*
- 3. Coat the prepared tooth (or teeth) on the cast with a separating medium (such as petroleum jelly).*
- 4. Mix tooth colored acrylic resin according to the manufacturer's instructions and place the mixed acrylic in the over-impression at the area of tooth preparation onlo)'.
(Note: 'onlo)' appears to be a typo for 'only').*
- 5. Seat the cast into the over-impression in an upright position and maintain constant pressure until the acrylic resin sets completely. It is important to note that the cast is correctly seated in the over impression.*
- 6. After complete polymerization of the acrylic resin, separate the cast from the overimpression. The formed crown is then removed from the prepared tooth in the cast.*
- 7. Trim any excess material from the formed crown. Then the crown is seated on the prepared tooth inside the patient's mouth. Check the occlusion and remove any premature contact in centric and eccentric occlusion.*
- 8. Cement the temporary crown on the prepared tooth using zinc oxide- eugenol cement or non eugenol temporary cement.*

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B. Clinical Procedure of the Direct Impression Method :

The clinical procedure of the direct impression method is the same as that of the indirect method except that it is done directly inside the patient's mouth. In this method, we need a preoperative over-impression but there is no need to have a study cast.

Prepare the tooth (or teeth), mix the acrylic resin, place it in the over- impression in the area of tooth preparation, and seat the over-impression inside the patient's mouth. Then follow the same steps that are used in the indirect method.

Advantages of the Indirect Method Over the Direct Method :

- 1. There is no direct contact of the free monomer of the acrylic with the prepared tooth or gingival tissue which might cause tissue irritation or allergic reaction.***
- 2. The in direct method avoids subjecting the prepared tooth to the heat of polymerization of the acrylic resin since the polymerization reaction of the acrylic resin is exothermic.***
- 3. The indirect method saves the clinician's chair time.***

TEMPORIZATION PROVISIONAL RESTORATION

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CEMENTATION OF PROVISIONAL RESTORATION

- **-IDEAL PROPERTIES OF CEMENT:**
 - Ability to seal against leakage of oral fluid.
 - Strength consist with intentional removal.
 - Low solubility.
 - Chemical compatibility with provisional polymer.
- ➤ Ease of eliminating excess.
- ➤ Adequate working time and short setting time.

- **-CEMENTS USED:**
 - **1) Zinc oxide eugenol. (contraindicated when used resin cement)**
 - **2) Reinforced zinc oxide eugenol** , The liquid can be ethoxybenzoic acid, known making it stronger.
 - **3) Non- eugenol cements**, do not soften resin (as in provisional restorations), They use carboxylic acids in place of eugenol.
 - **4) TempBond Clear** is a translucent cement with Triclosan (an antibacterial & antifungal agent)



TEMPORIZATION PROVISIONAL RESTORATION

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Digital temporary(interim) fixed prosthesis

The digital information is sent to a milling machine at the time of tooth preparation and milled from solid blocks/disks of resin.

digital production of interim restorations is that the data file can be used to mill the definitive restoration, if the tooth preparations (and tissue contours) have not been altered.

Advantages:

- 1. Efficient.*
- 2. No laboratory work needed.*
- 3. Easy on tissues.*
- 4. Lowest residual monomer.*
- 5. Generally more wear resistant.*
- 6. No air-inhibited layer.*
- 7. No polymerization shrinkage; some can be bonded to tooth structure.*
- 8. Definitive restoration can be milled as an exact duplicate of interim .*

Disadvantages:

- 1. Digital impression and in-office mill needed*
- 2. Some blanks are monicolor.*

TEMPORIZATION PROVISIONAL RESTORATION

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LIMITATIONS OF PROVISIONAL RESTORATION

- 1. Lack of adequate strength—fracture of provisional is possible in long span FPDs, patient with bruxism and reduced interocclusal clearance.*
- 2. Inadequate marginal adaptation.*
- 3. Poor aesthetic in long term provisional restoration.*
- 4. Plaque accumulation due to poor surface characteristic.*
- 5. Compromised bonding characteristics.*
- 6. Mild to moderate tissue irritation*

Cementation of crowns and bridges

Permanent Cementation

The mechanisms of holding a crown restoration on a prepared tooth using specific luting material (agent). it could be nonadhesive **(mechanical)** luting, **micromechanical bonding** , and **molecular adhesion**.

Luting Agent:

A material that acts as an adhesive to hold together the crown restoration to the tooth structure. Luting agents are designed to be either permanent or temporary.

Dental Cementing (luting) Agents, Cements may be classified as soft or hard.

1) Soft cements can be used for provisional cementation of definitive crowns when a trial assessment period is needed, for example if the occlusion or aesthetics is being significantly altered.

2) Hard cements There are used for definitive (permanent) cementation. There are essentially three types of hard cement: conventional, resin or a hybrid of the two.

crown and bridge

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NON- EUGENOL TEMPORARY CEMENT
USED TO CEMENT THE INTERIM RESTORATION



crown and bridge

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Zinc phosphate cement

This traditional luting agent continues to be popular for **cast restorations**. its advantages are:

1- adequate strength,

2- a **film thickness** (thickness of the layer) of about 25 μ m (which is within the tolerance limits required for making cast restorations),

3- reasonable working time.

4- Excess material can be easily removed.

The main disadvantages is the toxic effect of the phosphoric acid. However, the success of the use of this material over many years suggests that its effect on the dental pulp is clinically acceptable as long as normal precautions are taken and the preparation is not too close to the pulp.

crown and bridge

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Zinc polycarboxylate cement

advantages of this type are : 1- biocompatible because they has large molecules cannot penetrate the dentinal tubules .
2-adhesion to the tooth structure by chelate the calcium but not adhere to the restoration .

The main disadvantage of this cement is their high viscosity so it is difficult to mix but can be overcome by use the encapsulated type.



crown and bridge

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**permenant of
cement**

**glass ionomer cement.
resin cement.**

Glass ionomer cement

it is adhere to enamel and dentine (to enamel more), it releases fluoride after setting which is indication of an ability to inhibit secondary caries. Sensitive to early moisture contamination. Has been accused of causing post-operative sensitivity but a controlled trial reports it is no worse than zinc phosphate

Resin cement

ACCORDING TO THE TYPE

- *adhesive cement.*
- *esthetic resin cement.*
- *self-adhesive cement*

ACCORDING TO THE SETTING REACTION

chemical cured

light cured

duel cured



Characteristics of Esthetic Resin Cements

- Self-etch or total-etch bonding agent is needed for bonding to tooth substrates.
- Silane or ceramic primer is needed for all-ceramic restorations.
- Curing mode options – can be light- or dual-cured.
- Light-cured cement is available for veneers.
- Stronger mechanical properties than self-adhesive resin cement.
- Multiple shades available.
- Most esthetic resin cements provide water soluble try-in pastes.

Characteristics of Adhesive Resin Cements

- Primer is needed for bonding to tooth substrates.
- Silane coupling agent is needed for silica-based ceramics.
- Can bond directly to zirconia without primer.
- Curing mode options – can be light-, dual-, or self-cured.
- Several shades available.
- May release fluoride.

Characteristics of Self-adhesive Resin Cements

- Self-etching – no phosphoric acid or special primer needed for bonding to tooth substrates.
- Can bond directly to zirconia without primer.
- Curing mode options – can be light-, dual-, or self-cured.
- May release fluoride.
- Usually available in universal, translucent and opaque shades.

