

## CHAPTER 10

### RESTS AND PREPARATIONS

#### DEFINITIONS

A REST is any rigid part of an RPD framework which contacts a properly prepared surface of a tooth.

A REST PREPARATION or REST SEAT is any portion of a tooth or restoration properly prepared to receive a rest.

#### FUNCTIONS

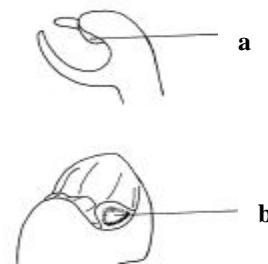
The functions of rests and their rest preparations are to:

1. Transmit forces from the prosthetic teeth to the abutment teeth. In this way at least some occlusal force may be dissipated through the supporting structures of the natural teeth.
2. Provide positive vertical support for the RPD in the area of the abutment tooth and thus prevent the impingement of the RPD on the gingival tissues adjacent to the abutment tooth.
3. Maintain the clasp in the correct position on the abutment tooth thus helping to maintain the effectiveness of the retentive and reciprocal components of the clasp.

4. Serve as a reference point for evaluating the fit of the framework to the teeth.
5. Help prevent extrusion, tipping, or migration of the abutment teeth.
6. Act, along with its minor connector, as an indirect retainer for a tooth-tissue supported RPD.
7. Help maintain the plane of occlusion in the region of the abutment teeth.
8. In addition to these functions, an internal rest may provide some bracing and retention for the RPD.

#### NOMENCLATURE

The typical rest preparation for a clasp assembly retained RPD consists of a shallow concavity in an abutment tooth into which the rest fits (Fig. 10-1). The rest fills in the missing

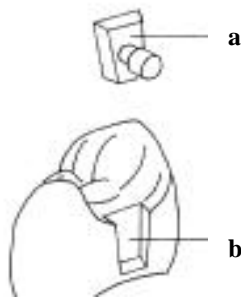


**Fig. 10-1.** ■ An extracoronal rest and rest preparation, a) the rest, b) the rest preparation

contours of the tooth. No bracing is provided by this type of rest because the walls of the rest preparation are inclined and very short. This type of rest is sometimes referred to as an **EXTRACRONAL REST**, although it is primarily within the contours of the abutment tooth. The name comes from its use with an extracronal clasp assembly-type direct retainer and contrasts it with the intracronal type rest used with many precision and semiprecision attachments.

**INTRACRONAL RESTS** fit into rest preparations within the contours of an abutment tooth crown (Fig. 10-2). They may be precision or semiprecision.

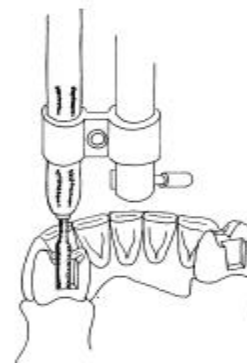
**PRECISION RESTS** consists of two metal components manufactured to fit together precisely. One component is a box-type rest seat, keyway or matrix which is incorporated into the crown of an abutment tooth. The other component is a rigid metal extension (patix) which fits the matrix precisely and is incorporated into the RPD (Fig. 10-2).



**Fig. 10-2.■** An intracoronally placed rest and rest preparation, a) rest (patix), b) rest preparation (matrix)

A **SEMI-PRECISION REST** is a box-type rest seat, keyway or matrix which is fabricated in the dental laboratory by incorporating a preformed plastic pattern into the wax pattern for the crown of the

abutment tooth, or by waxing the crown pattern around a special mandrel in the dental surveyor thus forming the contour of the rest preparation. After the crown is cast, the matrix is machined (milled) with a bur held in a surveyor (Fig. 10-3). The pattern for the patix of the semiprecision rest is formed by a performed plastic pattern or by waxing directly to the matrix (rest preparation) in a crown or a cast of the crown. The patix is cast as part of the RPD framework.



**Fig. 10-3.■** Milling a semi precision rest preparation

Intracronal rests should be discussed in greater detail at an advanced level.

Extracronal rests and rest preparations are also identified by their location on the tooth surface and by their shape. The most common extracronal rests and rest preparations are occlusal, incisal, lingual cingulum-shaped, lingual ledge-shaped, and transocclusal or (occlusal) embrasure.

