

Rests and Rest Seats

The component of a partial denture on a tooth surface that provides vertical support is called a **rest**. The prepared surface of an abutment to receive the rest is called the **rest seat**. The topography of any rest should restore the topography of the tooth that existed before the rest seat was prepared.

The relationship between a rest and a rest seat must be such that forces transmitted from the prosthesis to an abutment are directed apically down the long axis of the tooth. In this manner, stress can be absorbed by the fibers of the periodontal ligament without damaging the ligament or the supporting bone.

A rest that is part of a retentive clasp assembly is referred to as a **primary rest**. The main purpose of a primary rest is to prevent vertical movement of a prosthesis toward the tissues and also helps transmit forces to the supporting teeth. A rest that is responsible for additional support or indirect retention is called an **auxiliary rest** or **secondary rest**.

The purposes of the rest in general are:

1. Provide vertical support for the partial denture.
2. Directs and distributes occlusal loads to abutment teeth.
3. Maintains the components in their planned positions.
4. Maintains occlusal relationship by preventing settling of the denture.
5. Prevents impingement of soft tissue.
6. In addition, a rest may be used to close a small space between teeth, thereby restoring continuity of the arch and preventing food impaction.

Rests are designated by the surface of the tooth prepared to receive them. Thus, they are named as follows:

A. Occlusal Rest:

1. Occlusal rest (conventional)
2. Extended occlusal rest
3. Interproximal occlusal rest
4. Internal occlusal rest

B. Lingual Rest (Cingulum Rest)

C. Incisal Rest

D. Implants as a Rest

A. Occlusal Rest

This rest is associated with the posterior teeth; molars & premolars. The Form of the **Occlusal Rest and Rest Seat** should be as follows:

1. The outline form of an occlusal rest seat should be a rounded triangular shape with the apex toward the center of the occlusal surface (Fig. 1).
2. It should be as long as it is wide, and the base of the triangular shape (at the marginal ridge) should be at least 2.5 mm for both molars and premolars.
3. The marginal ridge of the abutment tooth at the site of the rest seat must be lowered to 1.5 mm to permit a sufficient bulk of metal for strength and rigidity of the rest and the minor connector. The most common mistake in occlusal rest seat preparation is insufficient reduction of the marginal ridge.
4. The floor of the occlusal rest seat should be apical to the marginal ridge and the occlusal surface and should be concave, or spoon shaped.
5. When viewed in cross section, the deepest part of an occlusal rest seat should be located near the center of the mesial or distal fossa. From its depth, the floor of the rest seat should rise gently toward the marginal ridge (Fig. 1).
6. The angle formed by the occlusal rest and the vertical minor connector from which it originates should be less than 90 degrees (Fig. 1). An angle greater than 90 degrees fails to transmit occlusal forces along the vertical axis of the abutment tooth. This also permits slippage of the prosthesis away from the abutment, with possible orthodontic tooth movement.

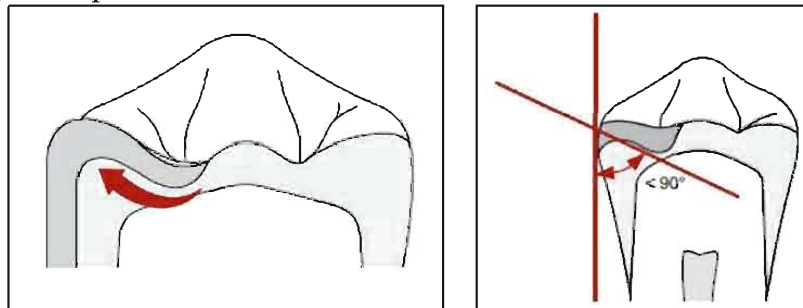


Figure 1: The deepest part should be near the center of the mesial or distal fossa and should be inclined apically from the lowered marginal ridge with an angle less than 90 degrees.

When occlusal rest seats are prepared next to an edentulous space the morphology follows the conventional form (Fig. 2). On the other hand, when a single occlusal rest seat is prepared next to an adjacent tooth (Fig. 3) the lingual line angle is flared more to provide additional space for the minor connector.

