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COMPLETE CAST CROWN PREPARATION/FULL METAL CROWN

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Indications:

1. Extensive destruction from caries or trauma.
2. Endodontically treated teeth
3. Existing restoration
4. Non Vital teeth
5. Necessity for maximum retention and strength (Long span bridges)



Indications:

6. To provide contours to receive a removable appliance
7. Other recontouring of axial surfaces (minor corrections of malinclinations).
8. Correction of occlusal plane.
9. Rampant Caries



Contraindications:

1. Less than maximum retention necessary.
2. Esthetics
3. Poor Periodontal health
4. High DMF index
5. Teeth with internal resorption
6. Young individuals



Advantages:

1. Increases strength to the remaining tooth structure.
2. High retentive qualities
3. Usually easy to obtain adequate resistance from
4. Option to modify form and occlusion.
5. Favorable contours, guide plane for RPD.
6. Easiest procedure (So common used and misused)



Advantages:



Fluting of the axial walls of a molar complete cast crown (arrow) will allow better access to the furcation area for oral hygiene and will improve the long-term prognosis of the restoration.



A



B



Complete cast crowns used as retainers to accommodate a mandibular removable partial denture. Metal-ceramic crowns have been placed on the mandibular left canine (A) and the maxillary first molar (B). Note the occlusal rest seats (A, arrows) and the survey contours (B), which extent to form reciprocation guide plane.

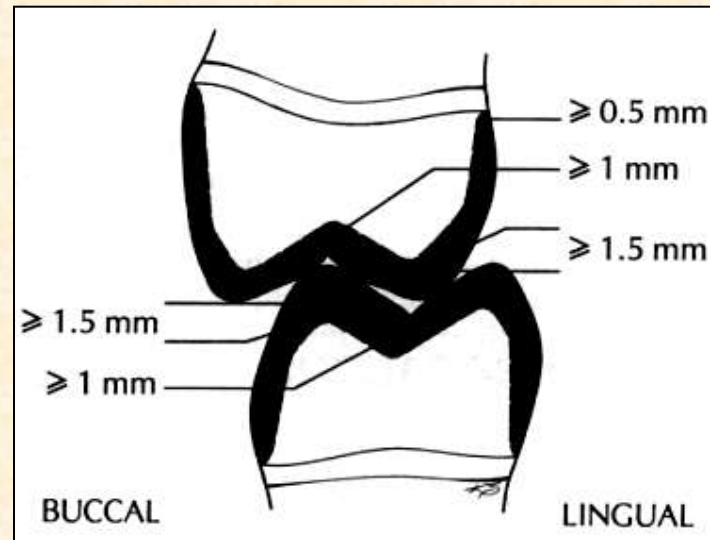


Disadvantages:

1. Removal of large amount of tooth structure.
2. Adverse effects on tissue.
3. Vitality testing not readily feasible
4. Display of metal.
5. Esthetics (it needs facing)
6. Undermined/secondary caries and periodontal diseases



Dimensions:



Recommended dimensions for a complete cast crown. On functional cusps (buccal mandibular and lingual maxillary) the occlusal clearance should be equal to 1.5mm. On nonfunctional cusps, a clearance of at least 1mm is needed. The chamfer should allow for approximately 0.5mm of metal thickness at the margin.



Preparation:

Armamentarium

Instrument	Use
Tapered carbide bur or diamond	Occlusal guiding grooves additional retentive features.
Narrow, round-tipped, tapered diamond (regular grit) (0.8mm)	Occlusal reduction Axial alignment grooves Axial reduction Chamfer preparation
Wide, round-tipped, tapered diamond (fine grit) (1.2mm)	Finishing
Utility wax and wax caliper occlusal reduction gauge	Verification of occlusal clearance.
High and low speed friction grip contra-angles.	



Preparation step:

- Depth grooves for occlusal reduction

Recommended Armamentarium:

- Tapered carbide or diamond

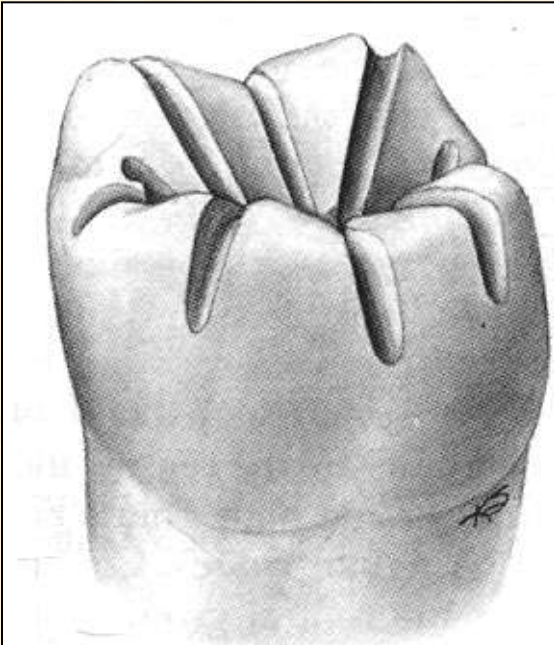
Criteria :

- Minimum clearance on noncentric cusps: 1mm
- Minimum clearance on centric cusps: 1.5mm



Step by Step procedure:

- Guiding Grooves for Occlusal Reduction:



Note that the grooves are deeper for the functional cups

Guiding grooves are placed on the occlusal surface. They are deeper on the functional cusp, and for the functional cusp bevel they diminish in depth for the cusp tip to the cervical margin.



A complete cast crown is indicated on this mandibular second molar with occlusal, proximal, and cervical lesions as well as a buccal longitudinal fracture.

Initial depth grooves placed for occlusal reduction. Note that they have not yet been extended onto the buccal surface, where the functional cusp bevel will be place.





Preparation step:

- Occlusal reduction (half at a time)

Recommended Armamentarium:

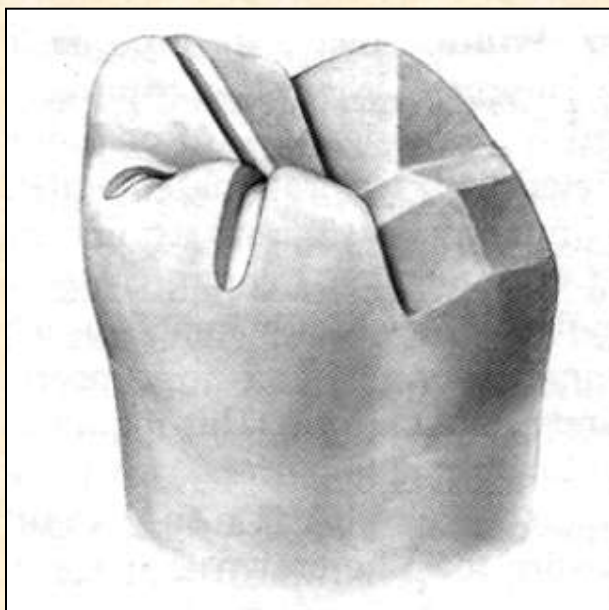
- Regular-grit, round-tipped, tapered diamond

Criteria:

- Should follow normal anatomic configuration of occlusal surface.



Occlusal Reduction:



Half of the occlusal reduction is performed; the other half is maintained for reference purposes.

After the guiding grooves are placed, the occlusal reduction is performed. Either the mesial or the distal half is maintained initially as a reference.



- Functional (centric Cusp Bevel):



The functional cusp bevel is prepared by slanting the bur at a flatter angle than the cuspal angulation. This will ensure additional reduction for the functional cusp.

Recommended Armamentarium:

- Tapered carbide or diamond

Criteria:

- Flatter than cuspal plane, to allow additional reduction at functional cusp.



Note the angulations of the bur as the functional cusp bevel is placed.

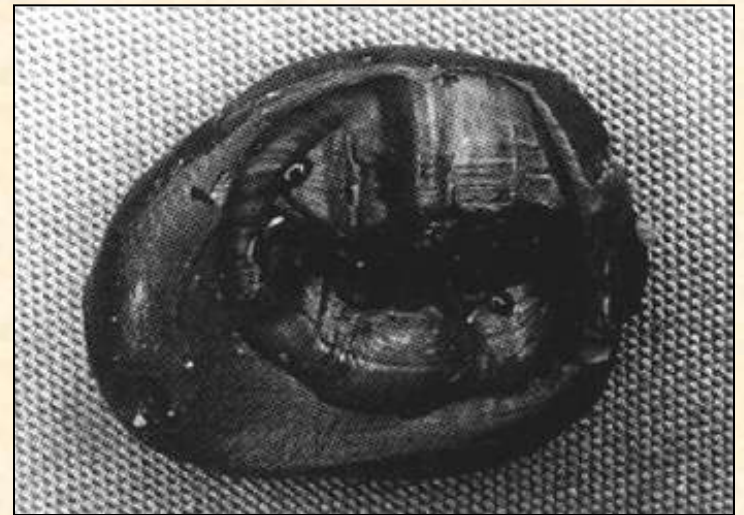
Completed occlusal reduction.
Note that it follows normal occlusal form. Three distinct planes can be seen buccolingually.

