ARAB AMERICAN UNIVERSITY

Lab. Manual

Prosthetic Dentistry1; Removable Prosthodontics

3rd year

Department of Fixed and removable prosthetic Dentistry

Faculty of Dentistry

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Course Instructor

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Custom Tray Fabrication For Edentulous Patient

Custom trays are individualized impression trays used for making final impressions.
Custom trays are made from a preliminary or diagnostic cast. They are most commonly made of a rigid acrylic resin (e.g. SR-Ivolin, Hygon, Formatray, Triad). Trays are made short of the periphery of the diagnostic casts, since they are usually overextended, due to the viscosity of the irreversible hydrocolloid used to make the preliminary impression.

Purpose of a custom tray

1. Minimize impression material distortion (uniform thickness, rigid tray)
2. Prevent tissue distortion (less viscous material, more accurately adapted tray)
3. Reduce costs - less impression material (expensive) is used
4. Allow for accuracy by molding the border, resulting in improved retention

Procedure:

1.Use a pencil to outline the depth of the vestibule (where the vertical portion of the ridge begins to turn toward the horizontal portion of the vestibule) and across the vibrating line
2.Draw a second line 2-3 mm short of the first around the vestibule
3.Provide adequate room for frenal attachments (narrow labial, and wide buccal)
4.Block out all undercuts with baseplate wax to prevent the tray from locking onto the cast
5.Lightly lubricate the cast (petroleum jelly, Alcote or material specific release agent)
6.Adapt a spacer of one thickness of base plate wax to the maxillary not mandibular cast. Trim the spacer 3 mm short of the second line in the vestibule and in a "butterfly" configuration at the vibrating line from hamular notch to hamular notch (do not relief wax over the blockout placed previously). The spacer provides room for the impression material, but more importantly minimizes the production of hydraulic pressures that could distort the mucosa. Where blockout is placed, these pressures cannot build up because the acrylic is already away from the tissue
7.Place a piece of unpolymerized acrylic resin on the edentulous cast. Wear gloves to minimize exposure to material to prevent sensitivity reactions.
8.Adapt the resin to the cast (palatal area first), trim excess using red handled knife and a scalpel blade. Push down through the resin, rather than pulling the blade along the periphery (This will minimize sticking and tearing of the resin, and result in a better periphery
9.Mold a small vertical handle, attach it to the anterior of maxillary tray and blend well to the tray material, ensuring it has slight undercuts to aid in removal from the mouth.
10. Construct two auxiliary handles for stabilization and orientation of the tongue. Place the handles in the area of the 2nd premolars or 1st molars.
11. Adapt the palatal and posterior portions of the tray to ensure proper adaptation.
12. Place the cast with uncured resin under water in a clear container with a lid. The entire tray must be covered in water to prevent the formation of an air-inhibited layer on the tray. The water

keeps the wax spacer from melting during curing and permits curing without the use of an air barrier coating. Polymerize in a light-curing unit as per the manufacturer's recommendations.
13. Use acrylic burs to trim trays make all edges round and smooth.
14. Mandibular trays should be made with two auxiliary handles for stabilization and orientation of the tongue. Ensure the handles do not impinge on the tongue space, or the tongue may retract and alter the resting position of the floor of the mouth.

Custom tray material:

- Should be safe to handle, compatible with biological tissues & impression material, sufficiently rigid to preclude distortion.
- Examples: Self-cured or light-cured acrylic resin

Peripheral extension:

- Cover the entire denture-bearing area within the anatomical limits previously described.
- The tray must extend to the depth of the hamular notches on the upper and should cover the retromolar pads on the lower . The lingual extension on the lower should stop at the mylohyoid line in the posterior and at the junction with the floor of the mouth in the anterior section
- 2-3 mm short of the sulcus to allow for border molding.

