

SCRUTINY OF CLINICAL FACTORS THAT AFFECT THE OUTCOME OF PERIODONTAL PLASTIC SURGERY-A Review

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Abstract- Periodontal plastic surgery is a scientific term introduced to describe a set of surgical procedures, including root coverage techniques. Over the years, several techniques have been proposed to reach complete root coverage, meaning the gingival margin's location is slightly coronal to the cemento– enamel junction with no residual probing depth, together with no detectable inflammation and a harmonic soft tissue and color integration. This review article focuses on various professional errors, presurgical conditions, intraoperative risks and post operative risks incurred in root coverage procedures.

INTRODUCTION

Gingival recession is defined as the apical migration of the junctional epithelium with exposure of root surfaces(Kasab,Cohen 2003).The indications for root coverage procedures are

- Root sensitivity
- Esthetics
- Protect root surface from caries and abrasion
- To improve oral hygiene

Various non surgical mode of treatments include

- Desensitizing agents
- Composite restoration
- Removable gingival veneers
- Orthodontic intervention

PRESURGICAL PHASE

1. Dietary supplements

Dietary and herbal supplements do not need a medical prescription and are poorly regulated; these factors have created a positive environment for growth in the market, and their consumption is increasing globally.Because these popular products contain “natural” ingredients, most consumers perceive them to be safe.Variou supplements known to have antiplatelet anticoagulant mechanism are illustrated in Table 1.

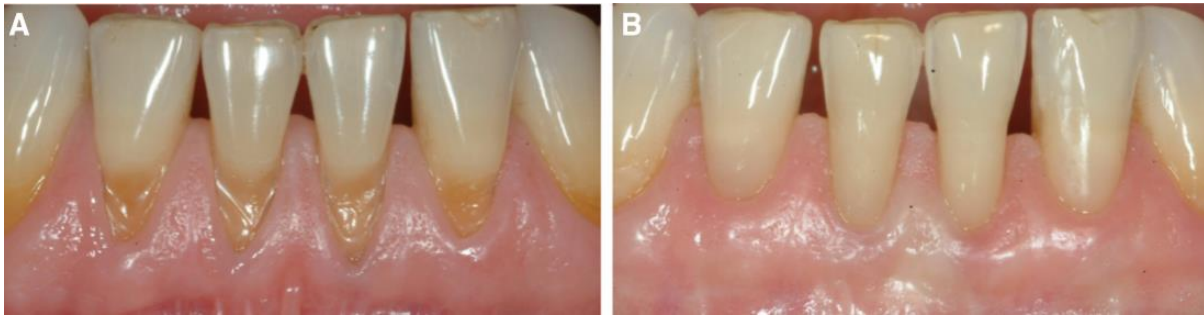
| Anticoagulant properties | Antiplatelet properties |
|--------------------------|-------------------------|
| Aloe vera | Chamomile |
| Cranberry | Fenugreek |
| Garlic | Red clover |
| Ginger | Ginseng |
| Turmeric | |

Table 1

American Society of Anesthesiologists and the American Academy of Orthopedic Surgeons has introduced recommendations to discontinue the intake of specific herbal products for up to 2 weeks before surgery for all patients requiring surgery as they may cause intraoperative bleeding.A thorough medical history has to be taken to avoid such complications as patients lack knowledge about the blood thinning properties of herbal supplements.

2. Tissue examination

According to said classifications, Miller class I/II and RT1 recessions are expected to achieve complete root coverage outcomes, whereas in Miller class III/RT2 and Miller class IV/RT3 only partial and no root coverage can be accomplished, respectively. Pini- Prato et al introduced a classification system of dental surface defects in areas of gingival recession, based on the presence (A) or absence (B) of identifiable cementoenamel junction and presence (+) or absence (-) of dental surface discrepancy caused by abrasion, thus resulting in four classes: A+, A-, B+, and B-. After having evaluated 1010 exposed root surfaces associated with gingival recessions, they found that 14% belonged in Class A+, 46% in Class A-, 24% in Class B+, and 15% in Class B-



Picture 1

Picture 1 depicts combined resto-perio treatment of mandibular anteriors.

