PROSTHESIS

COMPLETE DENTURE

Lec.6 Record block

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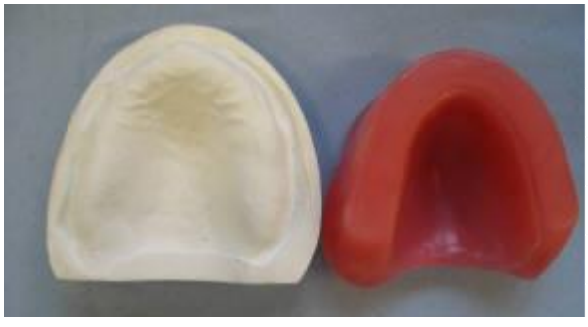
❖ **Def:** Record (occlusion blocks) is generally made of occlusion rims attached to well-fitting trial denture base (recording base)

✓ **Record block consist of (recording base , occlusion rim)**

Recording base

❖ **Def:** it is a temporary form that closely resembles the final base of the denture under construction.



❖ **Uses:**

1) Recording maxillomandibular jaw relationships.
2) Setting the artificial teeth.
3) When properly fabricated they assume important diagnostic and therapeutic roles in denture fabrication.

❖ Criteria for recording bases:

1) Well adapted and accurately formed to the final cast.
2) Extend to full depth of sulcus
3) Stable, both on the cast and in the mouth.
4) Free of voids or projections on the surface that contacts the oral mucosa.
5) 1mm thickness over the crest and the facial slope of the ridge to prevent the base from interfering with the placement of the artificial teeth.
6) 2mm thickness in the hard palate area of the maxillary base and the lingual flange of the mandibular base for rigidity. Easily removed from the cast.
7) Smooth and rounded border, and must reproduce both the contours and the dimensions of the reflections of the final cast .
8) Fabricated from materials that are dimensionally stable.
9) Failure to meet these criteria will permit movements of the bases in the mouth and results in inaccurate jaw relationship records.

❖ Types of record bases

1) **Temporary recording bases**
2) **Permanent recording bases**

1) Temporary bases Materials

- ✓ **Shellac**
- ✓ **Cold-curing acrylic resin{self-cure acrylic resin}**
- ✓ **Visible light cure {VLC}.**
- ✓ **Baseplate wax.**
- ✓ **Swaged tin**

2) Permanent bases Materials

- ✓ **Heat cure acrylic resin**
- ✓ **Gold**
- ✓ **Chromium cobalt alloy**
- ✓ **Chromium nickel alloy.**

❖ Criteria of the material used

1) Adapted to the required shape and contours with minimum time, expense, and technical skill.
2) Rigid and strong in a thin sections.
3) Not exhibit flow at mouth temperature.
4) Not warp or distort during the procedures of denture fabrication.
5) Exhibit a color will not distract from viewing the arrangement of the teeth.

Temporary recording bases

A) Shellac recording base

➢ **Advantages**

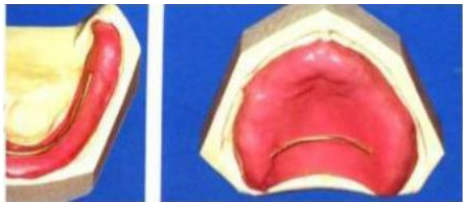
✓ Inexpensive, easily and quickly adapted, effectively utilized for maxillary & mandibular recording bases

➢ **Disadvantages:**

✓ It tends to warp when subjected to repeated changes in temperature.

✓ Brittle, subjected to breakage specially in lower

❖ Reinforcing of shellac



✓ Wires of 12 to 14 gauges should be used to increase strength and rigidity, to reduce distortion of shellac bases.

✓ For the maxillary cast, the wire is placed across the posterior palatal seal area

✓ while for the mandibular cast is adapted within the lingual flange

❖ Adaptation of the shellac -------- overheating

✓ Care must be taken not to overheat the shellac.

✓ Overheating will cause the molten shellac to penetrate the pores of the stone and adhere to the surface of the cast on cooling.

✓ Attempts to remove the shellac base can result in a fracture of the cast surface.

