



## Gingival management in fixed partial denture: A new perspective

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### Abstract

**Background:** Fixed dental prosthesis success requires appropriate impression making of the prepared finish line. This is critical in either tooth-supported fixed prosthesis (crown and bridge) or implant-supported fixed prosthesis (solid abutment). If the prepared finish line is adjacent to the gingival sulcus, gingival retraction techniques should be used to decrease the marginal discrepancy between the restoration and the prepared abutment. Accurate marginal positioning of the restoration in the prepared finish line of the abutment is required for therapeutic, preventive and aesthetic purposes.

**Keywords:** Impression making, Gingival retraction, cordless retraction.

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### Introduction

Gingiva plays a major role in the success of fixed partial prosthodontics. If any sort of gingival interference is there it can cause pocket formation and thereby cause the failure of the fixed partial denture.

Generally, trauma from occlusion in gingivitis can be classified into 2 zones

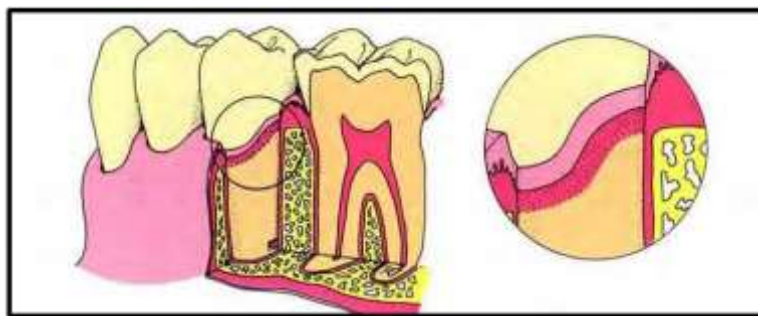
- Zone of irritation.
- Zone of co-destruction.

Trauma from occlusion causes infra osseous pockets, angular (vertical) and crater-like osseous defects with excessive tooth mobility<sup>(1)</sup>. For such reasons, it is always necessary to restore the gingival tissues to a healthy condition that can be maintained with proper instruction. Many authors have advocated that it is difficult to assess sub gingival finish lines and have also suggested Supragingival finish lines for cast metal restorations<sup>(2)</sup>.

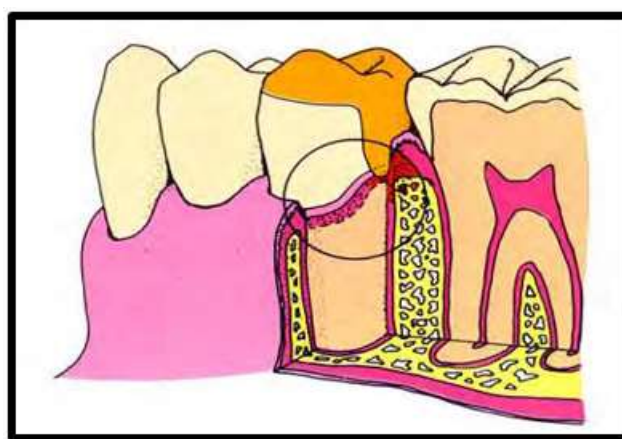
### Biological width

It is the distance from the epithelial attachment to the crest of the alveolar bone and is normally 2mm in width. When the margin of restoration is extended into the biological width,

inflammation and osteoclastic activity are stimulated. Continued inflammation along with bone loss and pocket formation will occur.



**Figure 1:** Depicts the Biological width from the epithelial attachment to the crest of the alveolar bone.



**Figure 2:** Depicts the encroachment of the Biological width by restorations.

### Margin placement

Margin placement in consideration with gingiva can be of 2 types:

- 1.) Supragingival margin placement and
- 2.) Intracrevicular margin placement.

#### Supragingival margin placement

Here margins are prepared Supragingival on the enamel of the anatomic crown. In addition to the favorable reaction of the gingiva, other advantages are:

- The common path of insertion and
- Adequate bulk of porcelain veneering material can be accommodated without any pulpal injury.

#### Intracrevicular margin placement

Also known as the sub gingival margin and it can extend into the junctional epithelium and the connective tissue, which is a violation of the biological width<sup>(3)</sup>. In conditions where there is severe cervical erosion, restoration or caries extending beyond the gingival crest, there is a need for esthetics then, in such conditions we have to place sub gingival margins.