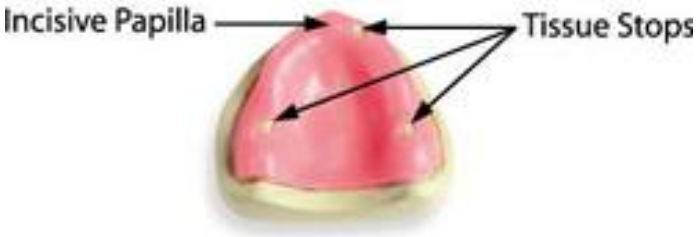
Custom tray handles:

- Should be formed to avoid encroaching on the surrounding tissues
- The handle must be placed in the anterior so that it does not interfere with placement of tray or border molding procedures. The handle may be placed approximately where the wax rim or anterior teeth would be positioned on a baseplate. (Look at the figure below)

Space for impression material:

- In general, should accommodate the optimum thickness of the chosen impression material
  - ► Zinc oxide-eugenol : close fitting
  - ► Polyvinyl siloxanes: depending on the viscosity
  - ► Polyethers : 2-3mm
  - ► Polysulphides: 2-3mm

- Place relief material such as baseplate wax to the outlined area and cut out three tissue stops. Avoid placing a tissue stop over the incisive papilla.



- The maxillary tray is made with 1 mm wax spacer and ends short of the final tray extensions. On the maxilla, wax must not cover the posterior palatal seal area. The mandibular tray is made with no spacer (close fit).
- Tray is well adapted to the model with no voids.

Custom tray perforations:

- Trays for complete dentures are requested without perforations so that peripheral seal can be estimated.

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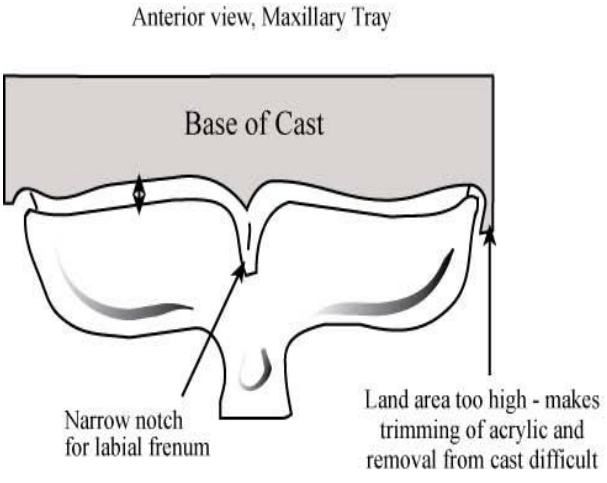
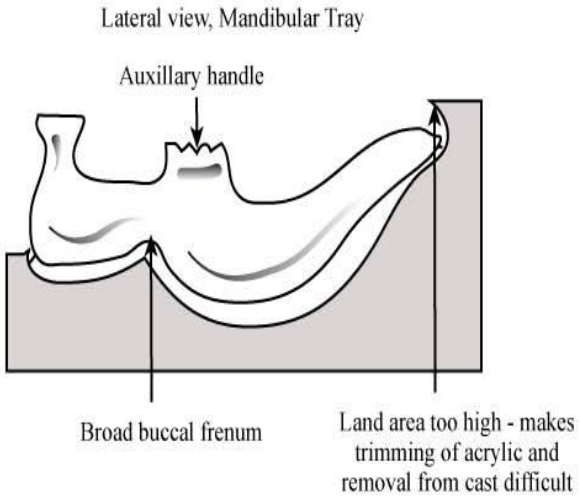
Custom tray thickness:

- Tray must be of uniform thickness.
- Thickness must be sufficient in strength to prevent distortion or breakage in use. The required thickness will vary with the material used. In general, acrylic resin and similar materials (such as light cure resins) should be approximately 2 mm thick.

Custom trays - quality failures

- Border extensions significantly longer or shorter than standard.
- Tray not stable (flexible) due to insufficient thickness.
- Tray cracked or damaged.
- Improper handle position (interferes with border molding or insertion).
- Sharp and/or rough edges, which may irritate the patient.





