

Understanding the Margins of Restorations

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Abstract

Gingival margins play a vital role in maintaining the health of the periodontium. The finish lines should always be conservative and supragingival for its technique sensitive and good for the soft tissues. The operator must know the various margins and their significance in maintaining the health of periodontal tissues.

Keywords: Types; Biologic Width; Gingival Health; Burs; Esthetics.

Introduction

The main interest of the restorative dentist must be to restore the tissues to normal in form, function and esthetics and in addition to maintaining the health of the tissues. Many materials are used to restore the prepared crown either for veneers or full or partial coverage. The margins of these materials must not affect the health of the gingiva surrounding the tooth being restored. Different finish lines have particular indications for optimum function[1].

Biologic width

The epithelial attachment is the most unprotected of the supporting structures, and procedural trauma can occur during tooth preparation. The deeper subgingival extension of the tooth preparation, the greater is the chance for insult to the epithelial attachment.

There is general consensus that placing restorative margins within the biologic width usually leads to gingival inflammation, clinical attachment loss, and bone loss. This is thought to be due to the destructive inflammatory response to microbial plaque

accumulation at deeply periodontal pockets or gingival recession[2,1].

Components of biologic width

1. Average depth of the histologic sulcus is 0.69 mm,
2. Average junctional epithelium measures 0.97 mm (0.71 to 1.35 mm),
3. Average supraalveolar connective tissue attachment is 1.07 mm (1.06 to 1.08 mm)

The total of the attachment is therefore 2.04 millimeters (1.77 to 2.43 mm) and is called the biologic width, essential for maintenance of periodontal health and avoid irritation that can damage the periodontium (prosthetic restorations, for example).

Indirect restorations where margins are critical

1. Veneers
2. Full metal crowns
3. Porcelain fused to metal crowns
4. All ceramic crowns

Types of margins [3]

Supragingival

Supragingival preparation is above the tissue to place the margin.

1. Easily finished
2. On enamel
3. Easier to take impression

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4. Better adapt the margins
5. Better hygiene
6. Easy to evaluate the margins in the later part

Disadvantages

1. Esthetics can be compromised when using certain restorative materials.
2. If zirconia, metal or alumina is used the process will be more difficult because the margin itself is more opaque.
3. When we are using a more opaque restorative material of any thickness, there will be a difference in opacity of the margin and tooth shade causing a visible line at the junction where the restoration meets the tooth.

Equigingival

Equigingival preparation is even with the tissue to place the margin.

Advantages

1. Similar to supragingival margins, it's easy to take impression and finish equigingival margins because preparation is not going below the tissue.
2. Very healthy gingiva, although may not be as healthy as it would be if preparation is to stop above the tissue.

Disadvantages

1. Equigingival margins carry very similar disadvantages as the supragingival margins.
2. Esthetics can become an issue but if you go in even to the tissue, it is less likely you will have an unaesthetic result.
3. In case patient has discolored teeth and an opaque material is being used, a highly esthetic result is more difficult to achieve than if preparation was subgingival.

Subgingival

Subgingival preparation below the tissue to place the margin where:

1. esthetic is of prime consideration,
2. dental caries, erosion and abrasion cavity,
3. old restorations extend subgingivally,

4. proximal contact area extend to gingival crest,
5. modification of axial contour is needed,
6. produce a cervical crown ferrule effect in endodontically treated tooth,
7. to control root sensitivity when other modalities are not effective.

Disadvantages

1. The gingiva can recede after placing the margin. There is a risk of having unhealthy gingiva since probing below tissue is done.
2. Very tedious to make an impression since retraction the tissue is needed.

Factors affecting the selection of finish line [5,2]

- Type of restoration
- Material of restoration
- Amount of occlusal forces the restoration will bear
- Predicable level of marginal integrity should be attained with that particular finish line
- Acceptable esthetics
- Health of the gingiva

Burs used for preparing finish lines [6,1]

Rotary instruments can be classified in two categories. These are:

- (1) Diamond abrading burs and
- (2) Cutting burs

Bur head designs

Round ended
Flat ended tapered diamonds
Chamfer diamonds
Chamfer carbide burs

Restoration margins and gingival health

Tissue response to metal-containing prosthetics is frequently poor, even when the margins are supragingival.

Conclusion

Improperly placed margins and poorly prepared finish lines can lead to distortion of the casting margins and affect the health of gingival. Gingival when not properly maintained can lead to accumulation of plaque, inflammation of gingival

eventually resulting in recession, tooth sensitivity due to cemental exposure, swollen inflamed gums. Hence, the margins of the restoration should be properly placed to ensure optimum esthetics and health of gingival. The restorative dentist must know the various margins, indication of the finish lines so that the completed restoration will not have any untoward effect on the periodontium.

Table 1 Different types of finish lines and their indications [4,3]

Types of finish lines	Bursused	Indications
• Shoulder		90° angle with unprepared tooth surface Allows for sufficient bulk of ceramic Indications: Facial surface of PFM crowns Disadvantages: Less conservative
• The beveled shoulder		45° bevel Bevel helps in burnishing the margins of subgingivally extending restorations Provide sufficient space for shape and contour Avoid marginal discrepancies Remove unsupported enamel Indications: Labial surface of full veneer crowns In case of extremely short walls
• The flat shoulder		The resulting butt joint permits the use of a bulk of porcelain at the margin, thus removing the need for a metal collar More severe than the knife edge and ideal for metal margins.
• Light chamfer (0.3 mm)	chamfer diamond	
• Heavy chamfer (0.8 mm)	heavy chamfer can be developed more effectively with a rounded end tapered diamond instrument	Well defined More space for bulk of metal Difficult to burnish Indicated for area to be covered by gold Indications: porcelain-fused-to metal restorations
• Shoulder with bevel		45° bevel Enough space for shape and contour Metal margin can be burnished Reduces marginal discrepancies Indications: Labial surface of full veneer crown
• Radial shoulder		Rounded internal line angles, this will reduce the shoulder slightly and reduce stress concentration on tooth structure
• Feather / Knife edge	Tapered fissure	Advantages: • Most conservative • Easily prepared and burnishable Disadvantages: • Difficult to recognize • Difficulty in casting the margin • Highly susceptible to distortion Indications: • Full metal crown • Three quarter crown • Lingual and proximal surface of full veneer crown

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