### **DESIRABLE CHARACTERISTICS FOR EXTRACRONAL REST PREPARATIONS**

Extracronal rest preparations should have the following desirable characteristics:

1. Provide sufficient space that the rest may fill in the missing contour of the tooth and have sufficient bulk to be rigid.
2. Have a positive seat faciolingually and mesiodistally which prevents the rest from being dislodged from the tooth when occlusal forces are applied to the RPD.
3. Direct vertically applied forces along the long axis of the tooth.
4. Have a smooth, rounded shape with sloping walls and no pits, sharp edges or angles.
5. Be in caries resistant enamel or a suitable restorative material.
6. Be easily cleansed by normal oral hygiene procedures.
7. Have a shape which may allow for rotation of the rest in the rest preparation for tooth-tissue supported RPDs.

### **DESIRABLE CHARACTERISTICS FOR EXTRACRONAL RESTS**

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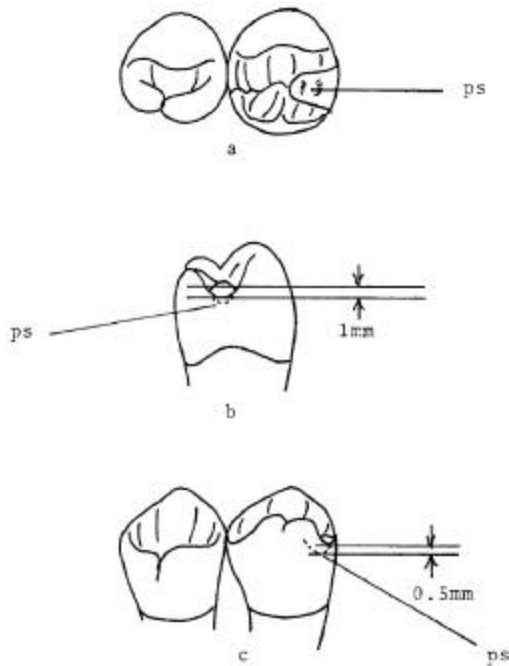
1. Be rigid.

2. Contact the deepest portion of the rest preparation (positive seat area).
3. Form an angle of less than  $90^{\circ}$  with its minor connector.
4. Fill the rest preparation, completing the contours of the tooth, thus resulting in a smooth metal-to-tooth margin.
5. Be capable of rotation within the rest preparation for tooth-tissue supported RPDs.

### **OCCLUSAL RESTS AND REST PREPARATIONS**

Occlusal rests are located in occlusal fossae of molars and premolars. There are three types of occlusal rests based on their location and extent: (1) proximal, (2) embrasure, and (3) transocclusal.

The PROXIMAL OCCLUSAL REST is located in a fossa adjacent to an edentulous space (Fig. 10-4). The proximal occlusal rest preparation follows the outline of the occlusal fossa and is spoon-shaped in all views. The facial and lingual margins flare toward the proximal line angle of the tooth. The width of the preparation is  $\frac{1}{2}$  to  $\frac{2}{3}$  the distance between the facial and lingual cusp tips. The preparation is at least 1.0 mm deep with a slightly deeper portion (0.5 mm) called the POSITIVE SEAT located toward the center of the preparation. The positive seat points apically so that vertical forces are directed as nearly as possible along the long axis of the tooth. The marginal ridge is reduced sufficiently that the rest will be approximately 0.1 mm thick in that area.



**Fig. 10-4.■** Proximal occlusal rest preparation, a) occlusal view, b) proximal view, c) lingual view (ps=positive seat)

The cavosurface margin of the rest preparation extends onto convex tooth surfaces, eliminates the occlusal fossa and may extend to the center of the tooth or entirely across the occlusal surface (Fig. 10-5). The purpose of extending the rest to the center of the tooth or across the entire occlusal surfaces is to: 1) direct forces more parallel to the long axis of the root than if the rest is just on the mesial or distal of the tooth, 2) provide increased stabilization (bracing) of the tooth and sometimes 3) provide occlusal contacts with the opposing teeth. The occlusal rest preparation which extends mesiodistally through the occlusal surface of a tooth is sometimes called a **CONTINUOUS REST PREPARATION**.