✓ Budding or smoking of the shellac indicates overheating.

✓ The shellac also turns black if overheated and is esthetically unacceptable.

B) Autopolymerizing resin recording base

✓ Self-cured acrylic resin is the most widely used material, as it permits the production of a base plate, which is accurate and stable.

❖ Adaptation

➢ **Fabrication techniques**

1) Nonflasking (noncompression dough Method)
2) Flasking (compression dough method)
3) Sprinkle-on method

1) Nonflasking (noncompression dough Method):

✓ Blocking of the cast undercut.
✓ Separating medium is applied to the cast surface.
✓ Mixing of the self-cure acrylic resin, when it reaches dough stage, it is pressed into molds shaped the maxillary and mandibular arches, to ensure the correct shape and even thickness of the material .
✓ Resin is molded to the cast with instrument or the fingers and then allowed to polymerize, polymerization hastened
by placing the cast in a pressure cooker in hot water for 20 minutes under 24 pounds of pressure

2) Flasking (compression molded dough method):

❖ Recording bases produced are accurate and stable.
❖ Require considerable time for fabrication & more costly than bases formed using shellac or autopolymerizing.
❖ It is advisable to duplicate the cast and to construct the recording base on the duplicated model.

❖ Method

✓ Wax pattern is formed to the desired dimensions, the duplicate cast invested in a flask, elimination of the wax by hot water, application of separating medium to the cast, mix self cure acrylic resin when it reaches the doughy stage, it placed into the mold, close the flask, allow to polymerize for 20 to 30 minutes.

3) Sprinkle-on method:

✓ The record base is preferred to the dough methods.
✓ **Used in case of insufficient posterior palatal seal (short PPS)**
✓ The bases are rigid, stable, not easily broken or warped, fit accurately except in the undercut areas.
✓ Can be contoured and polished for compatibility with the surrounding oral environment, and are inexpensive.
✓ They require more time to fabricate than the dough method

❖ Method

✓ The final cast is blocked out with wax in the same manner used in the noncompression dough method.
✓ The monomer and polymer are applied alternately; it is most desirable to keep excess polymer when applying the monomer and the polymer, as excessive monomer is conducive to dimensional changes .
✓ To provide additional rigidity, a slight excess in thickness can be tolerated on the lingual flange of the mandibular and in the palate of the maxillary base . To hasten polymerization and eliminate
excess monomer, place the cast and base in a pressure cooker in hot water for 20 minutes less than 24 pounds of pressure

C) Visible light cure {VLC} recording base

❖ Method

✓ Fill in the undercuts with pink bite rim wax .
✓ Coat the impression areas of both casts with a thin layer of petroleum jelly.
✓ Carefully remove the plastic sheets from the pink visible light cure (VLC) material (so as not to cause the material to pull and become too thin) .
✓ With very lightly petroleum jelly coated fingers, apply the
VLC material completely over the impression surface of the maxillary cast. Gently adapt the VLC to the cast. If an air pocket is trapped at the depth of the palate, letting the air escape through the vent hole and re-adapt the material. Be sure to have the posterior aspect of the maxillary record base extended 4mm. beyond the projected vibrating line . To avoid distortion of the record base
✓ For the mandibular record base, cut a trapezoidally shaped piece of VLC material and adapt the material to one side of the lower cast. Fill and fit the VLC material to the facial peripheral roll just as you did on the maxillary case.
✓ Evaluate both baseplates and assure that the material is smooth, completely adapted to the other underlying casts and to the peripheral rolls
✓ Place the casts and record bases into a VLC curing machine with the carousel set at its lowest position and turn the machine on for two minutes. With a pineapple shaped acrylic bur, smooth and round all of the peripheries of both record bases

D) Baseplate wax recording base

✓ Inexpensive, easily formed, and esthetic.
✓ They lack rigidity, dimensional stability, can be easily distorted.
✓ A strengthening wire adapted in the posterior palatal seal area of the maxillary base or

incorporated in the lingual flange of the mandibular base will increase both rigidity and the resistance to distortion .