Record Bases and Occlusion Rims

Fabrication of Record Bases:

1. Block out severe undercuts on both cast with hard baseplate wax. If the ridge is very thin, flow wax on each side to prevent fracturing the cast. Excessive blockout will decrease the retention of the record base.

Block all undercuts

2. Apply a light coat of Vaseline over the entire tissue surface of the cast to serve as a separating medium.
3. On the Maxillary cast: Place a sheet of resin material in the palate of the cast and adapt the resin gently moving from the depth of the palate to the borders of the vestibules to avoid trapping air bubbles under the tray material.
On the Mandibular Cast: Cut a V-shaped wedge out of the middle of the sheet to permit adaptation of the wafer to the lingual of the cast.

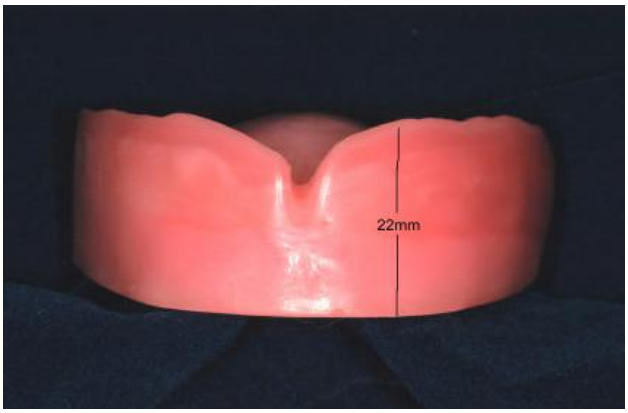
V-shaped wedge out of the middle of the resin sheet

4. Carefully trim the material.
5. Take care not to use excessive finger pressure and thin out the resin.
6. Smooth and trim the borders of the record base until completely smooth.

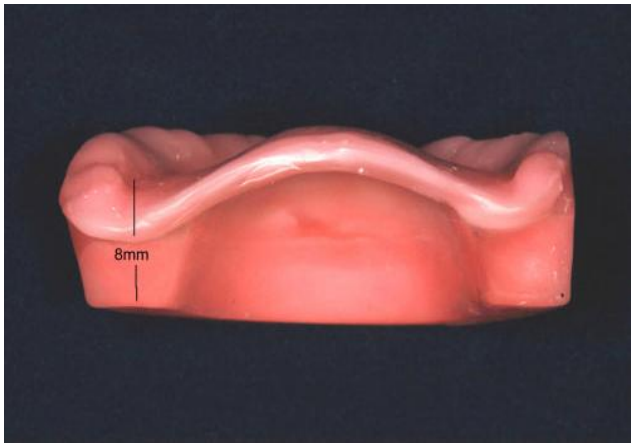
Wax Occlusion Rims

Maxillary Occlusion Rim:

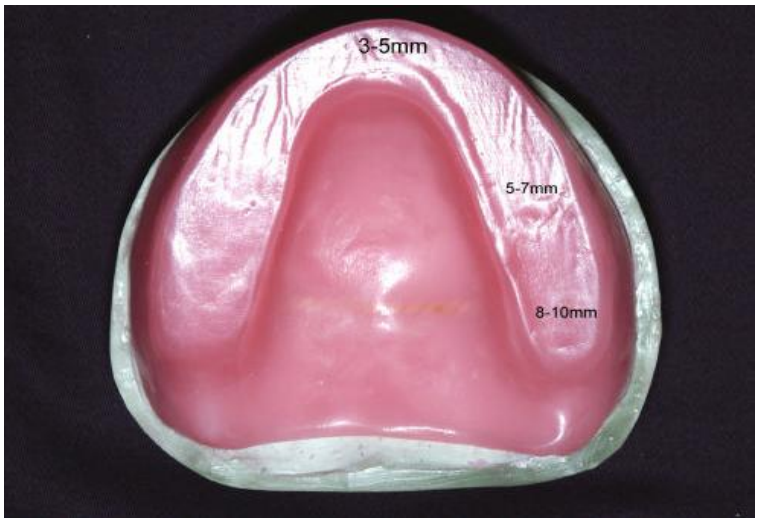
1. Dry the record base thoroughly as wax will not adhere to a wet surface. Roughen the area of the record base where the wax will be adapted.
2. Uniformly soften a sheet of hard pink baseplate wax.
3. Flame the wax on a Bunsen burner flame slowly by passing the wax quickly through the flame many times. When the wax is thoroughly softened, fold the wax in half. Continue to flame the wax to soften it. Repeat the folding and warming until the entire sheet of wax is used.
4. Form the wax into a horseshoe shape and adapt the wax to the record base over the ridge crest area. Begin at the right tuberosity area and continue to the anterior and opposite tuberosity area.
5. Seal it to the record base with molten wax using a hot spatula. Add wax as needed to contour the rim. Sticky wax can also be used to attach the occlusion rims.
6. The rim should approximate the position of the natural teeth. Remember the **facial surfaces of the central incisors are 5-7 mm anterior to the center of the incisive papilla. (**Anterior border of occlusion rim should be slightly facial to record base flange, generally 5-7 mm facial to the center of the incisal papilla).
7. Use a heated wax spatula to develop a flat occlusal plane.
8. The width of the occlusion rim in the **molar area is 8-10 mm, 5-7 mm in the premolar region, and 3-5 mm in the anterior.**
9. **Anteriorly:** The rim will measure **22 mm** from the anterior labial border of the baseplate (depth of vestibule) to the incisal edge. **Posteriorly**: The rim will measure **8 mm** from the occlusal surface of the wax rim to the intaglio surface of the record base.