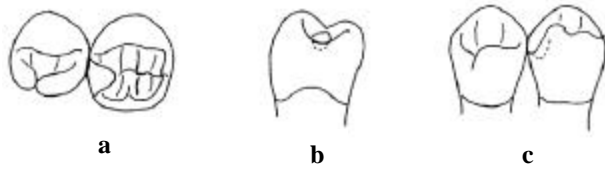
**Fig. 10-5.■** The mesiodistal extension of occlusal rest preparations: a) eliminating the primary occlusal fossa, b) extension to the mesiodistal center of the tooth (extended occlusal rest preparation), c) extension across the entire occlusal surface, sometimes called a continuous occlusal rest preparation, or channel rest preparation.

The angle between the rest and proximal minor connector should be slightly less than 90 degrees to form a positive mesiodistal seat (Fig. 10-6). The rest fills in the missing occlusal contours of the tooth.



**Fig. 10-6.■** The angle between the rest and the proximal minor connector is less than 90 degrees

The **EMBRASURE OCCLUSAL REST** is located in a fossa adjacent to another tooth (Fig. 10-7). Its size, shape and dimensions are similar to the proximal occlusal rest preparation **EXCEPT** that the flare of the facial margin is limited by the proximal contact with the adjacent tooth. The embrasure occlusal rest preparation rarely extends beyond the primary fossa.



**Fig. 10-7. ■** Embrasure occlusal rest preparations, a) occlusal view, b) proximal view, c) lingual view

As a general rule, if an embrasure occlusal rest is to be used, the occlusal fossa of the adjacent tooth is also prepared with an embrasure occlusal rest preparation **UNLESS THERE IS A REASON NOT TO** such as occlusion, existing restorative material, etc. In this way the adjacent embrasure occlusal rests eliminate the occlusal embrasure making the area more "self cleansing" and splint the two teeth together preventing them from being wedged apart by occlusal forces on the rest (Fig. 10-8).



**Fig. 10-8. ■** Adjacent embrasure occlusal rest preparations are prepared when possible to eliminate the occlusal embrasure and splint the teeth together with the RPD

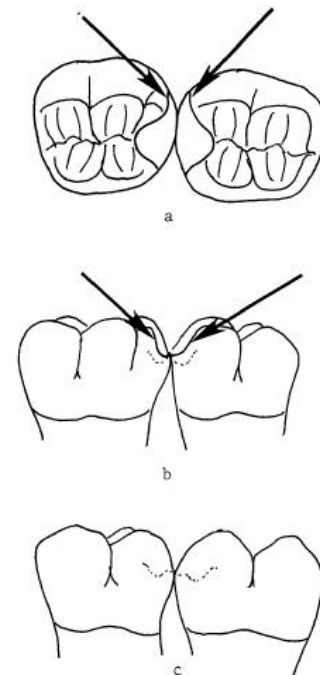
### TRANSOCCLUSAL RESTS AND REST PREPARATIONS

Transocclusal rests are located in the occlusal fossa of molars and premolars where there is no edentulous space (the tooth-supported side of a Class II or Class III partially edentulous arch and the posterior rests of a Class IV partially edentulous arch) or where the retentive clasp arm must approach an undercut on the surface of the tooth adjacent to the edentulous space (a

Class II survey line). Transocclusal rests and rest preparations are sometimes referred to as (occlusal) **EMBRASURE** rests and rest preparations.

A transocclusal rest preparation is similar in size and shape to an embrasure occlusal rest preparation **EXCEPT** that the preparation is extended facially to create space for the rest and clasp arm to extend onto the facial surface of the tooth (Fig. 10-9).

As a general rule, if a transocclusal rest is to be used, the occlusal fossa of the adjacent tooth is also prepared with a transocclusal rest preparation **UNLESS THERE IS A REASON NOT TO** such as occlusion, existing restorative material, etc. In this way the adjacent transocclusal rests eliminate the occlusal embrasure making the area more "self-cleansing" and splints the two teeth together preventing them from being wedged apart by occlusal forces on the rest (Fig. 10-9).



