Finish Line Configuration

Guidelines for Margin Design:

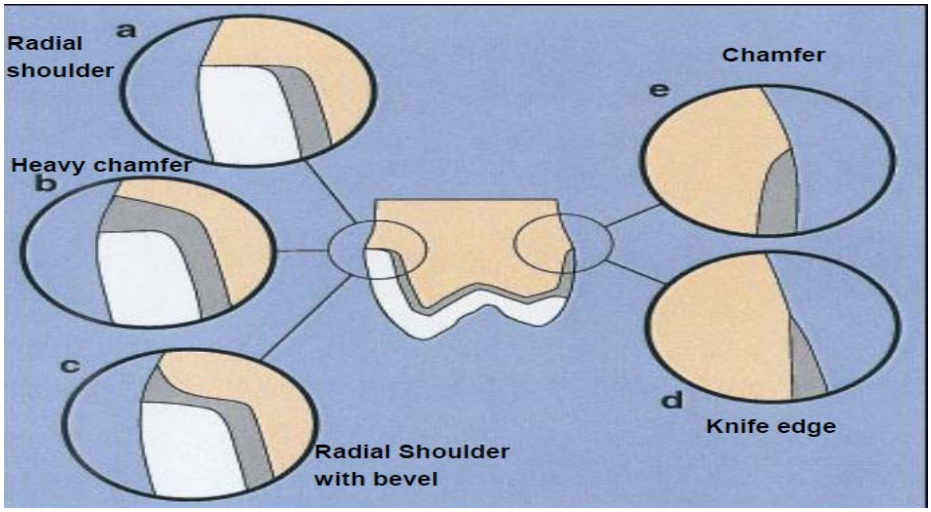
1. Ease of preparation without overextension or unsupported enamel.
2. Ease of identification in the impression and on the die.
3. A distinct boundary to which wax pattern can be finished.
4. Conservative of tooth structure.
5. Sufficient bulk of material for esthetic and strength of the restoration.
6. The most important consideration in selecting a cervical margin design is its ability to consistently and predictably provide excellent marginal integrity.

Finish line Classification:
A. according to its design or configuration

1. Knife edge (also named "feather end")
2. Chamfer
3. Heavy chamfer
4. Shoulder
5. Radial shoulder
6. Shoulder with bevel
7. Sloping shoulder
8. Chisel edge

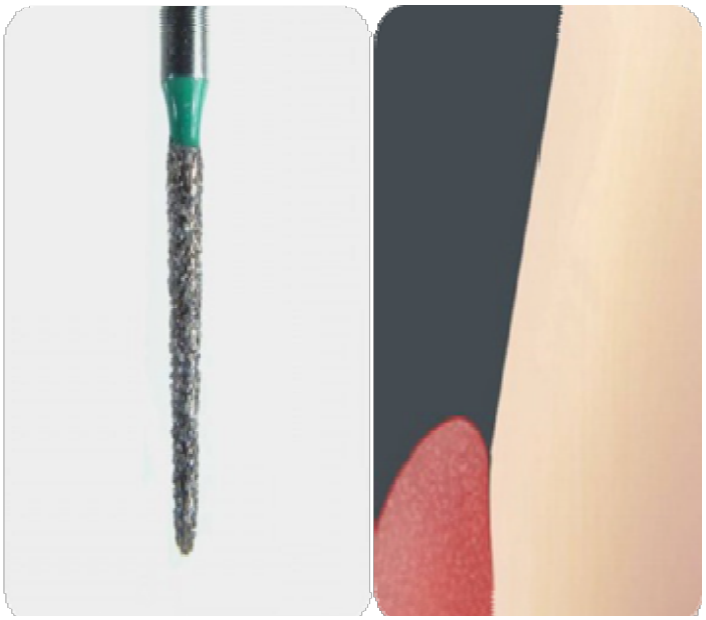
B. According to width:

1. Marginal width less than 0.3mm – knife-edge/feather edge
2. Marginal width up to 0.3mm – Chamfer
3. Marginal width greater than 0.3mm - Shoulder



1. Knife edge or feather end finishing line (shoulder-less)

A pointed end tapered fissure bur (long needle diamond fissure bur) is used to provide this type of margin design. It is the most conservative type of finishing line since the least amount of tooth structure is removed, but the margin is weak since this margin design does not provide enough bulk or thickness for the material. It forms >135° cavo-surface line angle.



Advantages of knife edge finishing line

1. It is the most conservative type of finishing line.
2. It is easy to prepare.
3. It is a burnishable type of finishing line. i.e. it provides a burnishable margin.

Burnishing is the further adaptation of the margin of metal restoration to the tooth structure.

Disadvantages of knife edge finishing line

1. Difficult to be identified by the laboratory technician.
2. It provides a thin margin that is difficult to accurately wax and cast.
3. The margin of the restoration is susceptible to distortion since this type of margin design does not provide enough thickness.

