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A Simple Technique to Reduce the Risk of Irreversible Gingival Recession after the Final Impression

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Abstract

The chemicomechanical method is the most common tissue displacement technique used to facilitate the final impression for fixed dental prostheses. The article describes a simple technique to minimize the risk of developing gingival irreversible recession because of tissue displacement cords.

Different tissue displacement methods have been developed and used clinically to expose both prepared and nonprepared tooth surfaces before the final impression. Most of these methods are technique sensitive and could contribute to tissue damage like gingival recession if they are not used properly. Periodontal tissue damage during gingival displacement should be minimized for a better soft tissue profile around the fixed prosthesis. Tissue displacement techniques have been classified as chemical, mechanical, surgical, or a combination of these. The chemicomechanical method is the most common tissue displacement technique used by dental practitioners.[1] In this method, chemically impregnated cord or cord dipped in an astringent is pushed into the soft tissue sulcus surrounding the tooth for a sufficient length of time before the impression.

The use of impregnated retraction cord is time consuming and might cause gingival bleeding and recession when improperly manipulated. Therefore, three factors need to be considered when this method is selected to displace gingival tissue: insertion time, cord packing instrument force, and the type of medicament. It has been recommended that the time should not be less than 5 minutes to avoid tissue collapse or greater than 10 minutes to avoid irreversible recession.[2] In many cases, as in a full-arch final impression, the retraction cord may remain longer than 10 minutes, which may lead to irreversible recession in some areas. As a result, the final soft tissue profile will be compromised if this recession occurred on the labial side of the maxillary and mandibular anterior teeth. This could lead to esthetic failure of the restoration and could necessitate a remake of the crown.

The force of the cord-packing instrument should be minimal to protect the Sharpey's fibers. Excessive force can lead to crevicular bleeding, gingival inflammation, and gingival margin shrinkage.[3–6] Many different medicaments with varying degrees of safety and effectiveness, such as aluminum potassium sulfate (Alum), ferric sulfate, zinc chloride, epinephrine, aluminum chloride, and sympathomimetic amines, have been used for tissue displacement. According to Woychesin, zinc chloride caused undesirable tissue destruction in dogs.[7] In addition, he concluded that cords impregnated with Hemodent (Buffered Aluminum Chloride; Premier Dental Products Co., Plymouth Meeting, PA), 100% alum, 8% racemic epinephrine, and racemic epinephrine 1 mg/inch were clinically effective without significant irreversible local effects. Hemodent has been further evaluated and compared to other medicaments in two studies by Ramadan and coworkers.[8,9] In one of these studies, the histological response of gingival tissue in dogs toward cords impregnated with 5%, 10%, and 15% solutions of aluminum chloride and Hemodent were evaluated.[8] The authors found that adequate gingival tissue healing was demonstrated by 5%, and severe tissue responses with lack of healing at 15 days were caused by 10% and 15%. In addition, the authors hypothesized that the caustic nature of aluminum chloride may be partially neutralized by the additional ingredients in Hemodent.

Recently, many cordless materials and techniques have been introduced to save time, enhance patient comfort, and minimize the invasive procedure. These materials include the following:

1. Expasyl (Kerr Corp, Orange, CA), a viscous paste that depends on the haemostatic effect of aluminum chloride and the hygroscopic expansion of kaolin after contact with crevicular fluid;
2. Magic Foam Cord (Coltene Whaledent AG, Altstatten, Switzerland), an expanding polyvinylsiloxane material;
3. Chemicals in an injectable matrix, such as injecting 15% aluminum chloride in a kaolin matrix.

The influences of Expasyl, Magic Foam Cord, and conventional retraction cord on human periodontium were evaluated by Al Hamad et al.[10] They found that all techniques caused a temporary inflammation, and the greatest inflammation was caused by Expasyl, which showed slower recovery as well. In a study by Yang et al, gingival recession caused by an injection of aluminum chloride in the sulcus was nearly undetectable.[11] A potential drawback of Expasyl, Magic Foam Cord, and injectable aluminum chloride is gingival displacement when a deep subgingival margin exists.

The aim of this article is to describe a modified single/double cord technique to reduce the unnecessary exposure time between the critical soft tissue area (labial/buccal sides) and the retraction cord and reagent.

Technique

1. Isolate the teeth and dry the field using cotton rolls, saliva suction, and air. Do not over-dry the teeth as it may lead to sensitivity.
2. If the final impression is planned for many teeth, including posterior and anterior teeth, begin with the posterior teeth first.
3. Cut enough pieces of the Ultrapack retraction cord (Ultradent Products Inc., South Jordan, UT) and dip them in an aluminum chloride solution such as Hemodent.
4. After squeezing the cord to remove excess astringent, insert the cord and push it with a serrated cord-packing instrument (#371–9127; Patterson Dental, St. Paul, MN) into the sulcus interproximally on one side going through the lingual/palatal side until you reach the interproximal area of the other side and stop. (Do not continue to the labial side.)
5. Finish all other teeth in the same way (Fig 1).
6. Return to the initial tooth and complete the cord insertion on the labial/buccal side (Fig 2).
7. For the double retraction cord technique, follow the above steps for the first cord for all teeth.
8. Do not insert the cord in the labial/buccal sulcus.
9. Insert the second cord on top of the first cord for all teeth.
10. Return to the initial tooth and complete the cord insertion on the labial/buccal side for the first and second cord.

Discussion

This article describes a simple technique to reduce the unnecessary exposure time between the critical soft tissue area (labial/buccal) and the retraction cord and reagent thereby minimizing the risk of gingival recession. This technique can be used with both single and double retraction cord methods and with different medicaments available in the market. Because the addition of chemical agents to retraction cords complicates the condition and might increase the risk of gingival recession, careful selection for the type of the medicament should be considered. In addition to the histological response of the gingival tissue,[8] the length of the time in which the sulcus remains open and the width of the sulcus after using plain cord and cords impregnated with different medicaments were evaluated by Ramadan.[9] Plain cord and cords with 1/1000 epinephrine, 8% epinephrine, 100% alum, and aluminum chloride were compared. This study found that the sulcus remained open the longest and was the widest when Hemodent was used. Therefore, aluminum chloride is the material of choice for our technique.

The conventional retraction cord technique is an effective and safe method for gingival displacement when compared to electrosurgery and gingival curettage. It has been also compared with different cordless materials and techniques.[10,11] Although most of the cordless materials have an easy and faster application technique, gingival displacement for deep subgingival margins is still a concern, and may account for the continued use of retraction cord with a reagent such as aluminum chloride.[1]

Figure 1 Cords were pushed into the sulcus interproximally on one side going through lingual/palatal side to the interproximal area of the other side.

Figure 2 Labial sides were completed at the end.

Summary

This technique takes advantage of traditional methods, but minimizes the risk of developing irreversible gingival recession by reducing the exposure time to the retraction cord, especially at the labial tissue side where the esthetic result may be significantly affected.

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