**Fig. 10-9. ■** Transocclusal (occlusal embrasure) rest preparations a) occlusal view, b) facial view, c) lingual view

## INCISAL RESTS AND REST PREPARATIONS

Incisal rests are placed on the incisal edges of mandibular canines and incisors. They are not placed on maxillary canines or incisors because the minor connector of the rest would interfere with occlusion and the facial portion of the rest would be very visible and unaesthetic. Incisal rests are usually located in the mesial or distal half of the tooth but occasionally are located in the center of the incisal edge. Incisal rests should be located in the portion of the incisal surface of the tooth which is most parallel to the occlusal plane so that a rest preparation with a positive mesiodistal seat can be easily formed. The rest should also be located so that it will direct forces parallel to the long axis of the tooth when occlusal forces are applied to the prosthetic teeth. In addition, the rest should be located where it will not be involved in occlusion, or will be involved the least amount in occlusion. And the rest should be located where the facial exposure of metal will interfere the least with esthetics.

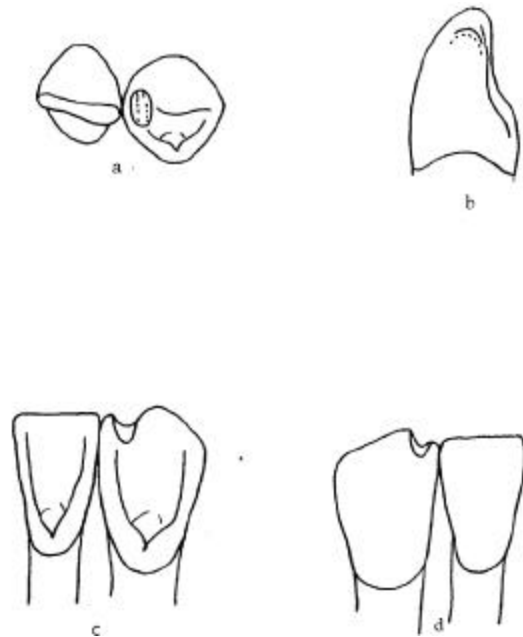
Incisal rest preparations are U-shaped when viewed from the facial or lingual and inverted U-shaped when viewed from the proximal (Fig. 10-10).



**Fig. 10-10.** ■ Incisal rest preparations, a) incisal view, b) proximal view, c) lingual view, d) facial view

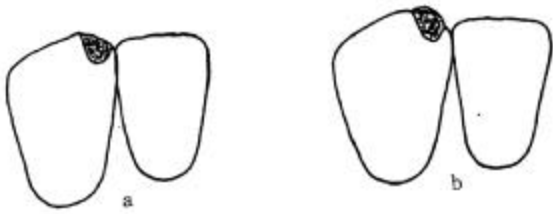
Incisal rest preparations should extend only slightly onto the facial surface

of the tooth to limit the display of metal. If the incisal rest preparation is located adjacent to an edentulous space, the proximal incisal angle is shortened to facilitate the junction of the proximal minor connector with the rest (Fig. 10-11).



**Fig. 10-11.** ■ The proximal incisal edge of incisal rest preparations adjacent to edentulous spaces is shortened to facilitate the junction of the rest and proximal minor connector

The mesiodistal dimension of the rest preparation should be 1½-2 mm and the depth at least 1 mm to provide adequate space for a bulk of metal for the rest. The incisal rest should complete the normal contours of the tooth and not be over contoured so that it appears as a "bump" on the incisal edge. Incisal rests should not interfere with functional occlusal contacts (Fig. 10-12).



**Fig. 10-12. ■** Incisal rest preparations should complete the normal contours of the tooth a), and not be over contoured and not appear as a "bump" on the incisal edge, b)

### LINGUAL RESTS AND REST PREPARATIONS

Lingual rests are placed on the lingual surface of canines and incisors. They are routinely placed on maxillary canines and incisors and in maxillary and mandibular surveyed crowns. Lingual rests are rarely use on natural mandibular incisors and canines because there is usually insufficient enamel thickness for an adequate lingual rest preparation.

