



SOFT TISSUE MANAGEMENT IN FIXED PROSTHODONTICS - A NOTE ON RETRACTION CORDS...!


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ABSTRACT

Complete control of the environment of the operative site is essential during restorative dental procedures for patients comfort and safety and operator's access and clear visibility. Control of the oral environment extends to the gingiva surrounding the teeth being restored. It must be displaced to permit the making of a complete impression and sometimes even for the completion of the preparation. It is occasionally necessary to permanently alter the contour of the gingival tissue around the teeth or the edentulous ridge to ensure a better long-lasting result for the fixed restoration. The present article presents a review on soft tissue management in fixed Prosthodontics.

Key words: Gingiva, Finish Line, Restoration, Retraction.

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INTRODUCTION

Gingival retraction is the deflection of the marginal gingiva away from a tooth (GPT -7). Gingival retraction is a process of exposing margins when making impressions of prepared teeth. There are several terms for this process; they are gingival displacement, gingival dilation etc.[1,2]

LITERATURE REVIEW: An extensive research was done in pubmed and science direct data bases on retraction cords using following meshwords like gingiva, finish line, restoration, retraction from the year 1976 till 2003 and 155

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articles were found, out of which 09 articles were reviewed as per relevance for the present research paper.

Acceptance criteria for gingival retraction procedures:

It should create sufficient lateral and vertical space between the finish line and gingival tissue to allow the margin of the prepared tooth to be recorded in an impression medium. It should provide absolute control of gingival fluid seepage and hemorrhage, especially when elastomeric impression is used. It should not cause significant irreversible soft or hard tissue damage and it should not produce any potentially dangerous systemic effects.

Various methods and techniques have been described in the literature to achieve exposure of the finish line and create an acceptable environment for the impression materials.

Mechanical methods were amongst the 1st being developed. These methods involve physical displacement

of the gingival tissues by placement of materials within the gingival sulcus. The materials can be used alone or in conjunction with other methods. Several types of materials may be used. Use of rubber dam is not only an asset in the preparation of the tooth, but also when the impression is made, with this technique wax must be used to block out the damp and prevent its displacement. Excellent impressions are obtainable when the prepared teeth are in clean and dry environment. However, it is not feasible to make complete arch impressions and the rubber dam should only be used on relatively simple preparations with minimal sub gingival extension. [3]

String or fibers of different types have been advocated for the placement, wet or dry, in the gingival sulcus. Included are plain cotton thread, unwaxed floss, cotton cord, and 210 untreated surgical silk. Cords are available in varying thickness and may be plain, braided or in other configuration. A blunt instrument is used to gently pack the string or cord into the crevice. The development of elastic retraction rings is intended to facilitate placement and retention in the crevice. [4]

Important considerations for these techniques are; Plain cotton cord is poor in its ability to displace gingival when compared with chemically impregnated cords. On the other hand, tissue recovery is excellent. Overpacking can traumatize the tissue. The cord must be placed firmly but gently. Wetting the cord with water before removal from the sulcus to prevent injury to delicate epithelial lining has been recommended. Plain cord also provides pressure homeostasis.

Another mechanical method involves using an adapted temporary metal crown filled with thermo-plastic stopping material. A temporary metal crown is adapted to the finish line of the tooth and lined with an excess of temporary stopping material. The crown is placed on prepared tooth and excess stopping is rounded and smoothed with a hot instrument where it protrudes into the crevice. The temporary crown thus fabricated is left in place until the next appointment, at which the final impression is made.

A temporary crown filled with thermoplastic material or gutta-percha can cause prolonged or lasting recession if left in place for more than 12 hours. The last mechanical technique to be described here in uses fine sterile twills of cotton with slow setting ZnOE cement. Cotton twills, the size of floss are rolled in a creamy mixture of ZnOE cement. Several twills are placed in the sulcus and covered with faster setting cement. A minimum of 48 hours is recommended for placement, but the material should not be left in place more than 5 to 7 days, according to Schultz et al. [5]

Mechano-Chemical Methods consisted of cords impregnated with chemicals that are carried into the intracrevicular space without force.