Indications of knife edge finishing line

NOT recommended:

Here are some reasons why a knife edge or feather edge finish line may not be recommended for crown preparations:

1. Marginal Integrity: These types of finish lines may be more susceptible to chipping, microleakage, or other issues over time.

2. Fracture Resistance: Thin and sharp margins may increase the risk of crown fracture.

3. Cementation Challenges: These types of margins may not allow for sufficient space for the cement.

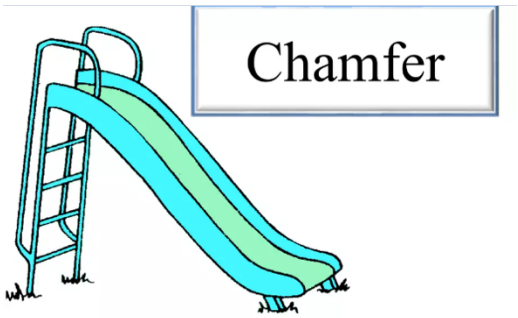
4. Periodontal Health: It may be more challenging for patients to keep the area clean, increasing the risk of inflammation and periodontal issues.

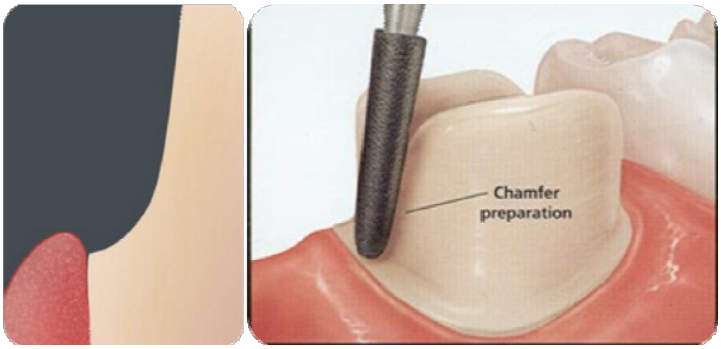
It is mainly used for:

1. Full Metal Crown.
2. The lingual and proximal surfaces of full veneer crown, three-quarter crown and post crown.

2. Chamfer finishing line

It is a well-defined finishing line somewhat like knife edge finishing line except that the cut is made deeper. It forms a 130-160° cavo-surface line angle. A round-end tapered fissure bur is used to obtain this preparation margin. It provides adequate space at the cervical region so can make the contour of the crown restoration within the contour of natural tooth without overcontouring of the final restoration. However, since the restoration margin obtained with this type of finishing line is thick, so it is unburnishable.





This type of finishing line is indicated for areas to be covered by metal only as the knife edge finishing line, so it is mainly used for:

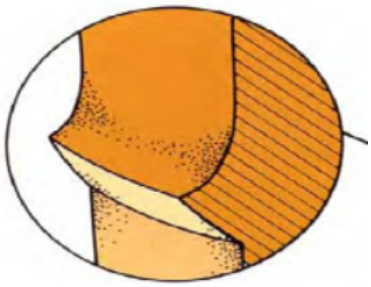
1. Full Metal Crown (All the surfaces).
2. The lingual and proximal surfaces of full veneer crown, three- quarter crown and post crown.

Advantages of Chamfer finishing line

1. Distinct margin
2. Adequate bulk
3. Easier control

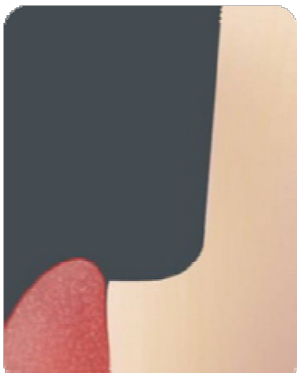
Disadvantages of Chamfer finishing line

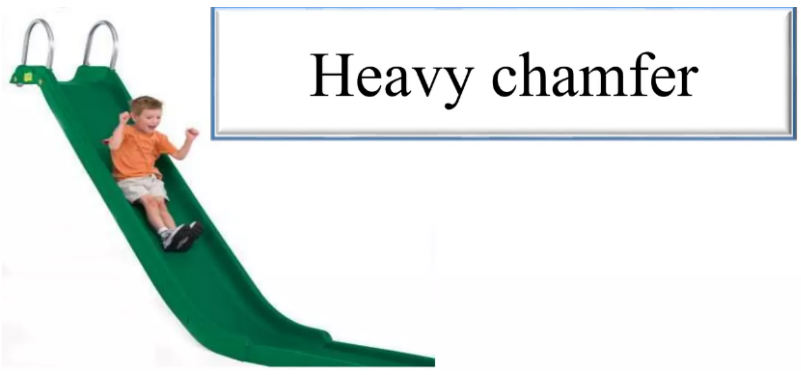
1. Care needed to avoid unsupported lip of enamel



3. Heavy chamfer finishing line

This type of finishing line provides a 90° cavo-surface line angle with a large radius internal angle, so it provides better support for the ceramic crown. It can be used with porcelain fused to metal (PFM) crown and All Ceramic crown.