There are two types of lingual rest preparations based on their shape:

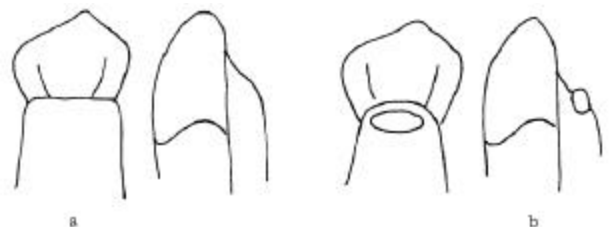
- (1) cingulum-shaped, (2) ledge-shaped and (3) dimple-shaped. The CINGULUM-SHAPED REST PREPARATION may be made in canines and incisors which have a prominent cingulum. The cingulum-shaped rest preparation follows the contours of the cingulum. The cingulum shaped rest preparation on maxillary canines and incisors are U-shaped when viewed from the lingual and proximal (Fig. 10-13). On mandibular canines and incisors the cingulum-shaped rest preparation is inverted U-shaped when viewed from the lingual and U-shaped when viewed from the proximal. The floor of the cingulum-shaped rest

preparation is placed in the bulk of the cingulum. The floor of the rest preparation is deepest toward the center of the tooth thus forming a positive faciolingual seat. The preparation extends more cervically on the mesial and distal thus forming a positive mesiodistal seat. The preparation extends through the marginal ridges. The cingulum-shaped rest preparation is approximately 1.0 mm deep pulpally and cervically.



**Fig. 10-13. ■** A lingual cingulum-shaped rest preparation, a) lingual view, b) proximal view, c) incisal view

The rest fitting a cingulum-shaped rest preparation may be a surface-type minor connector, or one with an incisal opening (window) through which the tip of the cingulum extends (Fig. 10-14). It is easier to evaluate the fit of a cingulum rest with the later design, and it is easier to clean the tissue surface of the rest. However, the open design is weaker than the surface design.



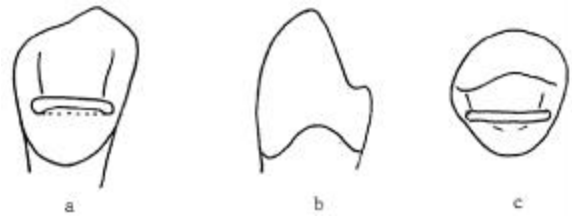
**Fig. 10-14. ■** Rests for cingulum-shaped rest preparations, a) surface type, b) surface type with a perforation for the tip of the cingulum

The LEDGE-SHAPED REST PREPARATION can be made in any tooth when the enamel thickness is greater than 1 mm. They are generally used where the tooth does not have a prominent cingulum or where a finger-type rest is to be used (Fig. 10-15). It is more difficult to provide a positive faciolingual and mesiodistal positive seat with a ledge-shaped rest preparation than with cingulum-shaped rest preparation.



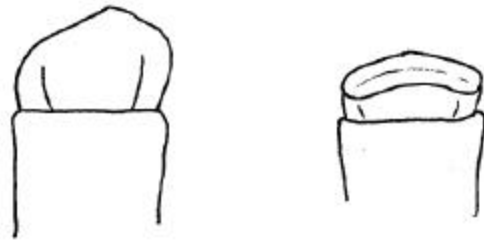
**Fig. 10-15.** ■ A lingual ledge-shaped rest preparation used with a finger type rest

The floor of the ledge-shaped rest preparation is placed in the bulk of the cingulum (Fig. 10-16). From the lingual view the floor of the rest preparation appears straight. From the proximal view the ledge-shaped rest preparation appears as a flat surface angled slightly cervically toward the center of the tooth to provide a positive faciolingual seat. From the incisal view the ledge-shaped rest preparation appears as a ledge following the contour of the lingual surface of the tooth. The preparation extends through the mesial and distal marginal ridges. The faciolingual width of the lingual ledge-shaped rest preparation is approximately 1.0 mm.