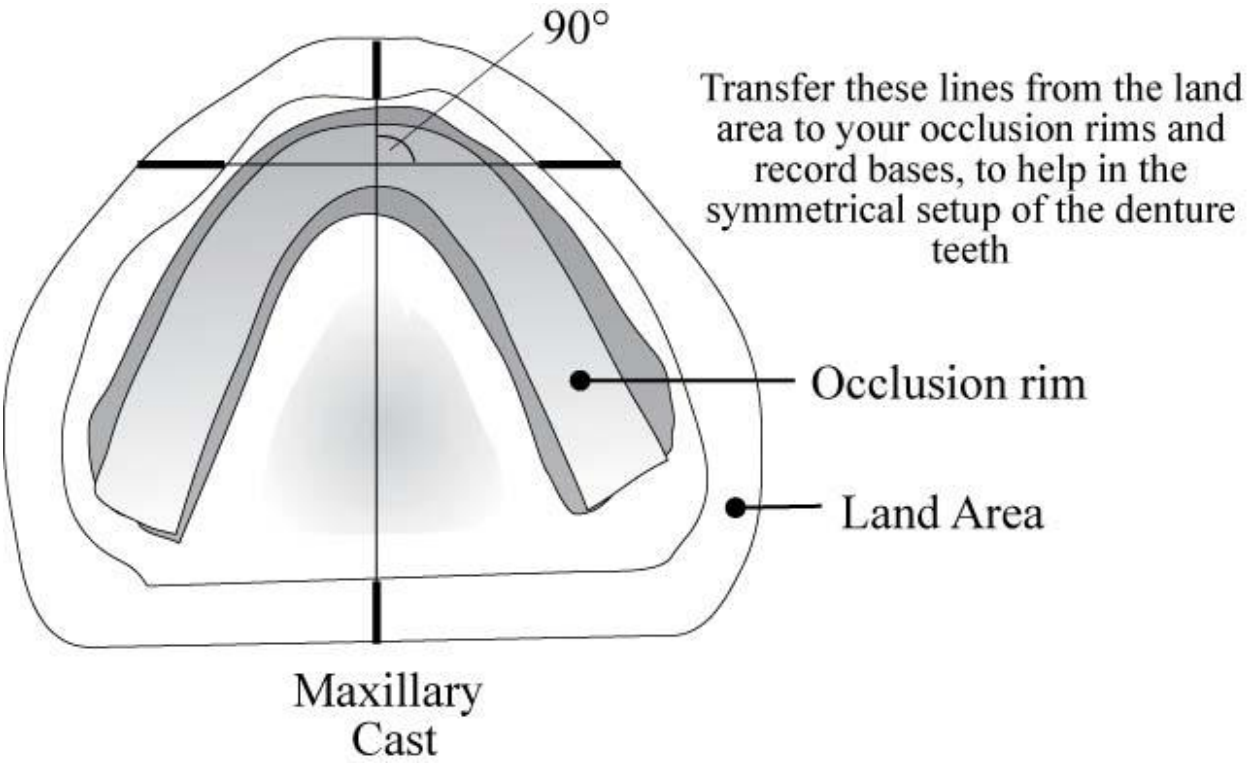
Labial view of Maxillary occlusion rim



Posterior view of Maxillary occlusion rim



Occlusal view of Maxillary occlusion rim

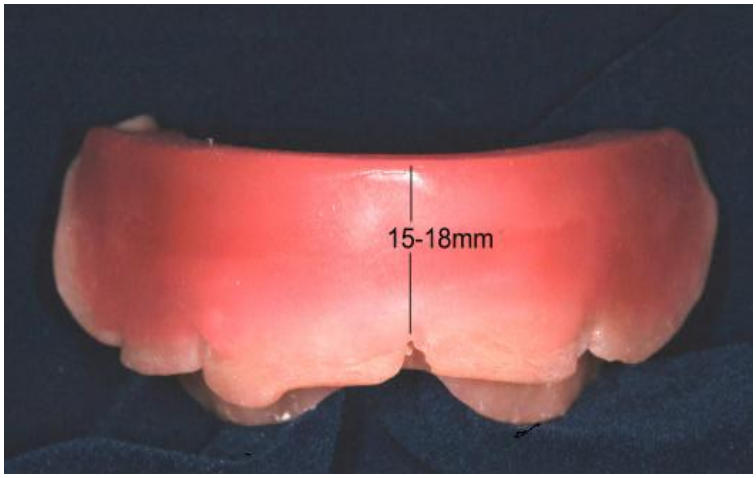


Mandibular Occlusion Rim:

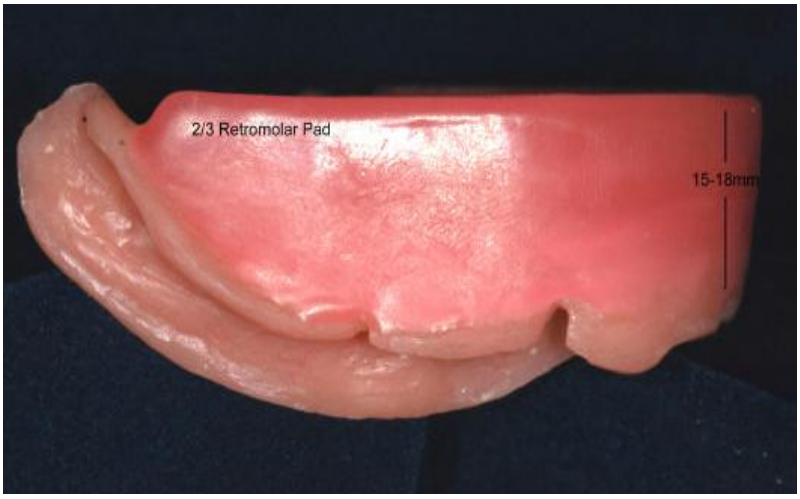
1. The procedure for making the mandibular rim is very similar to that for the maxillary rim. Make the **height of the rim about 15 to 18 mm from the anterior border of base plate (depth of vestibule) to the incisal edge**. The shape, position and dimensions of the rim should represent those of the natural teeth.
2. Posteriorly the wax rim parallels the base of the cast (and residual ridge) on a plane intersecting the **retromolar pad at 1/2 - 2/3 of the pad's height**.