Advantages of Heavy Chamfer finishing line

1. Better support for a ceramic for a ceramic crown.

Disadvantages of Heavy Chamfer finishing line

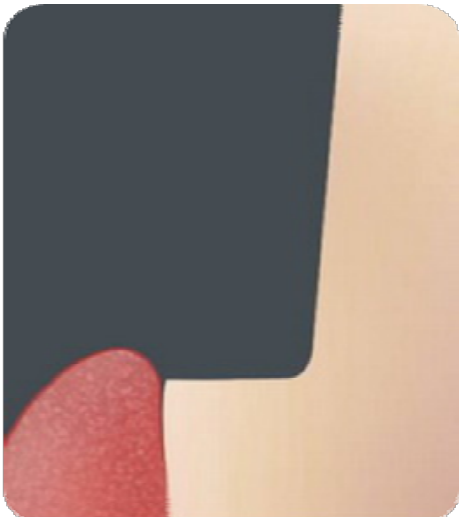
1. Unskilled operator can create fragile ‘lip’ of enamel at cavosurface

Bur

Round end taper

4. Shoulder finishing line (Butt shoulder)

Shoulder finishing line is the least conservative type of finishing line due to the excessive amount of tooth structure removed to obtain this type of finishing line. In the "butt" type of shoulder finishing line, the axial walls meet the finishing line at a right angle. A flat-end tapered fissure bur is used to obtain this finishing line.



This type of finishing line is used when bulk is required for strength or esthetic, that's why it is almost used with jacket crown since jacket crown is made of either porcelain or acrylic resin, which are brittle materials and require enough thickness

to withstand the occlusal forces without fracture. On the other hand, the increased thickness provides better shade of the material and so better esthetics.

*Jacket crown: it is an artificial non-metallic restoration made of porcelain, used to cover the all surfaces of the clinical crown.

Advantages of Shoulder finishing line

1. Bulk of restorative material.

Disadvantages of Shoulder finishing line

1. Less conservative of tooth structure.
2. Stress concertation at 90-degree internal angle of the finish line, hence conducive to coronal fracture.

Indication of Shoulder finishing line

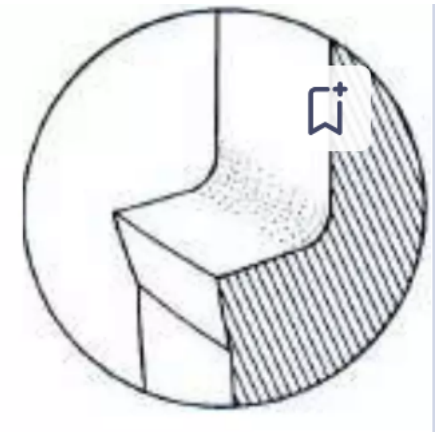
1. Facial margin of metal ceramic crowns.
2. Complete ceramic crown.

Bur

Flat end taper

5. Radial shoulder finishing line

Radial shoulder is a modification of the shoulder finishing line. It is a shoulder finishing line with rounded internal line angles. This will reduce the shoulder slightly and minimize stress concentration on the tooth structure from one hand and on the restoration itself from the other hand.



Advantages of Radial shoulder finishing line

1. Stress concentration lesser than the classic shoulder.

Disadvantages of Radial shoulder finishing line

1. Less conservative of tooth structure.

Indication of Radial shoulder finishing line

1. Facial margin of metal ceramic crowns.
2. Complete ceramic crown.

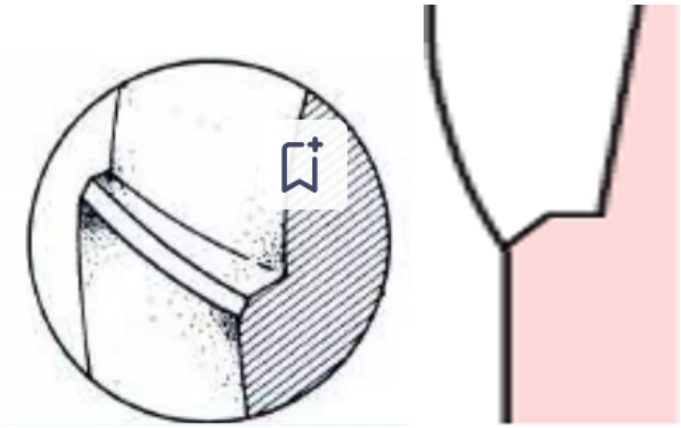
Bur

Flat end taper

End cutting carbide finishing bur

6. Shoulder with bevel finishing line

Shoulder with bevel is another modification of the shoulder finishing line by adding a bevel to the shoulder. The bevel is at 45° angle. NOT USED routinely for full veneer restorations.