#### Intracrevicular depth

Accurate estimation of the true gingival crevice is important to ensure that margins do not impinge on the junctional epithelium or the biologic width. It was discovered that the average crevice depth was between 0.5 to 1 mm in depth<sup>(4)</sup>. The ideal Intracrevicular position for margins is 0.5 mm beneath the gingival crest.

### **Crown lengthening**

Surgical crown lengthening or extension may be indicated to improve the appearance of an anterior tooth or when the clinical crown is too short to provide adequate retention without the restoration's impinging on the biological width. In some patients, a hopeless tooth with extensive sub gingival caries, a sub gingival fracture, or root perforation resulting from endodontics can be successfully restored after the crown.

A pretreatment decision must be made about whether the tooth should be removed or restored. Crown lengthening may be accomplished either surgically or with combined orthodontic-periodontics techniques, depending on the patient and the dental situation.

### **Gingival retraction**

Gingival Retraction is the deflection of the marginal gingiva away from a tooth. Gingival retraction is a process of exposing margins when making an impression of the preparation. Gingival retraction can be divided into basically two types. One is surgical retraction which includes Gingivectomy Gingivoplasty and periodontal flap procedures. Non-surgical retraction includes retraction cords and rings which can be impregnated or non-impregnated along with copper bands<sup>(5)</sup>.

#### **Mechanical Method**

First to be developed and causes physical displacement of gingival tissue. Used alone or in conjunction with other methods.

#### **Rubber Dam**

Charbonneau and Gilmore H.W Heavyweight rubber dams were used to produce retraction by compression. Advantages include control of seepage and hemorrhage and ease of application. Disadvantages are full arch models cannot be made and severe cervical extension of preparations<sup>(6)</sup>.

#### **Cotton twills with ZnO cement**

Employs gentle pressure over some time. Zone mixed into a creamy consistency. Cotton twills are rolled into this mass and then on a towel to gain compactness. Try to prevent sticking the pack to the instruments as it gives ease in handling. Reflect the tissue laterally and the pack is held in place with fast-setting Zone cement. It is used for a minimum period of 48 hours but not >7 days<sup>(7)</sup>.

#### **Copper Band impressions**

A copper band is used as a means of carrying the impression material and a mechanism for gingival retraction. This Technique includes the Selection of the copper band and one surface of the band may be perforated. The cervical end of the band may be trimmed by the finish line<sup>(8)</sup>.

#### **Gingival retraction using Chemico-mechanical method**

This method uses a chemically impregnated retraction cord as a Mechano-chemical method of displacement of the gingiva. The mechanical aspect involves the placement of the cord into the gingival sulcus and the chemical aspect involves the effect of chemicals/medicaments on the gingiva. Chemicals used are 0.1% to 8% epinephrine, 100% potassium aluminum sulfate, 5 to 25% aluminum chloride solution, 13.3% ferric sulfate solution, 8 to 40% zinc chloride solution and 20 to 100% tannic acid solution<sup>(9)</sup>. After vigorous debridement of the newly accessible tooth surfaces, a surgical dressing is applied for protection and hemostasis which remains in place for 7 to 10 days<sup>(15)</sup>.

#### **Epinephrine**

Epinephrine used in concentrations of 0.1% and 8% to saturate the retraction cord causes local vasoconstriction of the gingival tissues and minimal systemic effects if used in an intact sulcus<sup>(10)</sup>. However, it is contraindicated in patients with cardiovascular diseases, hypertension, diabetes, hyperthyroidism and hypersensitivity to epinephrine<sup>(11)</sup>.

**Rotary gingival curettage**

It must be done on healthy and inflammation-free tissue to prevent tissue shrinkage that occurs when diseased tissue heals. There should be the absence of bleeding on probing and Sulcus depth should be less than 3.0 mm and presence of adequate keratinized gingiva<sup>(12)</sup>. Shoulder finish line preparation at gingival crest using flat end tapered diamond. Place Aluminum chloride impregnated retraction cord to control hemorrhage. Remove the cord after 4-8 minutes and make an impression<sup>(13)</sup>.