3.The occlusal surface gradually widens in width from **3-5 mm** in the anterior region to **5-7 mm** in the pre-molar area and to **8-10 mm** in the molar region.

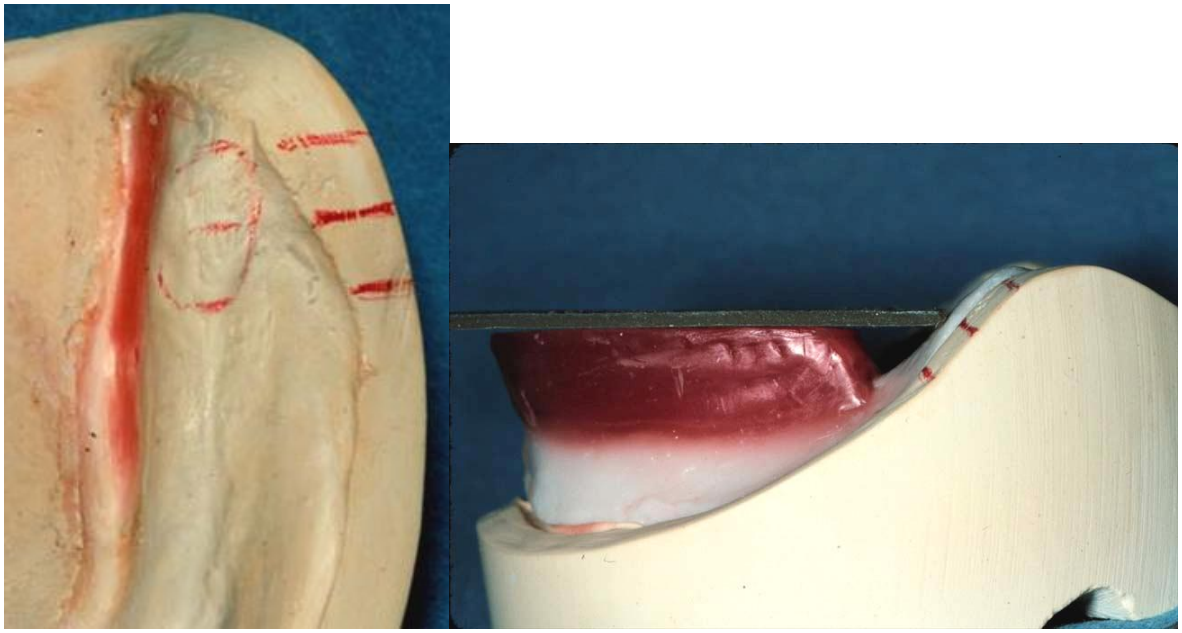
4. Anteriorly and posteriorly, the mandibular wax rim should be centered over the middle of the ridge to maximize stability, which is usually compromised in the mandible.