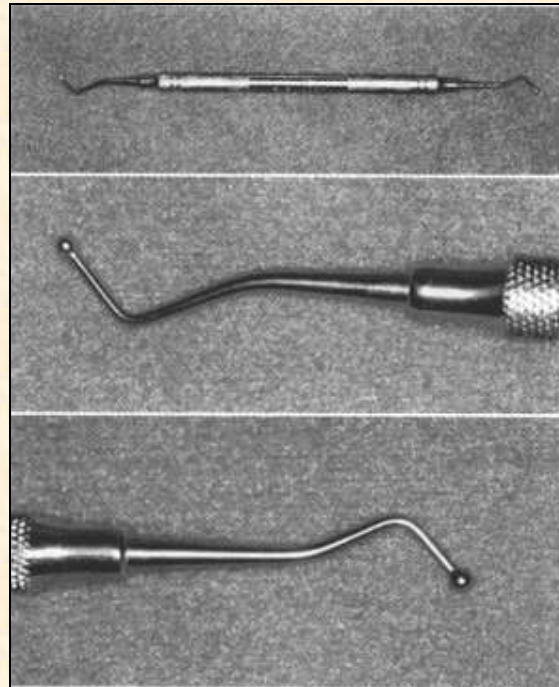




The patient closes into softened wax

The thickness of the wax is assessed visually and measured with a wax caliper after it has been removed from the mouth.





Occlusal clearance can be judged intra orally with a reduction gauge. This instrument has 1mm and 1.5mm diameter spherical tips.



Preparation step:

- Alignment grooves for axial reduction

Recommended Armamentarium :

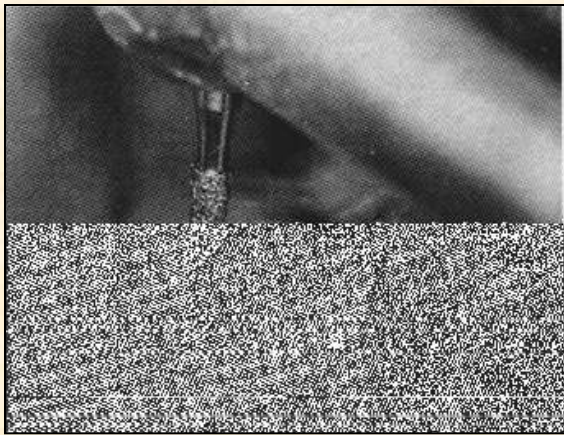
- Regular-grit, round-tipped, tapered diamond.

Criteria:

- Chamfer allows 0.5mm of thickness of wax at margin.

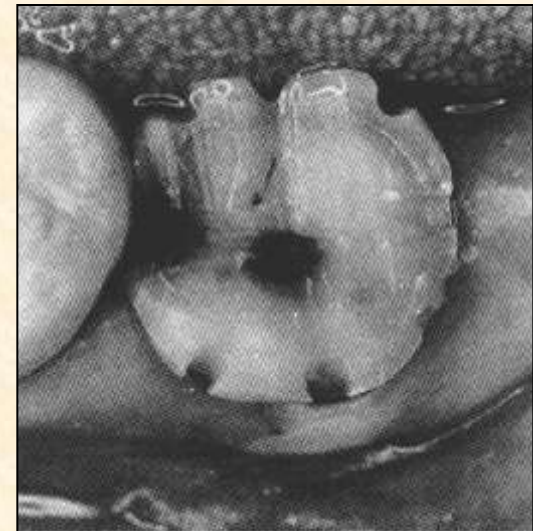


Alignment Grooves for Axial Reduction:



The diamond is aligned parallel to the long axis of the tooth as the buccal guiding grooves for axial alignment are placed.

After all six grooves have been placed. Note that they are deep occlusally but shallower towards the cervical margin.





