Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/12469
DOI URL: http://dx.doi.org/10.21474/IJAR01/12469

ISSN NO. 2320-5407

RESEARCH ARTICLE

RECENT ADVANCES ON GINGIVAL TISSUE MANAGEMENT IN RESTORATIVE DENTISTRY

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Manuscript Info

Manuscript History
Received: 10 December 2020
Final Accepted: 14 January 2021
Published: February 2021

Key words:-
Isolation, Retraction, Tissue Management, Recent Advancement

Abstract

Marginal integrity is one of the main factors that contribute to the outcome of a restoration and longevity of the restoration and cast restorations. An increased significance on the perio–restorative interface in restorative dentistry is essential to enable the utilization of the concept of biologic width in a practical manner. The goal, regarding the management of gingival tissues, is to ensure that the peridontium is in a healthy state. The oral cavity is a difficult to treat because of lips, cheeks, and tongue that hinders and makes it difficult to visualize and manipulate instruments in the area to be treated related. Gingival retraction is essential to perform better when the finish lines of the restoration is below the gingival margin. There are various gingival retractions that have been employed previously like mechanical, chemical, surgical and chemomechanical procedures. These methods not only provide an ideal working environment and ample vision, but also maintain hemostasis to certain extent. The choice of a retraction method depends on clinical situation and accessibility. The purpose of this review is to demonstrate the recent retraction materials and techniques.

Introduction:-

Marginal integrity is one of the important factors that contribute to the success of restorations, cast restorations etc. In order to aid in proper cavity preparation, subsequent impression procedures and restoration, soft tissues should be excluded from the operating site [1].

Gingival tissue management is defined as "*Gingival retraction or displacement is the deflection of the marginal gingiva away from the tooth." –GPT.* It refers to the various techniques that are used in order to displace these tissues from the proposed operating site.

This ensures best properties of restorative material and longevity of the restoration without adversely affecting the soft tissues.

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Indications:
1. To widen the gingival sulcus in order to provide access for impression material to reach the subgingival margins and to record adequately the finish line.
2. Helps in obtaining the perfect die with accurate margins, which helps in margin placement and contouring of the restoration.
3. It helps to blend the restoration with the unprepared tooth surface.
4. Helps in placement and finishing of the margins on the prepared tooth.
5. During cementation it helps in easy removal of cement without tissue damage.
6. It helps in visual assessment of the marginal fit and any caries if present.
7. When it is necessary to extend the restoration below the gingival margin to enhance retention.
8. To enhance access and to prevent damage to the soft tissue during cavity preparation procedure.
9. Aesthetics, while placing ceramic crown. The labial finish line of the crown preparation should stay 0.5mm into gingival sulcus.
10. Making impression to get the contour of tooth below cervical margin.
11. Enhancing the retention: If the crown is smaller, restoration is to be placed after increasing crown length after gingival surgery.
12. Control gingival hemorrhage or fluid flow during operative procedure e.g. class 2 composite restorations.

Soft tissue retraction can be classified based on three principle methods that are available for use today:
1) Mechanical;
2) Chemomechanical; and
3) Electrosurgical.

Various gingival retractions methods have been employed previously like mechanical, chemical, surgical and chemomechanical procedures and each type is loaded with its own pros and cons [2]. To overcome these limitations, various newer retraction systems are introduced which are given as follows:

Recent advances:

1. Expasyl:
1. Introduced by Satalec Pierre Rolland.
2. Cordless gingival retraction (SDS/Kerr Company).
3. Is a viscous paste used for all procedures requiring gingival retraction including: impressions, seating of restorations, fitting rubber dams, and restoring class II, III, and V cavities.

Composition:-

Aluminum chloride	15% astringent & hemostatic agent
Kaolin	
Excipients	

Mechanism of action:
1. It has both mechanical and chemical action.
2. Aluminum chloride provides- hemostasis.
3. Viscosity of Kaolin- retracts the tissue.
4. Recommended time of application-1-2 min.

Advantage:
1. Effectively achieves hemostasis.
2. Effectively retracts gingival tissues
3. Less traumatic to tissues than cord packing.
4. Faster than traditional cord.
5. Easy removal from sulcus by rinsing.
6. Dispenser tips can bent- improves intraoral access.

Disadvantage:
1. Expensive
2. Effective under limited conditions.
3. Disposable metal dispenser tips are too large, causes difficulty to express.

4. Thickness makes it difficult to express.

Precautions:
1. Thorough cleaning is mandatory to prevent interference in polymerization of elastomeric impression materials.

Contraindications:
1. Presence of periodontal pocket and furcation.
2. Known allergy to aluminum chloride.

2. ***Magic foam:***
1. Developed by Prof Dr. Dumfahrt.
2. It is a non-hemostatic gingival retraction system (Coltène/ Whaledent).
3. First expanding vinyl polysiloxane material designed for retraction of the gingival sulcus.

Mechanism:
1. Expansion of silicon foam
2. When comprecap is used to apply pressure, the expansion of magic foam cord occurs in the sulcus.

Limitation:
1. It has a limited clinical indication.
2. Less hemostatic.
3. No improvement in speed/quality compared to cord.
4. Less effective on sub gingival margin.