✓ The cast may be immersed in water for a short period until moist. Soften the wax and adapted, remove the excess wax with sharp instrument.

E) Swaged tin trial denture bases

✓ Three tin pieces of gauge 5 are swaged one above the other on a metal die made from the master cast and trimmed according to the predetermined outline.

✓ The layers of tin may be cemented together with a thin film of hard wax and the complete unite is re-swaged for adaptation on the cast.

Stabilization of recording bases

❖ Materials

✓ Several materials are available for this purpose as:

- zinc oxide impression material
- light-bodied rubber base
- Soft denture liner

❖ Method

✓ Tin foil is burnished to the final cast, after elimination of the undercut, and then mix the material used, flowed it onto the tissue surface of the base, and then pressed it firmly against the cast.

✓ The excess material flows from around the borders of the base. Care should be taken to ensure that only a thin layer of the material remains between the base and the cast, if the material is thick it may occupy the available interarch space.

✓ The base is removed from the cast, the excess impression paste cut away, and the border is rounded to produce smooth border

Permanent recording bases

A) Heat cure acrylic resin

- ✓ After the maxillomandibular relations have been verified, the teeth arranged and waxed, then processed to the base.
- ✓ Teeth when processed by heat cure acrylic resin the denture base is exposed to another curing cycle this result in the releasing of the internal stress of the heat cure acrylic resin denture base result in warpage of the base. So it is preferred teeth be attached with self-cure acrylic resin.

❖ Advantages

1) Rigid
2) Accurate
3) Stable
4) Not subject to distortion

5) Not easily broken
6) Suitable for the arrangement of teeth

❖ Disadvantage

1) It requires more time
2) More complicated techniques
3) Causing destruction of the final cast

❖ Methods:

✓ Block out undercuts, wax form of the desired shape and dimension is adapted to the cast, invest the pattern in a flask, eliminate of the wax by hot water, separating medium is applied to the cast, mix the resin and packed in the mold, processing, recovered and finished.

✓ Blocking of the base undercut, dental plaster or stone is poured into the base to provide mounting casts for the transfer of jaw relation to the articulator.

B) Cast alloys denture base

❖ Advantages

1) Rigid
2) Accurate
3) Dimensionally stable
4) Increase the weight of the mandibular denture leading to increase stability of the lower denture
5) More thermal conductivity to the maxillary denture so increase the blood circulation to the underlying tissue increase the nutrition to the underlying bone leading to reduce the alveolar bone resorption.

❖ Disadvantage

1) More costly
2) More time for fabrication

❖ Methods:

✓ Refractory casts are prepared from the final cast, forming a wax pattern on the refractory cast, sprued, invested in a suitable investment, burn out of the wax, and casting of the molten alloy in the mold cavity.

✓ On cooling, the casting is removed, finished and polished, then turned to the final cast.

✓ Artificial teeth are attached to the metal base in the same manner as the heat cure acrylic resin.

❖ **Used in repeated fracture denture , flat ridge**

Occlusion rims

❖ Definition

✓ occlusion rims are occluding surfaces constructed on the record bases or permanent denture bases to be used in recording jaw relation and for arranging teeth

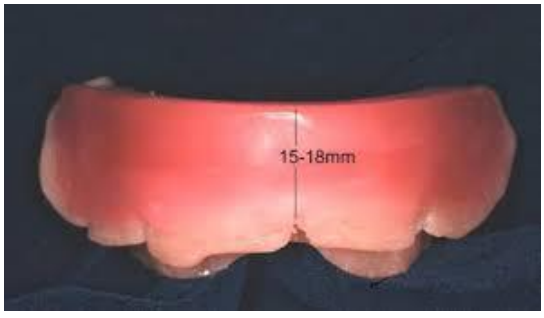
❖ Objectives of occlusal rims

➢ To determine the approximate value for:

1) Length and, width of the artificial teeth.
2) Midline of the arch for the correct placement of the central incisors.
3) The occlusal vertical dimension.
4) The necessary degrees of lip support. The level and orientation of the occlusal plane.
5) The most detruded relationship of the mandible to the maxilla.
6) The occlusion rims simply replace the natural teeth both in dimension and their relationships to anatomic structures