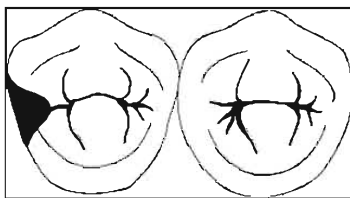


Figure 2: Occlusal rest seat prepared next to an edentulous space

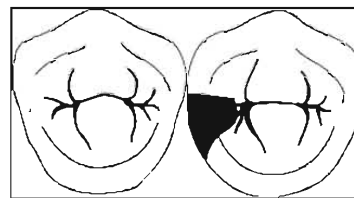


Figure 3: Single occlusal rest seat prepared next to an adjacent tooth

Extended Occlusal Rest

An extended occlusal rest should be used in situations in which the most posterior abutment is a mesially tipped molar, to minimize further tipping of the abutment and to ensure that the forces are directed down the long axis of the abutment. This rest should extend more than one-half the mesio-distal width of the tooth (Fig. 4).



Figure 4: Extended occlusal rest seat on the mandibular first molar.

Interproximal Occlusal Rest

The rest seats of this rest are prepared as individual occlusal rest seats (Fig. 5), with the exception that the preparations must be extended farther lingually and additional tooth structure is removed in the marginal areas to provide at least 1.5 mm of room for the embrasure clasps. The rest seats are flared more dramatically to the facial and the lingual line angles to provide additional space for the retentive arms and minor connector. The lingual interproximal area requires only minor preparation. Creation of a vertical groove must be avoided to prevent a torqueing effect on the abutments by the minor connector. This is especially true for RPDs with distal extension bases.

The advantages of such occlusal rests are: 1) Prevent interproximal wedging by the framework. 2) The joined rests shunt food away from contact points.



Figure 5: Preparations of interproximal occlusal rest extending lingually.



Internal Occlusal Rests

They are used for a partial denture that is totally tooth supported for both occlusal support and horizontal stabilization (Fig. 6). They must be used in association with a crown on the abutment tooth. An internal occlusal rest should not be confused with an internal attachment.

The main advantages of the internal rest are:

- 1) The clasp arm buccally is not visible. Retention is provided by a lingual clasp arm.
- 2) Permits the location of the rest seat in a more favorable position in relation to the tipping axis (horizontal) of the abutment.



Figure 6: Maxillary tooth-supported removable partial denture utilizing internal occlusal rests.

Occlusal Rest Seat Preparation

Occlusal rest seats should have smooth gentle curves and any sharp angles, walls, and ledges must be avoided. Any portion of the rest seat that restricts movement of the rest may transmit undesirable horizontal forces to the tooth.

Rest seat preparations should be made in sound enamel and should follow preparation of proximal tooth surfaces that are necessary to provide proximal guiding planes and eliminate undesirable undercuts.

Occlusal rest seats in sound enamel may be prepared with burs and polishing points that leave the enamel surface as smooth as the original enamel. The larger round bur is used first to lower the marginal ridge and to establish the outline form of the rest seat. A slightly smaller round bur then is used to deepen the floor of the occlusal rest seat and form the desired spoon shape.

The anatomy and depth of the rest seat preparation can be evaluated by using sheet wax. A small piece is firmly pressed into the rest seat and the patient is asked to occlude on the wax while the wax is in the rest seat. The surface of the wax is inspected to determine the anatomy of the rest seat preparation. The depth of the rest seat is determined by carefully measuring the thickness of the wax. Any corrections can be accompanied and the process can be repeated.

The preparation is smoothed by a polishing point of suitable size and shape. Fluoride gel should be applied to abutment teeth following enamel recontouring.

Occlusal Rests on Amalgam Restorations

It is always better to place an occlusal rest on sound enamel or cast restoration. Sometimes a conservative amalgam restoration may be used to support removable partial denture, but advantages and disadvantages of such treatment should be carefully considered.

As for a large amalgam restoration, it is easier to place an occlusal rest on a large amalgam restoration because an amalgam restoration costs less than a crown. However, the disadvantages are greater than the benefits so this is not advisable.

The flow characteristics and poor tensile characteristics of amalgam increase the possibility of restoration failure. Amalgam alloys tend to deform when a sustained load is applied and this may result in fracture of the material and failure of the restoration. In addition, future replacement of a defective restoration under an existing removable partial denture is difficult, and the results are not always good. Retreatment may need restoration of the abutment and a construction of a new removable partial denture.