Advantages of Shoulder with bevel finishing line

1. Bulk of material.

Disadvantages of Shoulder with bevel finishing line

1. Less conservative, extend preparation apically.

Indication of Shoulder with bevel finishing line

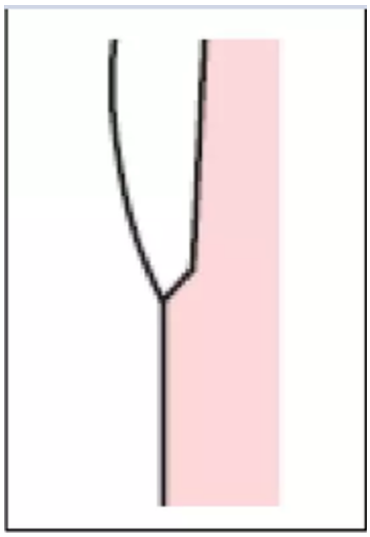
1. Facial margin of posterior metal ceramic crowns with supragingival margin.
2. Gingival finish line on the proximal box of inlays and onlays.
3. Occlusal shoulder of onlays and mandibular three-quarter crowns.
4. Finish line for extremely short walls.

Objectives of adding a bevel to the shoulder finishing line

1. The bevel provides a burnishable margin for the metal that may extend sub-gingivally (The thinner it is, the more adaptable to the tooth surface).
2. To provide enough space for shape and contour.
3. To reduce marginal discrepancies.
4. To remove unsupported enamel.

7. Sloping Shoulder:

- A 120-degree sloped shoulder margin used as an alternative to the 90-degree shoulder for the facial margin of a metal-ceramic crown.
- Reduces the possibility of leaving unsupported enamel.
- Provides sufficient bulk to allow thinning of the metal framework to a knife-edge for acceptable esthetics.



Advantages of Shoulder with bevel finishing line

1. Bulk of material.

Disadvantages of Shoulder with bevel finishing line

1. Less conservative of tooth structure.

Indication of Shoulder with bevel finishing line

1. Facial margin of metal ceramic crowns.

8. Chisel edge:

- A variation of the feather edge.
- Formed when there is a larger angle between the axial surfaces and the unprepared tooth structure.
- Associated with an excessively tapered perparation.

Advantages of Chisel finishing line

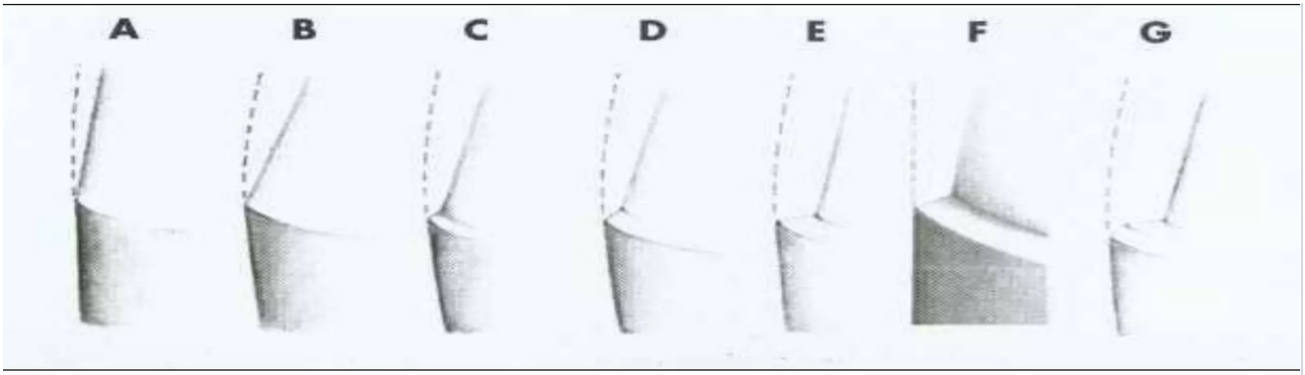
1. Conservative of tooth structure.

Disadvantages of Chisel finishing line

1. Location of margin difficult to control.

Indication of Chisel finishing line

1. Occasionally on tilted teeth.



A. Featheredge, B. Chisel, C. Chamfer, D. Bevel, E. Shoulder, F. Sloped Shoulder, G. Beveled shoulder

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Clinical note:

1. Shoulder margins provide good seat but a comparatively wider marginal seal.
2. Chamfer margins provide superior sealing of the margins despite poor seat.
3. Commonly used finish line types include chamfer, shoulder, bevel, depending on the case.