Preparation step:

- Axial reduction (half at a time)

Recommended Armamentarium

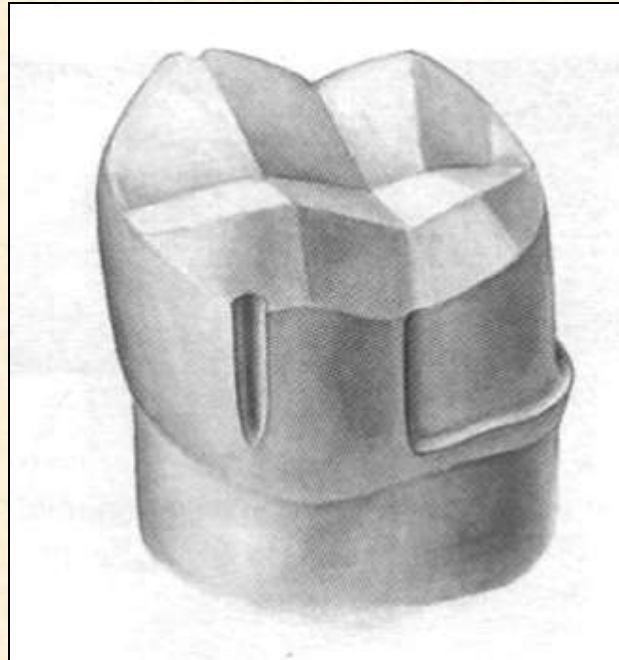
- Regular-grit, round-tipped, tapered diamond.

Criteria

- Reduction performed parallel to long axis.



Axial Reduction:

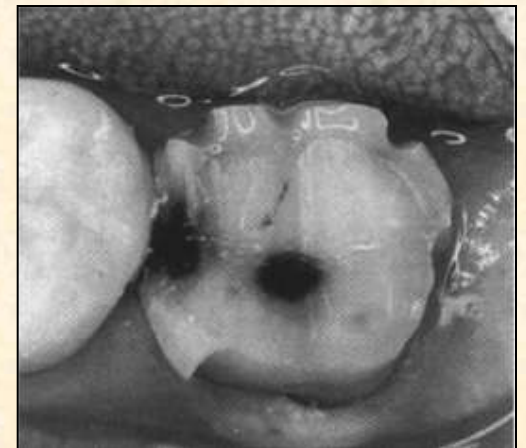


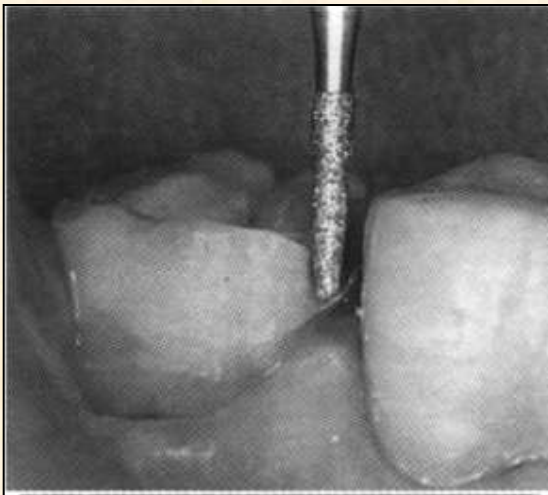
If axial reduction is completed first on either the distal or the mesial half of the tooth, evaluation is simplified because the remaining intact tooth can serve as a reference.



Note the alignment of the diamond as tooth structure between the alignment grooves is removed.

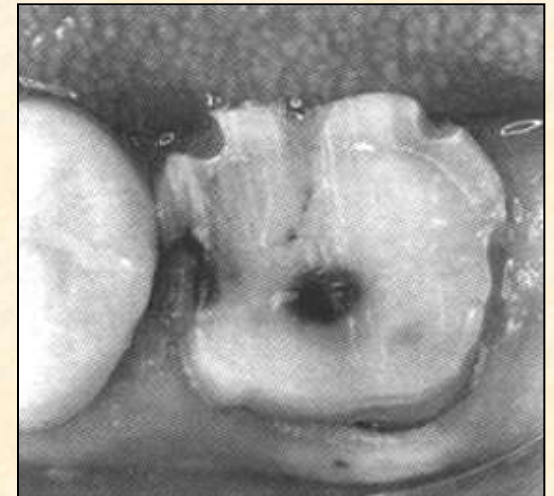
Axial reduction. The distobuccal axial reduction has been completed.