❖ Requirement of the occlusion rims

✓ The occlusion must be fabricated of an easy managed material.
✓ It must be well attached to the underlying record base.
✓ It must be centralized over the crest of the ridge to maximize the denture stability
✓ It must have the shape of the underlying ridge
✓ The edges of the occlusion rims are extended along the lateral surfaces to the border of the recording base
✓ The sides Formed 90 degree angles with the occlusal surface of the occlusal rim
✓ The anterior surface should incline outward while the posterior surface is sloped slightly inwards.
✓ The maxillary occlusion rim make 1-2 mm horizontal overjet in anterior & posterior sides with the mandibular occlusion rim
✓ The labial surface of the maxillary occlusion rim is about 10 mm anterior to the incisive papillae
✓ Posterior border of the maxillary occlusal rim ended at the anterior border of the tuberosity, while the mandibular occlusion rim ended at the anterior of the retro molar pad.



❖ Occlusion rim dimension

➢ Maxillary occlusion rim:

✓ Width in the anterior region is about 5 mm, posteriorly about 8 to 10 mm.

✓ Height in the anterior region is about 22 mm from the reflection of the cast, while is about 18 mm.

➢ Mandibular occlusion rim:

✓ Width in the anterior region is about 3-5 mm, posteriorly about 8-10 mm.

✓ Height in the anterior region is about 15-18 mm, posteriorly is equal to a point representing one half to one third of the height of the retromolar pad

❖ Materials for occlusion rims:

➢ Three materials are used for construction of the rim.

1) Wax occlusion rim

✓ Most commonly used material, quick and simple. It destroyed easily, if it is not homogenously softened, it will cause inaccuracy in the registration.

✓ Nonfunctional method **(static technique)**

❖ Methods:

✓ A sheet of wax is heated over approximately 1/2 of its length with a Bunsen burner until the wax is soft, the wax is rolled at a point just short of the unheated area, it is then rolled and the process is repeated until a soft roll has been formed, the soft wax is adapted to the recording base.

✓ The wax is further sealed to the base using a wax spatula with additional molten wax, the edges of the roll are extended along the lateral surfaces to the border of the recording base, and a heated plaster spatula is used to quickly shape the labial surface of the occlusion rim, the wax rim then is adjusted to the dimension previously mentioned

Modeling compound occlusion rim

✓ It is used for recording the jaw relation with special clinical techniques.

✓ **Used with neutral zone impression technique**

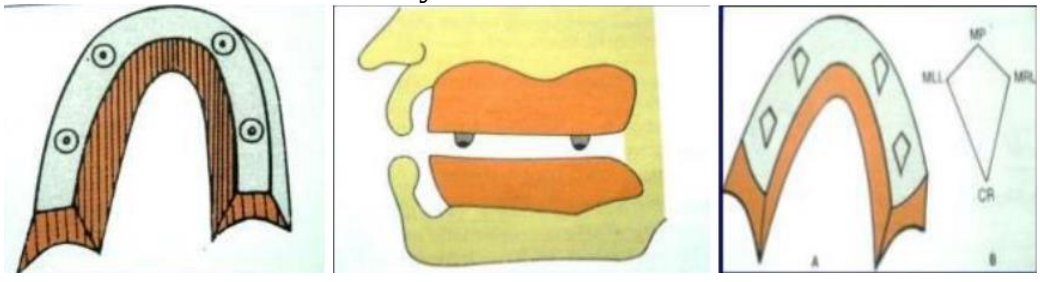
✓ Not softened at mouth temperature, not distorted under pressure.

✓ Takes long time in to cut and to trim than the wax.