**Fig. 10-16.** ■ A lingual ledge-shaped rest preparation a) lingual view, b) proximal view, c) incisal view

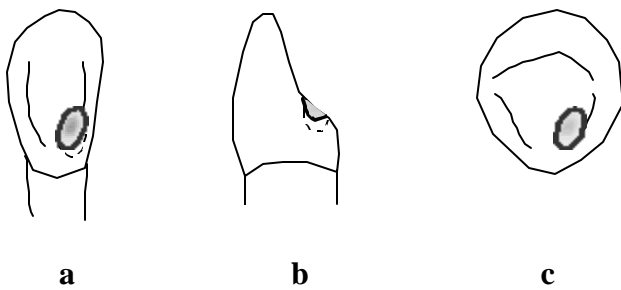
The lingual ledge rest must extend slightly onto the proximal tooth surfaces to provide a positive mesiodistal seat on the tooth (Fig. 10-17).



**Fig. 10-17.** ■ The rest for a lingual ledge - shaped rest preparation must extend into the proximal embrasures to provide a positive mesiodistal seat on the tooth, a) lingual view, b) incisal view.

Lingual dimple-shaped rest preparation is employed when there is limited surface on anterior teeth due to occlusal contacts.

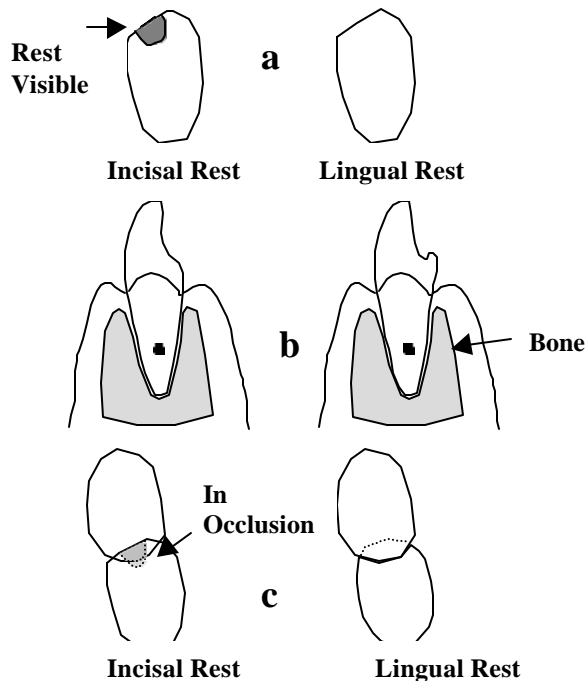




**Fig. 10-18.■** A lingual dimple-shaped rest preparation, a) lingual view, b) proximal view, c) incisal view

### INCISAL V.S. LINGUAL RESTS

Lingual rests are preferred to incisal rests because: (1) they do not show metal when viewed from the facial and are, therefore, more esthetic, (2) they are more cervical on the tooth and, therefore, closer to the fulcrum point and have a shorter lever arm and lower mechanical advantage in torquing the tooth and (3) for mandibular teeth they are not involved in the occlusion (Fig. 10-19).



**Fig. 10-19.■** Lingual rest preparations are preferred to incisal rests because they are: a) more esthetic, b) closer to the fulcrum point and, therefore, less able to torque the tooth, c) not involved in the occlusion for mandibular teeth

### DESIRABLE MATERIALS FOR REST PREPARATIONS

Enamel and cast metal are ideal materials for rest preparations. Porcelain is less desirable because of its propensity to fracture.

Rest preparations may be prepared as an economic necessity in amalgam but the flow and low yield strength of amalgam and the possibility of recurrent caries and fracture of the tooth and/or restoration make amalgam an undesirable material for a rest preparation.

Dentin is an undesirable material for a rest preparation because of its low abrasion resistance and propensity for caries. Unfortunately, dentin is frequently exposed when placing rest preparations in natural teeth. In these situations the tooth does not need to be restored unless it is sensitive or caries is anticipated.

Conventional and resin composite are unacceptable materials for rest preparations because of their low yield strength and low abrasion resistance.

### THE PREPARATION OF REST PREPARATIONS

The preparation of rest preparations in natural teeth, existing restoration, and crowns for abutment teeth will be discussed in a later chapter.