3. Altered tooth eruption

Clinically, gingival recession determines an elongated appearance of the affected tooth when compared with the adjacent teeth. A similar condition that may mislead an inexperienced practitioner into diagnosing a gingival recession is when the teeth adjacent to the “elongated tooth” are affected by the altered passive eruption. The latter is a clinical situation in which the relationship between teeth, alveolar bone, and soft tissues produces an excessive gingival display, resulting in apparently short clinical crowns. Therefore, in the said scenario, the “elongated tooth” is actually a healthy tooth with a physiologic relationship between soft tissue margin location and cemento-enamel junction. For this reason, clinicians must have full knowledge of altered passive eruption and its clinical and radiographical diagnosis.

4. Bad habits evaluation

Smoking is a patient-related factor that can influence the wound healing process due to the alteration of gingival tissue vascularization, immune and inflammatory responses, and healing potential of the periodontal connective tissues. During the examination phase, efforts should be concentrated on detecting bad toothbrushing habits and on their modification through motivation and proper oral hygiene instructions.

SURGICAL PHASE

1. Bleeding

Excessive bleeding is influenced by preoperative intake of NSAID and epinephrine content of local anesthesia. 0.2 mg is the maximum dose of epinephrine that can be administered to a healthy patient. Articaine 4% with epinephrine (1:100000) provides excellent surgical pain control. However, despite a favourable medical history, increased bleeding can also result from errors made when carrying out flap incisions. For this reason, it is essential to perform the split-thickness incisions adequately: A limited “deep” incision is made, using the blade parallel to the periosteum, to separate muscle insertions from the underlying bone just enough to allow performing the “superficial” incision by positioning the blade parallel to the external mucosal surface and thus detaching muscle insertions from the inner aspect of the flap. Intraoperative hemostasis is achieved by applying pressure to the surgical site for 3-5 minutes with a gauze dressing, either dry or soaked in hemostatic agents. Among these, tranexamic acid is one of the most frequently used and it works by inhibiting plasminogen action and reduces the fibrinolytic activity of the early formed hemostatic clot.

2. Flap perforation

It is more likely to appear when performing the split-thickness incisions: during the “deep” split-thickness, if the blade is not maintained parallel and in contact with the bone while detaching muscular insertions from the periosteum; and also, at the time of “superficial” split-thickness, if the blade is not kept sufficiently parallel to the external flap surface while separating the muscle fibers from the inner aspect of the flap. In the latter surgical step, the presence of scars as a result of previous surgeries can cause mucosal adhesions that might further increase the risk of perforation. Flap perforation compromises its blood supply, leading to necrosis. If the perforation is greater than 2 mm or lies on an avascular area (root surfaces) it is mandatory to close it using simple interrupted sutures with a thin thread and small needle (ie, 7.0 suture, 8 mm cutting needle, 3/8 circle) to avoid further damage to the soft tissues.

3. Nerve injuries

There are two nerve structures of interest when treating gingival recessions. They are infraorbital nerve and mental nerve. Infraorbital nerve is situated well beyond the dissection planes in case of bilaminar techniques, pouch and tunnel technique and coronally advanced technique. When dealing with deep gingival recessions in the canine premolar area of mandibular arch there are chances of mental nerve injury. During the surgery, deep periosteal releasing incisions should be avoided; instead, the initial flap release can be performed by compressing the flap with a gauze in an apical direction. With this technique, muscle fibers are released, allowing an easier distinction and separation between the deep plane (in which the fibers are inserted into the periosteum) and the superficial plane (characterized by the insertion of the fibers into the inner aspect of the flap). Afterward, superficial split-thickness dissection of the flap will ensure that the clinician does not encounter or sever main or accessory nerve fibers.



Picture 2

Picture 2 illustrates the “gauze” technique allows the release of muscle fibers, providing an easier distinction and separation between the deep plane and superficial plane.

POSTSURGICAL PHASE

1. Bleeding

There are many causes for abnormal blood coagulation, such as liver disease, renal insufficiency, fibrinolysis, disseminated intravascular coagulopathy, leukemia, pharmaceutical agents, and genetic disorders that involve deficiencies of various clotting factors. If the patient presents with significant postsurgical hemorrhagic sequelae, laboratory blood studies must be done to look into the possible causes. “Liver clot” or “currant jelly clot” describes a red, jelly-like clot that is rich in hemoglobin from the erythrocytes within the clot; it usually results from venous hemorrhage, characterized by slow, oozing, dark blood hemorrhage. According to the literature, the “liver clot” formation generally occurs 24- 48 hours after surgical procedures and it is usually located at the margin of the flap, extending up to the crowns of the involved and neighbouring teeth.