**Electro surgery**

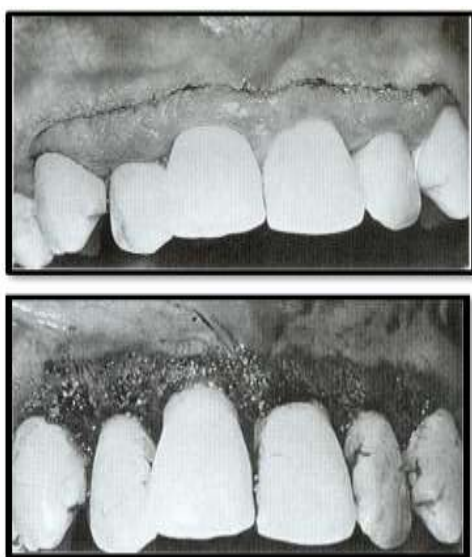
Experiments by d'Arsonvol (1891) demonstrated that electricity at high frequency will pass through a body without producing a shock (pain or muscle spasm), producing instead an increase in the internal temperature of the tissue. This discovery was used as the basis for the eventual development of electro surgery. Mechanism of action involves controlled tissue destruction as current flows through a small cutting electrode producing a high current density and rapid temperature rise. Cells directly adjacent to the electrode are destroyed due to this temperature increase.

**Gingivectomy**

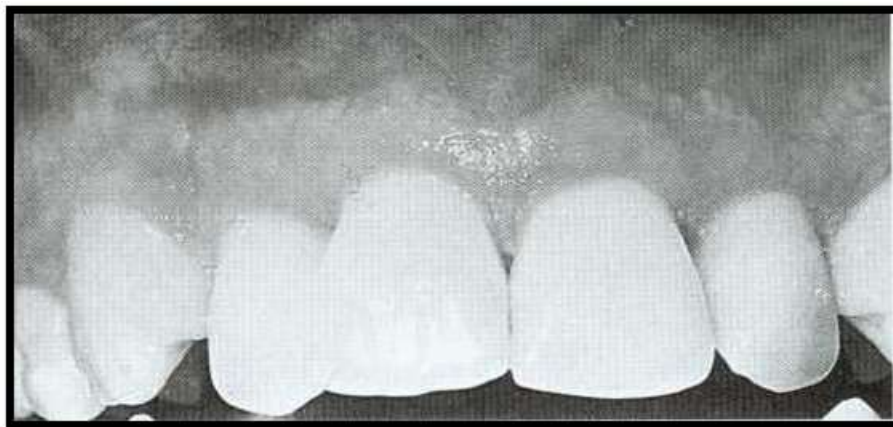
Gingivectomy is the removal of diseased or hypertrophied gingiva. Introduced by G.V. Black as it was the first periodontal surgical approach to gain widespread acceptance. Gingivectomy is essentially the resection of keratinized gingiva only. It may be applied to the treatment of supra body pockets and fibrous or enlarged gingiva, particularly when they result from Diphenyl hydantoin (Dilantin) therapy. However; it is unsuitable for the treatment of infrabony defects<sup>(14)</sup>.

The surgical technique consists of establishing bleeding points at the base of the gingival sulcus with a pocket marker or periodontal probe to serve as a guide for the gingival excision. The initial incision is made to these points in a beveled fashion with firm, continuous strokes from the Gingivectomy knife. The interproximal tissue is freed by sharp excision and is removed from the site.

The resulting ledge of tissue at the buccal and lingual or palatal terminations of the incision is then smoothed with the incision of a Gingivectomy knife or a rotary instrument to a margin continuous with the remaining tissue.



**Figure 3:** Removal of the ledge of gingival tissues with a Gingivectomy knife.



**Figure 4:** Healing of the gingival tissues post- surgical intervention.

### Conclusion

In the practice of fixed partial dentures, we should plan the placement of margins as per the need of the treatment. We should always consider the Intracrevicular depth and biological width, before placing any restoration. Surgical crown lengthening is an option for increasing the crown root ratio, but we have to assess the condition of the tooth.

**Author's Contribution:** All authors contributed equally to the manuscript.

**Conflict of Interest:** NIL

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