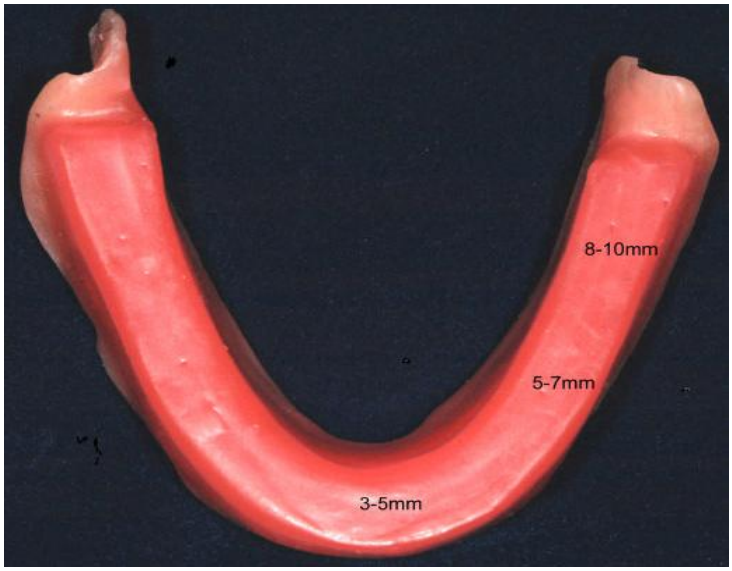
Labial view of Mandibular occlusion rim



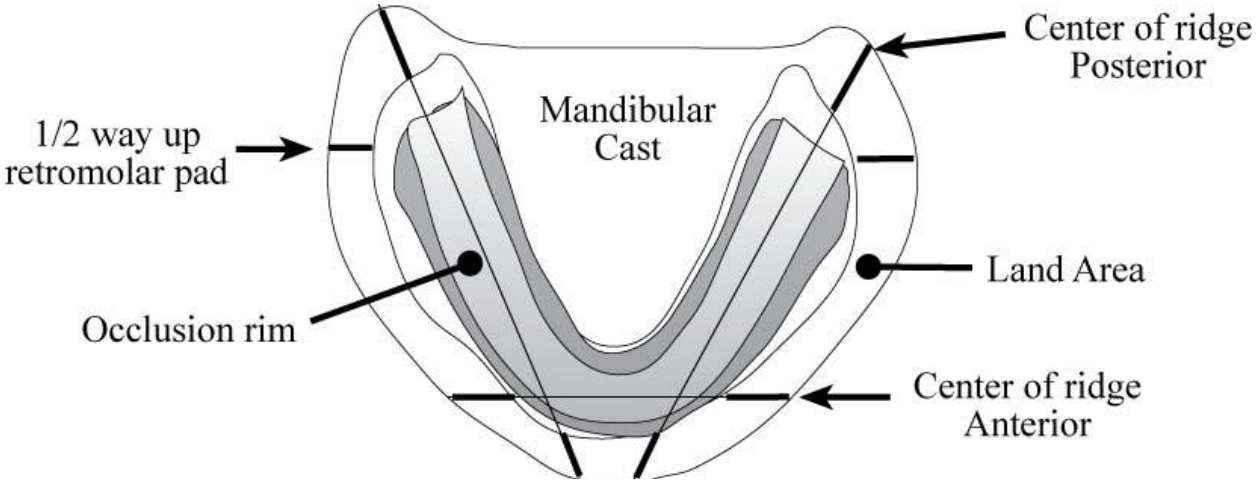
Side view of Mandibular occlusion rim



The height of mandibular occlusion rim posteriorly



Occlusal view of Mandibular occlusion rim



Mandibular wax rim centered over the middle of the ridge anteriorly and posteriorly

Evaluation of record bases:

1. Record bases should be 2-3 mm uniformly thick except in vestibule which may be thicker.
2. Record base extends to depth of vestibule fully filling it.
3. Record base is well adapted to the master cast, rigid, and stable on master casts (no rocking).
4. All surfaces of record base and occlusion rims should be smooth with no voids. No wax on tissue side of record base. No space between palate of cast and record base. Borders should be smoothly contoured as in a complete denture. Clean.
5. The maxillary wax rim should be slightly facial to the ridge (Anterior border slightly facial to record base flange, generally 5-7 mm facial to the center of the incisal papilla).
6. The width of the occlusion rim in the molar area is 8-10 mm, 5-7 mm in the premolar region, and 3-5 mm in the anterior for both mandibular and maxillary rims.
7. For maxillary rim, anteriorly: the rim will measure 22 mm from the anterior labial border of the baseplate (depth of vestibule) to the incisal edge. Posteriorly: The rim will measure 8 mm from the occlusal surface of the wax rim to the intaglio surface of the record base.
8. For mandibular rim, the height of the rim about 15 to 18 mm from the anterior border of base plate (depth of vestibule) to the incisal edge. Posteriorly: the wax rim parallels the base of the cast (and residual ridge) on a plane intersecting the retromolar pad at 1/2 - 2/3 of the pad's height.
9. The mandibular wax rim should be centered over the middle of the ridge.