2. Pain

Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage, which results in a highly subjective experience.

Pain management after root coverage procedures is reasonably straightforward: It is usually achieved with nonsteroidal anti-inflammatory drugs (ie, ibuprofen) immediately after the surgery and recommended in the following days according to the patient's needs.

3. Swelling

Swelling is part of the body's repair process and is considered a normal reaction to surgery. Intra- oral surgical trauma always determines injury characterized by hyperemia, vasodilatation, and increased capillary permeability with liquid accumulation in the interstitial space. Edema is the expression of exudates or transudation, and it is likely that both events occur in surgery. Cryotherapy (ice packing) is largely applied empirically to manage postoperative swelling and discomfort. The time interval for cold applications varied in different studies, but there seemed to be a consensus among clinicians that cryotherapy should be applied for 10- 20 minutes followed by a rest period. The total duration of therapy ranged from 2 to 48 hours. In a recent meta- analysis, Marques do Nascimento- Júnior et al highlighted the lack of standardization of cold application or effective evidence- based treatment protocols for cryotherapy after third- molar surgery, concluding that cryotherapy may have a small benefit in reducing pain after third- molar surgery, but it is not effective on facial swelling and trismus.

4. Flap dehiscence

The first 14 days after root coverage procedures are considered of paramount importance in terms of flap stability for successful wound healing. In this period, traumatic or inflammatory/ infective injuries may represent a cause for its dislodgement. Early flap dehiscence defined as a condition in which two layers, previously stitched together, separate or rupture may appear as a complication during this time frame. This event usually leads to flap shrinkage, with severe consequences for the expected results in terms of root coverage. In order to understand how to deal with such undesirable outcomes, it is mandatory to know the potential factors correlated with flap dehiscence. The first key factor to take into consideration for avoiding or reducing the risk of flap dehiscence is the adequate management of flap tension. One of the main features of performing the coronally advanced flap is eliminating muscle tension on the flap and its passive displacement in the coronal position. The final passive position of the flap can be achieved through adequate split- thickness (deep and superficial) flap management as previously reported and described by de Sanctis and Zucchelli.

5. Graft exposure

In order to avoid or minimize premature graft exposure, some fundamental surgical steps have to be respected. Regarding the position of the graft, it should be secured at the level of the cemento- enamel junction or slightly apical to it, but never coronally. In terms of thickness and size, it has been shown that using “small” grafts allows for better esthetic outcomes and minimizes impingement on the flow of blood supply from the underlying connective tissue bed to the coronally advanced covering flap. Recently, porcine- derived matrices have been introduced as connective tissue substitutes in root coverage procedures, with the ultimate goal to reduce postoperative morbidity by avoiding a second surgical site.

6. External root resorption

External root resorption is a progressive and destructive loss of tooth structure that manifests itself in a mineralized or denuded area of the root surface. According to Heithersay, periodontal surgeries that might potentially damage root cementum can result in resorption in 1.6% of cases. In such cases a clinical evaluation and intraoral X- ray must be done to understand the extension of the lesion and to decide whether or not to intervene. It is also crucial to check tooth vitality to exclude endodontic involvement. Usually, invasive cervical resorption appears as an irregularly shaped lesion localized in the midfacial portion of the root. Flap elevation is recommended for adequate visualization of the entire lesion so that it can be properly cleaned from granulation tissue and bone ingrowths. Afterwards, the field should be isolated using the rubber dam, and then the cavity is recontoured using burs and filled with a flowable composite. In the literature, other restorative materials have been suggested to fill the lesions, like glass-

ionomer cement, composite resin, calcium silicate–based cement, and calcium- enriched mixture the mucoperiosteal flap is replaced and secured in position.

CONCLUSION

In recent decades, root coverage procedures have become very common in daily practice. As with any surgical procedure, patient morbidity can be highly influenced by a number of factors, such as local and systemic conditions, as well as by the skill and knowledge of the clinician performing the surgery. Proper patient evaluation and site diagnosis can help avoid many undesirable outcomes.

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