Components of magic foam:
1. Foam
2. Cartridges
3. Mixing and intraoral tips
4. Compre caps

Advantages:
1. Non-traumatic, conservative method of temporary gingival retraction.
2. Easy and fast application directly to the sulcus without pressure or packing.
3. Comfortable to the patient.
4. Extensive rising is not required due to absence of haemostatic chemicals that could contaminate impression site.
5. Outstanding retraction for perfect impressions.

Limitations:
1. Hemostasis cannot be achieved.
2. Relatively expensive compared to cord.
3. No improvement in speed or quality of retraction compared with cord.
4. Less effective on subgingival margins.

3. Compre cap:
1. Hold the retraction deep in the sulcus, opening it even wider.
2. Ensure dry, clean area and well defined gingival margins.
3. Stops bleeding naturally by compression.

Usage
1. Simple to use.
2. The patient bites on the cap for 3-5mins and is removed carefully along the retraction cord.
3. Available in 3 sizes and are categorised for:
- Incisors
- Premolars
- Molars

4. Gingitrac (Centrix co):
1. Mild natural astringent gel.
2. Utilizes patient s bite pressure to push material into sulcus and retract gingiva.

Consists of:
1. Mixing gun
2. Gingitrac cartridge
3. Gingitrac matrix cartridge
4. Mixing nozzle
5. Dispensing tips
6. Gingicap

Advantages:
1. Less traumatic to tissues than retraction cord.
2. Color of foam makes it easy to see during use.
3. Easy to remove material from preparation and sulcus.
4. Adequate working time.

Disadvantages:
1. Limited clinical indications.
2. No hemostasis provided.
3. Expensive
4. No improvement in speed or quality of retraction compared with cord.
5. Less effective on sub-gingival margins.
6. Intraoral tips may be too large to adequately inject material into sulcus.

5. Merocel strips:
1. Introduced by Marco Ferrari et al in 1996.
2. Synthetic material that is a biocompatible polymer (hydroxylate polyvinyl acetate).

Mechanism of action:
1. Expands by absorption of oral fluids and exerts pressure on the surrounding tissue.

Method:-
1. About 2 mm of merocel retraction strip is taken.
2. Provisional crown is inserted.
3. Maintain pressure on crown for 10-15 min.

Advantages:
1. Easily shaped and adapted around tooth.
2. Highly effective in absorption of oral fluids.
3. No post surgical complications.
4. Non abrasive

6. Stay put retraction cord:
1. It is a fine metal filament reinforced displacement cord, which can be impregnated/ non-impregnated.
2. Consists of braided retraction cord and ultrafine copper filaments.
3. Remains in shape and does not deform.

Advantages:
1. Can be easily adapted.
2. Does not lift in the sulcus.
3. Does not unravel.
4. No overlapping required.
5. Non-impregnated, but can be impregnated with an astringent or haemostatic solution as required.

7. Traxodent:
1. Consits of 15% aluminum chloride,hemostatic paste.
2. Syringe-dispensed.
3. Ergonomic syringe.
4. Easy to use.
5. Disposable and flexible tips.
6. Paste with a malleable consistency.

8. Retraction Capsule:
1. Astringent retraction paste supplied in a single-use capsule.
2. The retraction paste contains 15% aluminum chloride and can be used alone or in conjunction with retraction cord for all indications procedures.
3. When compared with retraction cords, the retraction procedure with this material can be up to 50% faster.
4. The risk of bleeding and/or hemorrhage is less on removal, and is milder on gingival tissue.
5. The significantly fine tip of the capsule offers improved access into the sulcus and interproximal areas.
6. As the tip of the capsule is plastic with round, soft edges, practitioners can use it with less apprehension about detrimentaleffects on the tissue and patient discomfort.

9. G-Cuff:
1. It is a non-invasive tissue management.
2. Introduced by a Canadian company, named Stomatotech.
3. Consist of a disposable plastic collar for gingival retraction which is inserted on the apical end of the abutment before the abutment is engaged to the implant.
4. The plastic collar is found between the apical part of the abutment and the gingival soft tissue. Once the impression is retrieved from the mouth, the plastic collar is drawn out and removed permanently.
5. The plastic creates a valve preventing the liquids from contaminating the area of the finish line of the abutment.
6. Provides immediate tissue displacement for transfer emergence profile modeling as a recipient for the resin.
7. For clean cementation as a cement barrier.

10. Tissue Goo:
1. It is a gel that contains 25% aluminum sulfate.
2. It provides hemostasis during tissue management processes.
3. Aluminum sulfate does not cauterize, but rather acts similar to a coagulant to arrest the bleeding.
4. It also acts as a lubricant while placement of the cord.
5. The retraction cord will provide ideal tissue displacement, while absorbing the goo and deliver hemostasis.

11. Gel-Cord:
1. It comprises of- 25% Aluminum Sulfate Gel.
2. It is indicated for Class V Restorations or if tissue is altered during composite placement.
3. The gel is rubbed mildly into the hemorrhaging area.
4. It is brightly colored for better visualization.
5. It provides good lubrication for the initial cord to slide easily into the sulcus.

Conclusion:-

A healthy peridontium is important for the well being, comfort and esthetics of the oral structures. A particular clinical situation may indicate for the specific technique. Hence the type of gingival retraction to be employed should be thoroughly evaluated over before using, keeping in mind that the gingival tissue health and comfort of both patient and the practitioners. All these measures are helpful in not only impression making, but also protect gingiva from getting traumatised.

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