

Gingival tissue management in Restorative Dentistry

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Abstract:

The periodontium that surrounds the tooth should be healthy for the optimum functioning of the tooth. The gingiva which is a part of the periodontium must be healthy as well so that that any iatrogenic procedures don't damage the gingiva. The concept of biologic width must be well understood to properly manage the gingiva during any restorative procedures.

Keywords: Biological width, gingival retraction, hemostasis, techniques

Introduction

Esthetic considerations of teeth and soft tissue play a major role in the treatment planning of dental care, especially in the restoration of anterior teeth. Most attention is paid to techniques and materials that are available in esthetic restorative dentistry, and less on soft tissue esthetics; i.e., the contours, color, and overall appearance of the gingiva and associated soft tissues.¹

Every tooth that undergo endodontic treatment must be protected with extracoronary restoration and when a crown is deemed mandatory the margins must be fabricated in such a way that it does not affect the health of the gingiva and no periodontal complications arise eventually². The biologic width is the guiding factor for placement of the margins of the extracoronary restoration. The biologic width should not be violated at any cost. Therefore, the objective of the present article is to review briefly the management of gingival tissue in restorative dentistry.

Review of literature

Biological width^{3,4}

Biologic width is defined as the dimension of the soft tissue, which is attached to the portion of the tooth coronal to the crest of alveolar bone.

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The notion of biologic width was begun by Gargiulo et al in 1961, who observed a kind of uniformity in the dimensions of some components of the periodontium which forms the biologic width. It was recounted by Ingber, and the denomination biologic width was conceived by D Walter Cohen.¹

Components of biologic width

- Mean depth of the histologic sulcus is 0.69 mm
- Mean junctional epithelium measures 0.97 mm (0.71 to 1.35 mm)
- Mean supraalveolar connective tissue attachment is 1.07 mm (1.06 to 1.08 mm)

The entire width of attachment is therefore 2.04 millimeters (1.77 to 2.43 mm) and is known as biologic width, necessary for maintenance of periodontal health and circumvent irritation that can damage the periodontium (for example prosthetic restorations).^{2,5}

The three categories of biologic width described are:

1. Normal Crest
2. High Crest
3. Low Crest Stable
4. Low Crest Unstable

Normal Crest:

- The mid-facial measurement is 3.0 mm and the proximal measurement is a range from 3.0 mm to 4.5 mm.
- Incidence: Normal Crest occurs approximately 85% of time.

High Crest:

- The mid-facial measurement is less than 3.0 mm and the proximal measurement is also less than 3.0 mm.
- Incidence: High Crest is an unusual finding in nature and occurs approximately 2% of the time.

- There is one area where high crest is seen more often: in a proximal surface adjacent to an edentulous site.
- If a tooth is removed and the interproximal papilla is not supported, it will collapse, commonly resulting in a High Crest situation.

Low Crest:

- The mid-facial measurement is greater than 3.0 mm and the proximal measurement is greater than 4.5 mm.
- Incidence: Low Crest occurs approximately in 13% of people
- Conventionally, the Low Crest patient has been described as more susceptible to recession secondary to the placement of an intracrevicular crown margin. When retraction cord is placed subsequent to the crown preparation, the attachment apparatus is routinely injured. As the injured attachment heals, it tends to heal back to a Normal Crest position, resulting in gingival recession.

Low Crest, Stable or Unstable

- The Low Crest attachment is in fact more complex because all Low Crest patients do not react the same way whenever there is injury to the attachment.
- Few Low Crest patients are susceptible to gingival recession while others have a quite stable attachment apparatus.
- The difference is based on the depth of the sulcus, which can have a wide range

The extent of biological width is not same for all teeth and depends on tooth position within the alveolus and is different for each tooth and for same tooth on different surfaces.⁸

Importance of Preparation of the periodontium for Restorative Dentistry:^{1,6}

The reasons why periodontal disease must be eliminated prior to restorative dentistry are:

1. Gingiva shrinks after periodontal treatment.
2. Position of teeth is commonly altered in periodontal disease. Resolution of inflammation after treatment causes the teeth to move again, often back to their original position. Restorations designed for teeth before the periodontium is treated may produce injurious tensions and pressures on the treated periodontium.
3. Any inflammation of the periodontium retards the capacity of abutment teeth.
4. Discomfort from tooth mobility interferes with mastication and function.
5. It is easy to obtain accurate impressions and make

precise preparations on healthy gingiva than inflamed one

6. To minimize the risk of trauma to the gingival tissues during preparation and impression procedures.

Gingival retractions should fulfill the following criteria^{6,7}

- It should provide maximum visibility of the operating site.
- It should expose the finish line margins of the tooth preparation totally such that it permits impression taking and allows marginal integrity for the restoration.
- It should provide space for sufficient bulk of the impression material so that the impression does not tear on its removal.
- It should permit completion of the preparation and cementation of the restoration.

Classification

I. Mechanical methods

- A) Wooden wedges
- b) Rolled cotton twills
- c) Cotton twills + slow setting ZnOE cement
- d) Copper band
- e) Rubber dam
- f) Oversized temporary

II. Chemicomechanical Methods

In most cases these drugs are both astringent, causing contraction-retraction of the gingival tissues, and hemostasis, constricting blood flow through coagulation.

1. 8% Racemic epinephrine
2. Aluminum chloride.
3. Alum (aluminum potassium sulfate).
4. Aluminum sulfate.
5. Ferric sulfate.

III. Rotary curettage

IV. Electrosurgery

Latest retraction techniques

1. Magic Foam Cord
2. Merocel retraction strips
3. Expasyl (Gingival Retraction Paste/Gels): it's an injectable Retraction Method and cordless technique.
4. Retrac
5. Lasers

Surgical gingival retraction techniques

Surgical tissue dilation

Electrosurgery

Rotary curettage/ Gingitage

Rotary curettage makes use of a high-speed turbine to cut the gingival tissue rapidly and create a trough all around the margins.

Advantages:

- i. Reduce the excessive tissue
- ii. Help to contour the gingival outline

Haemostasis during gingival retraction techniques⁸

A common clinical problem dentists confront with restorative procedures is contamination with blood. The causes include:

- i. Plaque, trauma, and/or an encroached biologic width
- ii. Plaque causes gingivitis, caries, and periodontitis.
- iii. Trauma that happens during the restorative procedure
- iv. Wedges can press laterally and aggressively against the gingival papilla, and metal or plastic matrix bands' sharp edges can cut healthy/inflamed tissue during the isolation of the cavity.
- v. Burs used to excise the caries, excise inflammatory tissue, and widen the gingival sulcus
- vi. Cords packed to deflect or retract the gingiva in attempt to expose the cavity margin

Any of these events can result in blood contaminating the restorative field, thus negatively affecting impressions, cavity preparation, restorative materials, and cementation^{2, 9}.

Commonly used hemostatic agents in restorative dentistry are ferric (ferrous) sulfate and AlCl₃.

There is a link between restorative care and periodontal health. An invasion of the biologic width happens when the restorative margins are prepared too deep inside the sulcus. Inadequate restorations can have ledges or areas that are not cleansable, which can lead to plaque accumulation. Adolescents and geriatric patients usually have poor oral hygiene. New restorations are often needed as plaque control is compromised.

To eliminate gingivitis and a periodontal condition, there must be perfect marginal fit of the restoration. One such instance is a fixed prosthodontic restoration. The

fit of the restoration is related to the precision of the impression. An inadequate impression from blood contamination creates a problem with the restoration if the impression is forwarded to the dental laboratory.

Conclusion

The goal of any restorative treatment must be to restore the health of the tooth and the periodontium for optimum health and function. The gingiva is very sensitive to any external insults. With the progress in the gingival management techniques every restorative dentist must strive to do the procedure without inflicting any damage to the gingiva.

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