Electro surgical methods are some situations in which the gingiva cannot be successfully handled by retraction cord

alone even if general condition of gingiva in mouth is healthy. Areas of inflammation and granulation tissue may be encountered around a given tooth. This may be result of overhangs or previous restorations or of caries itself. Resulting haemorrhage in sulcus can make impression making impossible by conventional means. The finish line may have to be placed so near the epithelial attachment that it is impossible to retract gingiva sufficiently to get an adequate impression. In these cases, it may be necessary to use some more means other than cord impregnated with chemicals to gain access and control minor bleeding.

Gingival Retraction Cord: They were initially introduced commercially in United States in 1994, a new series of knitted and twined gingival retraction cords were introduced that was impregnated with epinephrine or aluminium sulphate. Cords can be fabricated from cotton yarn or purchased commercially in a variety of forms. The cords physically pushes the gingiva away from the finish line and the combination of chemical action and pressure packing helps to control of fluids from the wells of gingival surface. [6]

Cords are lubricated with branched chain or porosity esters. The lubricating agents allow a medicament to be absorbed and released from the cord and also permit easier placement and atraumatic removal because they will not adhere to the gingival tissue. Braided cords are preferred over twisted cords as they don't unravel while they are having inserted.

Cord displaces the gingival tissue laterally and vertically. Lateral retraction places the tissues so that an adequate bulk of impression material can be interfaced with the prepared tooth. Vertical retraction exposed the unprepared portion. Authors describe both lateral and vertical components to tissue displacement. The cord may be saturated with solution prior to insertion or placed dry and solution applied. When various combinations of chemicals together used, it is recommended that the cord be saturated with solution before insertion. During gingival retraction procedures special emphasis should be given on the fragility of junctional epithelium and attachment of supracrestal fibres. Cord packing must be delicate and as atraumatic as possible.

Drag and Williams demonstrated that retraction cord placement following sub gingival preparations often tore the epithelial and connective tissue attachment from teeth. By delaying the final impression 2-3 weeks in cases involving anterior preparation tissues became firmer and more resistant to cord packing. The potential for permanent gingival recession is greater when a cord is left in a thin crevice for more than 15 min or if 2 cords are placed on top of one another with uncontrolled pressure within a shallow crevice. For this reason the facial crevice in the anterior regions should be delicately packed with one cord minimally possible.

Gingival Retraction Techniques Using Retracting Cord: The operating area must be dry. An evacuating device is placed in the mouth and the quadrant containing the prepared tooth is isolated with cotton rolls. The retraction cord is drawn from the dispenser bottle with sterile cotton pliers and a piece of approx. 2 inches long is cut off.

Grasp the ends of the cords between the thumb and forefinger of each hand holding the cord, twist the ends to produce a tightly wound cord of small diameter. If a braided or woven cord is used, twist is not necessary. Form it into a 'U' and loop it around the prepared tooth. Hold the cord between thumb and forefinger and apply tension very slightly in an apical direction. Start pushing the cord down between the tooth and gingiva in the mesial interproximal area with a packing instrument. Once the cord has been tucked in on the mesial, use the instrument to slightly secure it in distal proximal area.

Proceed to the lingual surface and begin working from the mesial lingual core. The tip of the instrument should be inclined slightly toward the area where the cord already has been placed. If the tip is inclined away from the area the cord may be displaced or pulled off. In some instances where the crevice is shallow or a finish line has drastically changing contours, it may be necessary to hold cord already placed in position with an instrument hold in left hand. Gently press down on the cord with the instrument directing the tip slightly toward the preparation. Slide the cord gingivally along the preparation until the finish line is felt. Push the cord in the crevice.

If the instrument is directed totally in an apical direction, the cord will rebound off the gingiva and roll out of the sulcus. Continue around the mesial, firmly securing the cord where it was slightly tucked before. Cut off the length of cord protruding from the mesial sulcus as nearly as possible to the interdental papilla.

Continue packing the cord around the facial surface, overlapping the cord in the mesial interproximal area. This tag is left protruding so that it can be grasped for easy removal. After 10 min, remove cord slowly to avoid bleeding. If active bleeding persists, ferric sulphate chemical can be applied to the gingiva. [7,8]

Retraction Procedures for Anterior Region: Especially for anterior teeth, when the intracrevicular margins are prepared for esthetics, depending upon the layers of cords placed, they are; [9]

Single Cord Technique: It is the simplest and least traumatic option. It is therefore indicated when gingival sulcus appears healthy and do not bleed as the cord is packed. To achieve maximum saturation of the cord by the chemical. Plain knitted cords can be permanently soaked in buffered AlCl_3 solution. Knitted cords do not spread easily and maintain their shape during handling. Before

impression making the cord is sequentially packed from the mesial aspect to lingual to distal and finally to buccal aspect of the preparation.