✓ **needle house technique**

❖ **Methods:**

✓ Compound is softened in warm water, molded into a block of the necessary size and sealed to the trial denture base, which is preferred to be made acrylic resin or metal to assure maximum retention and stability



Plaster and abrasive rims

✓ Used when a dynamic relation between mandible and maxilla is to be recorded, because this technique allows the patient to form their own occlusal plane and degree of curvature of the compensating curves, using grinding masticatory movements

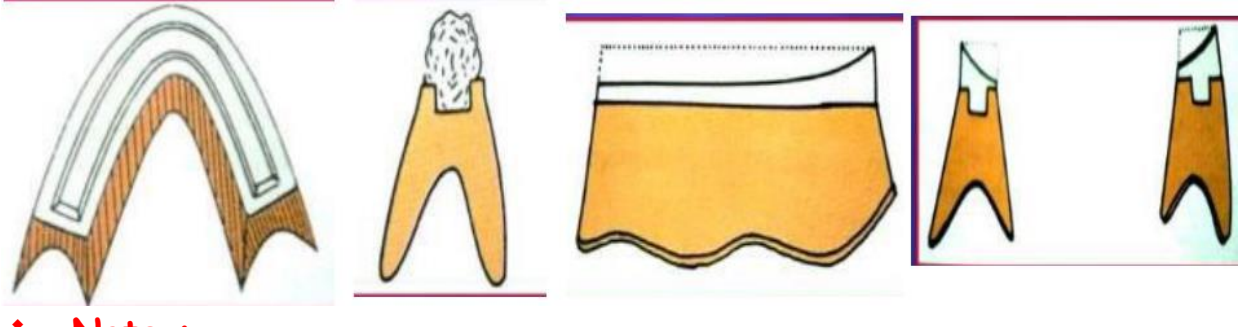
✓ **Used in chew in impression technique**

❖ **Methods**

✓ The rim is constructed using plaster and pumice mixed with water into thick consistency and a roll of it is placed on the baseplate using wire loops

✓ The height of each rim is about 2 mm greater than the accurate height.

✓ Placed in the patient mouth, the patient asked to grind together slowly, to the accurate height



❖ **Note :**

➢ **FUNCTION OF THE RECORD BLOCKS**

1) Jaw relations recording.

2) Transfer of accurate jaw relation record to an articulator

3) Selection of teeth:

✓ High and low lip lines help in determining the length of the anterior teeth.

✓ The distance between the two canine lines determines the width of the anterior teeth.

✓ The distance between the canine line and the posterior end of the occlusion rim determine the mesiodistal width of the posterior teeth.

4) Arrangement of teeth:

✓ Central line determine the positions of the central incisors.

✓ The contour of the labial surface of the occlusion rim determine the position of the labial surface of the anterior teeth.

➢ Making a stabilized base of shellac :

✓ Make a regular base and then lining it with a material which accurately reproduces the surface of the master cast to overcome the dimensional instability

✓ The impression materials used are either **zinc oxide eugenol paste,** or rubber base impression material.

➢ Poly vinyle material (plastic sheet)

✓ It is thermoplastic material (soften by heat ,,harden by cooling)

✓ Where apply sheet on cast and vacuum machine produce heat to soft sheet then produce pressure to adapt on cast

❖ **Advantage**

✓ More adapted on cast

❖ **Disadvantage**

✓ Time consuming

✓ Brittle

✓ Expensive

✓ Need special equipment

➢ Casted denture base (metal):

✓ They are designed to cover the palate in the normal way and usually terminate at the crest of the alveolar ridge, though when there are no undercuts, the ridges may be covered.

✓ Buccal and labial flanges are rarely extended to the full depth of the sulci because of the difficulty of obtaining a good peripheral seal or of easing the finished denture.

✓ Buccal and labial flanges are extended to the full depth of the sulcus with acrylic resin , shellac base plate or wax, in order to make the base retentive and stable during recording of the jaw relations.

❖ **Differ between record base and special tray?**

1) Record base reach to full depth of sulcus ,but special tray shorter than sulcus by 2mm

2) Record base adapted to cast so adapted to tissue ,but special tray has spacer under it

3) In special tray ,there is handle not present in record block

- ❖ Occlusal plane of lower not exceed 2/3 RMP (with tongue) to increase stability
- ❖ Posterior part of maxillary record bock not interfere with ascending ramus or mandibular record block
- ❖ Name of record base differ according to stage of complete denture construction
- ✓ During jaw relation ----- called denture base /record base
- ✓ During try-in ----- called trial denture base