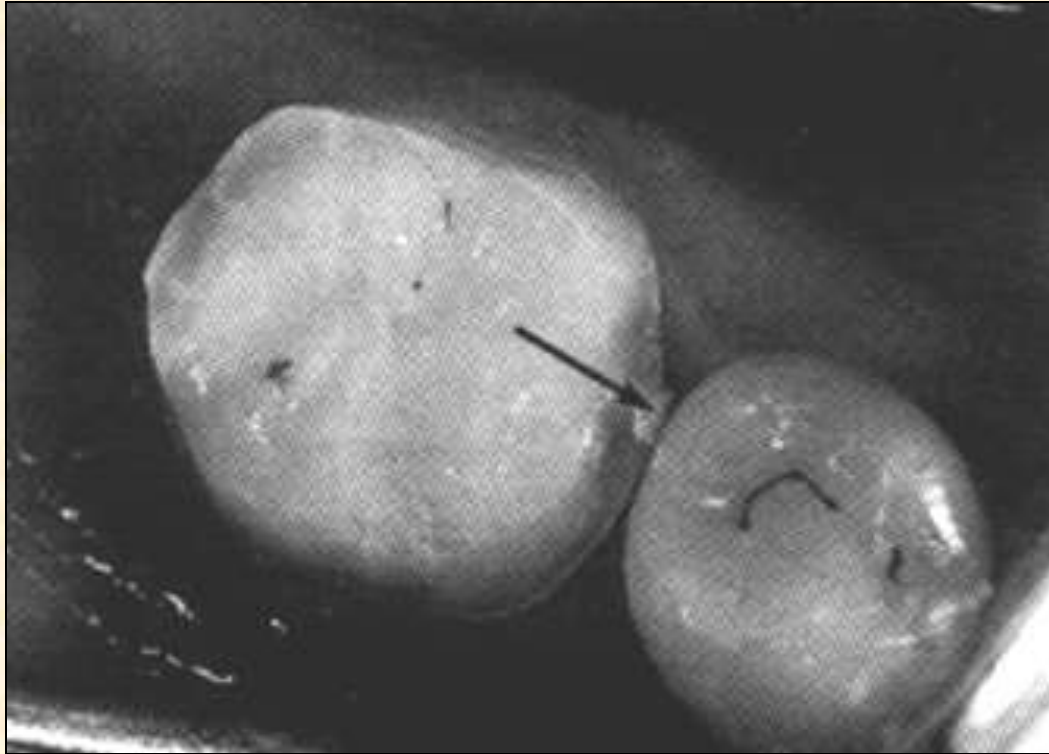




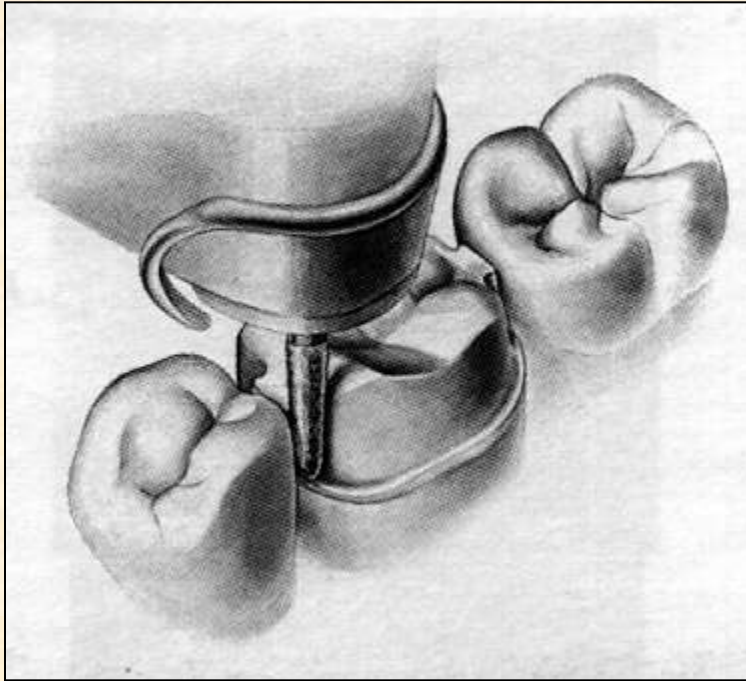
As the mesio-buccal axial reduction is performed, a cervical chamfer is placed.

Make the chamfer of relatively even width and maintain the somewhat angular preparation outline form to maximum resistance form.