Occlusal Rest on Crowns

All-ceramic restorations should not be used to support removable partial dentures, via rests, because of the undesirable physical characteristics of ceramics. Ceramic materials are relatively strong in compression, but weak in tension and any wedging or elongation of a ceramic surface often lead to fracture. If the rests bind against the walls of the rest seat, this will result in a wedging effect and create tensile forces that cause fracture of the ceramic. Also, the interaction between a ceramic rest seat and the associated metal rest is not desirable because of the different material properties.

Metal-ceramic restorations can be used but it is recommended that rest seats be constructed entirely in metal. The metal borders should extend at least 1 mm beyond the borders of the rest (in all directions).

Occlusal rest seat preparations in existing restorations (crown) may be widened to compensate for shallowness, but the floor of the rest seat should still be slightly inclined apically from the marginal ridge. When this is not possible, a secondary occlusal rest should be used on the opposite side of the tooth to prevent slipping of the primary rest.

Occlusal rest seats that will be located in new restorations, crowns, and inlays should be known when the tooth is prepared so that sufficient clearance may be provided for the rest seat within the preparation (Fig. 7).

Figure 7: Adequate occlusal reduction to accommodate the depth of the rest seat in the abutment crown.



B. Lingual Rests (Cingulum Rest)

An occlusal rest seat on a posterior tooth is preferred over a cingulum or incisal rest seat on an anterior tooth. Because of its size and position, an occlusal rest seat permits forces to be directed along the long axis of the tooth in a better manner. Posterior teeth also present large divergent roots that can withstand more loading than the small conical roots of anterior teeth.

There are situations where a lingual rest is used because an anterior tooth may be the only abutment available for occlusal support of the denture. Also, an anterior tooth may be used as an indirect retainer or an auxiliary rest. In such cases a canine is preferred over an incisor for this purpose due to the greater root length, root surface area, and crown morphology.

Lingual rests are used primarily on maxillary canines. The normal crown morphology of a maxillary canine permits preparation of a satisfactory rest seat with minimal tooth reduction. Lingual rests are not usually placed on mandibular canines because of the lack of sufficient enamel thickness for appropriate preparation of the rest seat. Also, mandibular canines do not have a prominent cingulum and appropriate depth for a rest seat may expose the underlying dentine.

When a canine is not present, multiple rests over several incisor teeth are preferable to distribute the stresses over a number of teeth because a single incisor doesn't provide adequate support.

The preparation of an anterior tooth to receive a lingual rest is accomplished in two ways:

First method: A slightly rounded V-shape prepared on the lingual surface at the junction of the gingival and the middle one third of the tooth (Fig. 8). The apex of the V is directed incisally. The mesio-distal length of the preparation should be a minimum of 2.5 to 3 mm, labio-lingual width about 2 mm, and incisal-apical depth a minimum of 1.5 mm. This preparation of the tooth starts with an inverted cone shaped bur and progresses to a smaller tapered bur with a round end to complete the preparation.



Figure 8: Three views of lingual rest seat prepared in enamel of the maxillary canine.

Second method: A ball type of rest may be used in a prepared seat (Fig. 9). Round rest seats are occasionally prepared on the mesial side of the canine when the use of a typical cingulum rest is contraindicated (i.e. large restoration, lack of clearance with

the opposing teeth, poorly developed cingulum). The seats of these rests are prepared in the same manner as that of the occlusal rest seats.



Figure 9: Ball type rest seat on canine.

There are several modifications to lingual rest seats prepared in natural teeth:

1. Lingual (Cingulum) Rest Seat in a New Cast-Metal or Metal Ceramic Restoration Cast Restoration (Crown)

The most satisfactory lingual rest from the standpoint of support is one that is placed on a prepared rest seat in a cast restoration (crown). When a fixed restoration is to be placed on an anterior abutment, a cingulum rest seat should be incorporated into the wax pattern. This rest seat should exhibit ideal contours and should direct forces along the long axis of the abutment.

2. Cast Alloy Rest Seat Forms

Also, individually cast alloy rest seat forms are used on teeth with unacceptable lingual contours using minimal tooth preparation. They are attached to lingual surfaces by the use of composite resin cements (Fig. 10).

A limited area on the lingual surface of the abutment is prepared to a depth of 0.5 to 0.7 mm. This minimizes tooth reduction and permits the surface of the casting to be positioned at the level of the adjacent tooth structure. Two or three circular indentations are then prepared within the borders of the tooth reduction. The indentations assist in placement of the restoration and also provide vertical support for the cast. The casting is cemented using an appropriate luting agent.