This sequence allows the string to be well secured in the sulcus before engaging the shallow facial crevice. Lateral deflection of elastic materials should be approx. 0.5 mm lateral deflection is frequently insufficient interproximally with only one cord because the tissues may collapse over the cord.

This usually requires that the same and be packed once more in the mesial, lingual and distal aspects. In this fashion However, the delicate and shallow facial crevice remains packed once whereas, the interproximal and lingual aspects are deflected with 2 cord thicknesses, for optimum results the cord should remain in place for approx. 10 min.

Selective Double Cord Technique: It is recommended when spontaneous bleeding of gingival crevice is likely to occur during impression making. A bleeding crevice is a major obstacle to an accurate impression and is usually caused by injury laterally or apically during tooth preparation. It is also associated with accumulation of plaque in marginal defects of provisional restorations or with deep margins.

Whenever there is suspicious or spontaneous bleeding during impression making, selective preparation of an extra thin string is recommended as a safety precaution.

Typically the interproximal and lingual aspects of tissues are more prone to localized inflammation whereas the facial sulcus remains relatively healthier. With selective double string technique, prepacking the facial crevice is usually avoided; it is packed only once to minimize the risk of tearing the epithelial and connective tissue attachments from the tooth.

A braid of extra thin cord impregnated with buffered AlCl_3 is prepacked and confined to inflamed portion of the crevice only. The excess braid should be sectioned with thin scissors and excess seepage and coagulum wiped with a cotton relief. A thin impregnated knitted cord is then packed into crevice according to normal retraction procedure sequence. Before impression material is injected, the thin cord should be removed but extra thin braid is left in place for haemostatic effect. It may get caught in impression, but should be left undisturbed when the impression is poured.

Double Cord Technique: As more haemorrhage control is required, the retraction process becomes more aggressive. If the gingival tissues are highly inflamed, obtaining an accurate impression is technically feasible, but gingival healing and reattachment are unpredictable. The double cord technique should ideally be reserved for situations where the whole gingival crevice is prone to bleeding.

typically occurs with gingival lacerations due to aggressive tooth preparation or after the wearing a faulty provisional restorations with overhanging margins. In this technique, an extra thin cord impregnated with buffered AlCl_3 is pre-packed into the entire sulcus and sectioned so that its both extremities meet at right angles without overlapping.

A gingival bleeding still occurs as would occur with exposed connective tissue, with papilla may need to be injected with 2% lidocaine solution with epinephrine to cause local vasoconstrictions. The crevice may also be very delicately rubbed with aluminium chloride, ferric sulphate of H_2O_2 solution. A thin impregnated knitted cord is then packed into crevice. Before taking impression it is removed while the extra thin cord is left in place for haemostasis. It may get caught in the impression but only close segments should be sectioned off before pouring of the impression. This technique controls the gingival haemorrhage effectively and yields excellent tissue displacement. However, it has greater potential for gingival recession because packing 2 cords into facial crevice in the anterior region may tear connective tissue attachment from root.

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CONCLUSION

It is essential that gingival tissue be healthy and free of inflammation before cast restorations are began. To start preparations in the cases of gingivitis makes the task more difficult and seriously compromises the chances for success. Because the marginal fit of a restoration is essential in preventing recurrent caries and gingival irritation, the finish line of the tooth preparation must be reproduced in the impression. Obtaining a complete impression is complicated when some or all of the preparation finish lines lies at or apical to the crest of the free gingiva. In these situations, the preparation finish line must be temporarily exposed to ensure reproduction of the entire preparation control of fluids in the sulcus, particularly when a hydrophobic impression material is used is also necessary because liquids can cause an incomplete impression of the critical finish line area. These are accomplished by one or more of the three techniques – chemical, mechano-chemical, and surgical. When used cautiously and meticulously it works excellently towards successful impression making and ultimately ensuring the complete success of the prosthodontic therapy.

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