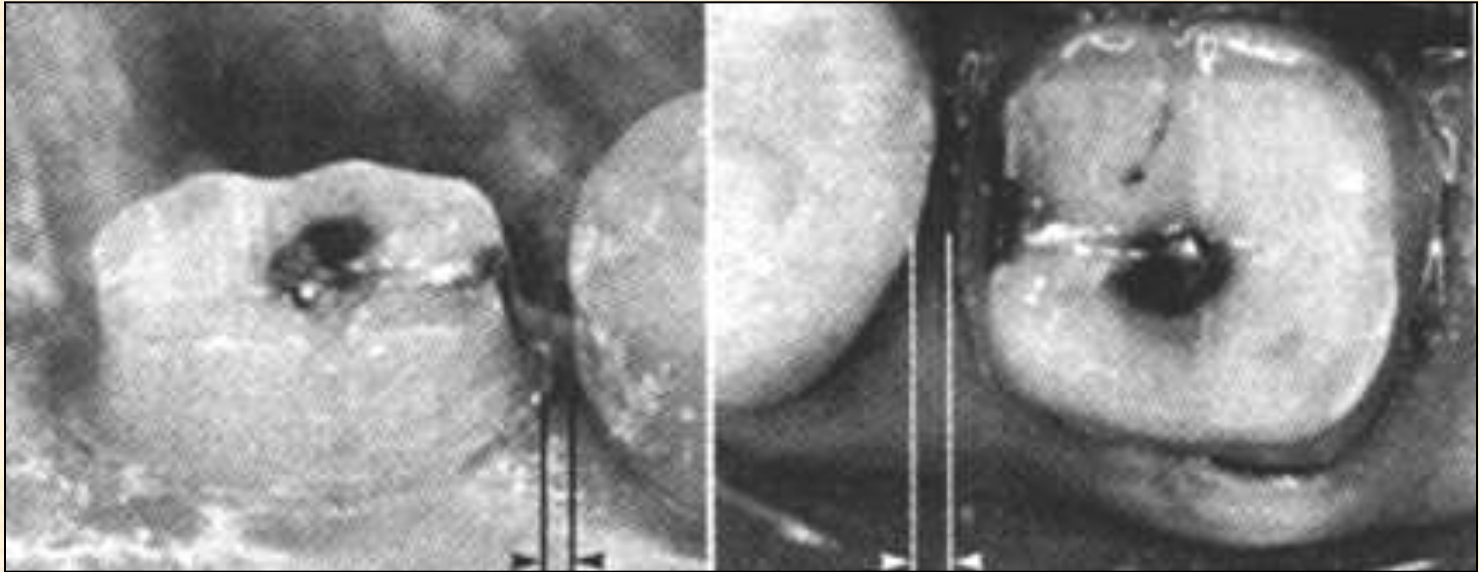


A lip of enamel (arrow) protects the adjacent tooth from iatrogenic damage as the axial reduction is completed.



As the axial reduction is performed, eventually a small island of tooth structure will remain in the interproximal area. When removing this, maintain a narrow “lip” of tooth structure between the diamond and the adjacent tooth to protect the latter from damage.

Preparation of the proximal contact area.



$\geq 0.6\text{mm}$ $\geq 0.6\text{mm}$

Note that a adequate clearance) exists between the external surface of the proximal chamfer and the adjacent tooth.

Occlusal view of the preparation



Preparation step:

- Finishing of chamfer

Recommended Armamentarium

- Wide, round-tipped diamond or carbide

Criteria:

Smooth mesiodistally and buccolingually; resistance to vertical displacement by tip of explorer or periodontal probe.



Preparation step:

- Finishing

Recommended Armamentarium

- Fine-grit diamond or carbide

Criteria:

Rounding of all sharp line angles to facilitate impression making, die pouring, waxing and casting.

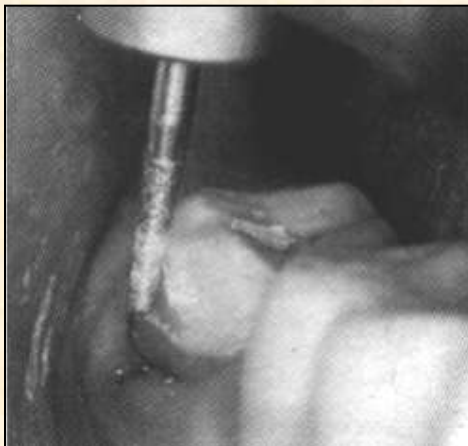


Finishing:

The transition from lingual to occlusal is rounded with a fine-grit diamond.