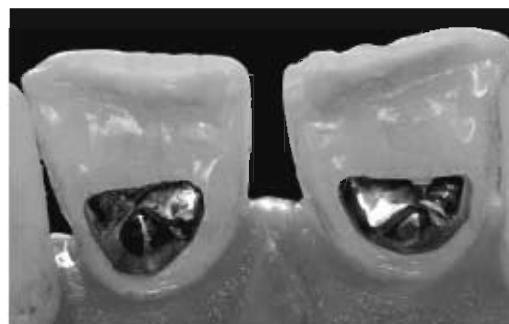


Figure 10: cast alloy lingual rest seat on mandibular canine.

3. Bonded Composite Cingulum Rest Seats

Bonded composite cingulum rest seats with composite resin have also been successfully used as a conservative approach to forming rest seats (Fig. 11).

This is accomplished by bonding composite resin to the lingual surface of the tooth, then shaping the resin in the manner described for rest seats prepared in enamel. The disadvantage of these rest seats is that they are susceptible to wear and may lose their effectiveness over a relatively short period. Thus, they are not always desired.



Figure 11: Composite resin rest seat.

4. An Alternative Cingulum Rest Seat

The alternative cingulum rest seat may be described as a crescent-shaped depression located in the middle and gingival thirds of the crown (Fig 12). This type can be used for mandibular canines with insufficient enamel that prevents preparation of conventional cingulum rest seats.

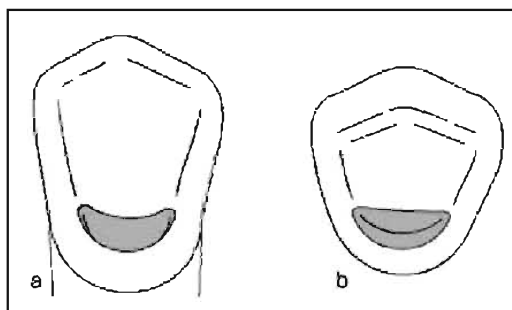


Figure 12: Alternative Cingulum Rest Seat.

Attempts to create adequate depth often result in exposure of the underlying dentin. Therefore, the alternative cingulum rest seat should be used very carefully.

C. Incisal Rests and Rest Seats

An incisal rest seat is usually placed on the disto-incisal angle for esthetic purposes, but the mesio-incisal may also be used (Fig. 13). It is predominantly used as an auxiliary rest or an indirect retainer.

An incisal rest is inferior to a lingual rest. 1) Esthetically, the metal of the rest shows at the incisal edge, 2) mechanically the lingual rest is placed nearer to the center of rotation of the tooth and has fewer tendencies to tip the tooth, 3) may interfere with

occlusion, and 4) has a higher possibility for breakage and distortion. Although, it may be used successfully for selected patients when the abutment is sound and when a cast restoration is not otherwise indicated.

Incisal rest seats are commonly used on mandibular canines, but may be used on other anterior teeth as well. The placement of incisal rest seats on incisors should be considered a last resort because of the esthetic and mechanical compromises that must be made.

The incisal rest seat is prepared in the form of a rounded notch at the incisal edge of the teeth, with the deepest portion of the preparation apical to the incisal edge. The rest seat should be approximately 2.5 mm wide and 1.5 mm deep so that the rest will be strong without having to exceed the natural contour of the incisal edge.

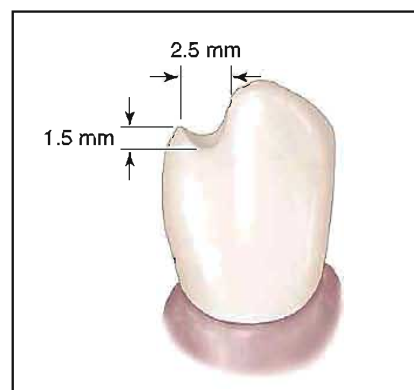


Figure 13: Incisal rest seat preparation and dimensions.

D. Implants as a Rest

Implants can serve as a rest, since they resist tissue-ward movement and are useful for retentive needs as well. Their use allows a low profile connection (i.e., close to the ridge), and less torque to the implant.

References:

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