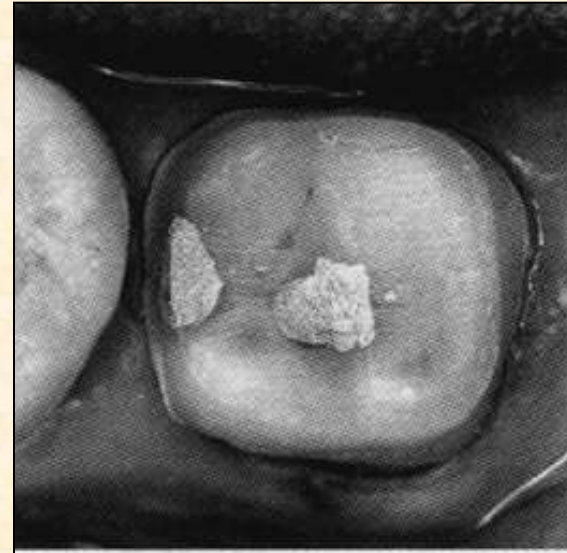
All sharp line angles between occlusal reduction and functional cusp bevel are similarly rounded.



The margin is refined, and any minor irregularities are removed.



A



B

Complete preparation. The carious lesions have been excavated and the resulting irregularities blocked out with amalgam. **A**, Buccal appearance. **B**. Occlusal appearance.



Preparation step:

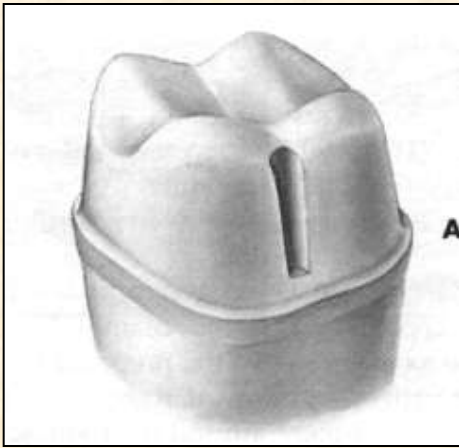
- Additional retentive features if needed

Recommended Armamentarium

- Tapered carbide

Criteria:

Grooves, boxes, pinholes as described for partial coverage restorations.



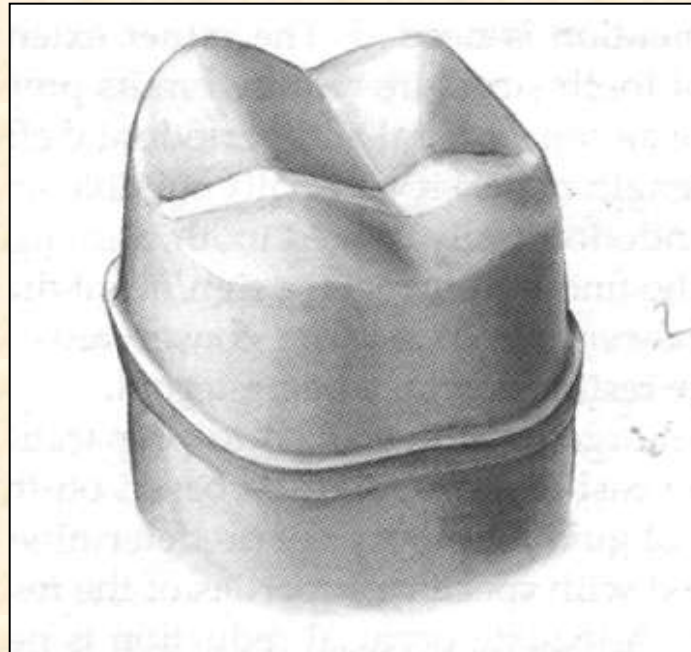
When opposing axial walls are excessively tapered, internal features such as this buccal groove can be used to improve retention and resistance from.

Mesially tipped molars and short premolars often benefit from grooves and/or boxes incorporated in the preparation design.





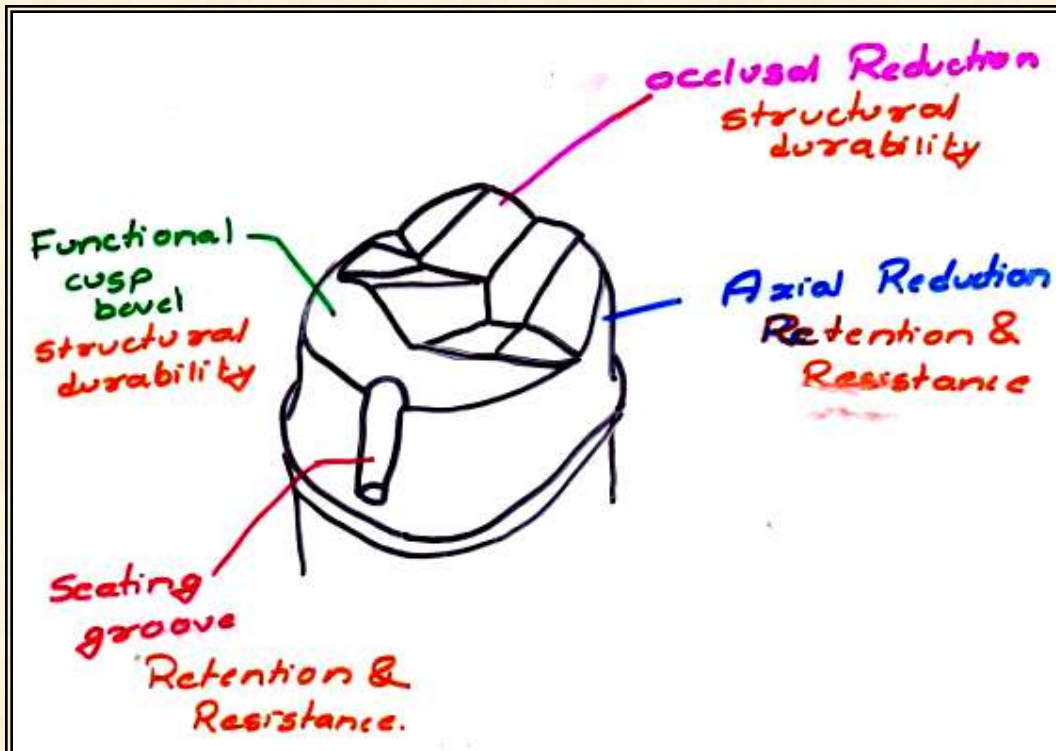
Evaluation:



The completed preparation is characterized by a smooth, even chamfer; a 6 degree taper; and gradual transitions between all prepared surfaces.



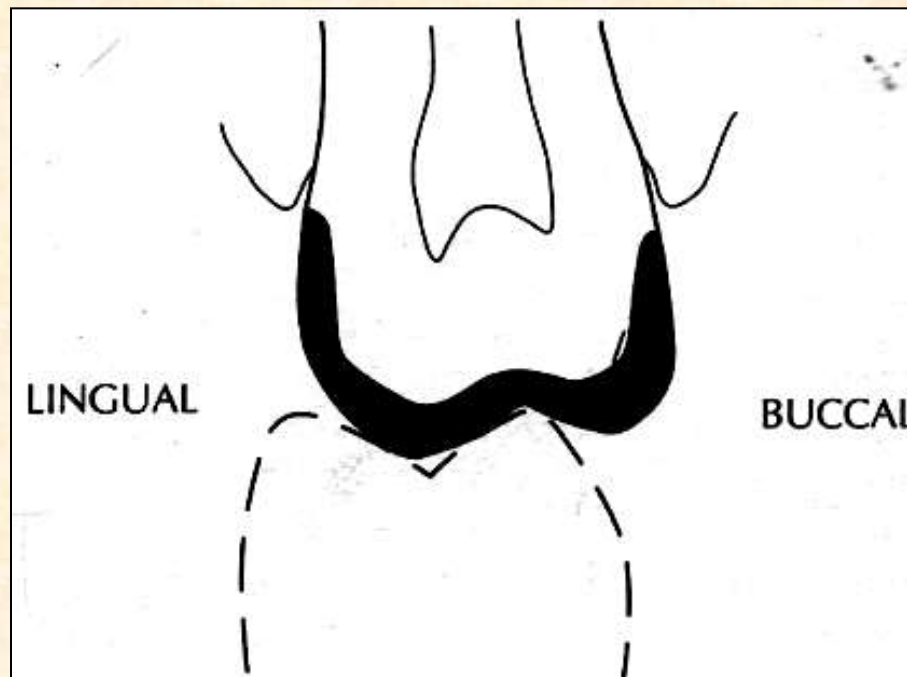
Features of a FVC preparation and the function served by each





Special Considerations

- Nonfunctional (Noncentric) cusp Bevel:



The configuration of the facial wall of the maxillary molars may require slight additional reduction in the occlusal third to prevent an over contoured restoration.



Common Errors in the preparation:

- Under reduction
- Over reduction
- Undercut
- Inadequate occlusal clearance
- Damage to adjacent tooth
- Pulpal exposure.