

Gingival recession and periodontal therapy

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ABSTRACT

Background: Gingival recession is well-defined by means of the apical movement of the gingival margin below the cemento-enamel junction (CEJ), causing in exposure of the root surface and it remains the foremost esthetic complaints of patients. The treatment of gingival recession is depend on a full assessment of the etiological factors and the amount of tissue envelopment.

Key words: Gingival recession, periodontal disease, surgical treatment., pinhole surgery. (Received: 1/9/2017; Accepted: 22/10/2017)

INTRODUCTION

Gingival recession is well-defined as the apical movement of the gingival margin below the cemento-enamel junction (CEJ), resulting in exposure of the root surface. It can be localized or generalized and is a common problem. Gingival recession is measured from the cement–enamel junction to the gingival margin, and can be severe on some teeth, leading to exposure of root surfaces and furcations.⁽¹⁾

Etiology:-

Primary causes of gingival recession⁽²⁾

1. Low-level and long-lasting trauma.
2. Chronic inflammatory periodontal disease.
3. Periodontal treatment.
4. Occlusal trauma.

Predisposing factors of gingival recession⁽²⁾

1. Decreased alveolar bone crest thickness.
2. Orthodontic treatment.
3. Dehiscence and Fenestration.
4. Frenulum insertion.

Classification systems of gingival recession

To categorize gingival recession, various classifications have been proposed. Most of the them are unable to convey all the relevant information related to tissue recession. This information is important not only for shaping, diagnosis, prognosis, and treatment planing but also communication between clinicians. Furthermore, with a broad variety of cases with different clinical presentations, it is not constantly probable to categorize all gingival recession defects depending on one categorizing system⁽³⁾.

Several classifications have been proposed⁽⁴⁾. They are as follows:

- Sullivan and Atkins (1968).
- Mlinek *et al.* (1973).
- Liu and Solt (1980).

- Bengue *et al.* (1983).
- Miller (1985).
- Smith (1990).
- Nordland and Tarnow (1998).
- Mahajan (2010).
- Cairo *et al.* (2011).
- Rotundo *et al.* (2011).
- Ashish Kumar and Masamatti (2013).
- Prashant *et al.* (2014).

Sullivan and Atkins (1968)

It is one of the head classifications to be suggested. The basis of this classification system was the depth and width of the defect. They proposed the following four categories:⁽⁵⁾

1. Deep wide.
2. Shallow wide.
3. Deep narrow.
4. Shallow narrow

Mlinek *et al.* (1973): classified gingival recession into:

- Shallow narrow: Recession <3 mm.
- Deep wide: Recession >3 mm.

This modification reduced subjective differences, but it does not identify the landmark for horizontal measurement as variable measurement may be present at variable distances⁽³⁾.

Liu and Solt (1980): Classified marginal tissue recession as follows:-⁽⁶⁾⁽³⁾

1. Visual: Measured from CEJ to soft tissue margin.
2. Hidden: In which Loss of attachment occur within the pocket that is apical to tissue margin.

Bengue *et al.* (1983): Classified the recessions according to the coverage prognosis⁽⁶⁾.

1. U-type: poor prognosis.
2. V-type: fair prognosis.
3. I-type: good prognosis.

Miller(1985): Miller has primarily based his classification of gingival recession defects on following aspects:

- A. Extent of gingival recession defects.

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- B. Extent of hard and soft tissue loss in interdental areas surrounding the gingival recession defects. ⁽⁷⁾⁽⁸⁾

Four types of recession defects were categorized as follows ⁽⁴⁾.

- Class I: Does not reach to the mucogingival junction (MGJ). There is no bone or soft tissue in the interdental area, and one hundred percent root coverage can be expected.
- Class II: Which reach to or past the MGJ. There is no bone or soft tissue in the interdental area, and one hundred percent root coverage can be expected.
- Class III: As Class II but there is Bone or soft tissue loss in the interdental area or malpositioning of the teeth can be occur, which stops the trying of one hundred percent of root coverage. Partial root coverage can be expected.
- Class IV: As class III but the bone or soft tissue loss in the interdental area and/or malpositioning of teeth is so severe that root coverage cannot be expected.

In Miller's classification there are limitations that essential to be taken into consideration ⁽⁵⁾.

1. Because the reference point for classification is MGJ, there is troubles in the classification between Class I and II because of the difficulty in recognizing the MGJ. There is no reference of existence of keratinized tissue.
2. In Miller's Classes III and IV recession, the quantity and type of bone loss have not been identified. The interdental bone or soft tissue loss is an essential point to classify the recessions. A clear depiction of severity of recession is hard to project.
3. In Classes III and IV categories of Miller's classification the cases which have interproximal bone loss and the marginal recession that does not extend to MGJ because of interproximal bone loss cannot be classified either in Class I or because the gingival margin does not extend to MGJ in Class III
4. The position of the gingival margin of the two adjacent teeth will determine the difference between Classes III and IV. Class III and Class IV can be recognized if there are adjacent teeth; however, in situation of a lost adjacent tooth, there is no reference point and it is difficult to include this case in the Class III or Class IV.

5. Miller's classification does not require facial (F) or lingual (L) envelopment of the bordering tissue.
6. Additional classification system needs for the recession of the interdental papilla because alone cannot be classified according to the Miller's classification
7. In the recession of the palatal aspect of maxillary jaw there is difficulty in the application of Miller's criteria because there is no MGJ on the palatal side.
8. Prognosis of root coverage following grafting procedure estimated by Miller's classification. Miller identified in Class I and II recessions that 100% coverage occur, in Class III partial root coverage, and in Class IV no root coverage.

Pini Prato G (2011) ⁽³⁾, identified that expectation of one hundred percent of root coverage does not mean that it will happen. Root coverage percentage extending from nine percent to ninety percent has been described by altered authors in Classes I and II recessions using diverse techniques. Outcome of treatment may be determined by additional prognostic features and category to expect the results of root coverage in Classes I and II are not correct. ⁽³⁾

Smith (1990): Proposed index of recession that involves of two numbers separated by a dash. The first number represents the horizontal and the second number represents the vertical component of a place of recession. ⁽³⁾

Nordland WP and Tarnow DP (1998):

Developed a classification system for loss of papillary height ⁽⁹⁾. The system uses three recognizable landmarks: the interdental contact point, the facial apical range of the CEJ, and the interproximal coronal range of the CEJ.

Mahajan (2010): Proposed a modified classification of gingival recession in 2010 which is: ⁽⁸⁾

Class I: Gingival recession defect not encompassing to the MGJ.

Class II: Gingival recession defect encompassing to the MGJ or past it.

Class III: Gingival recession defect by loss of bone or soft tissue in the interdental area equal to cervical one third of the root surface and/or malpositioning of the teeth.

Class IV: Gingival recession defect in which stark bone or soft tissue loss in the interdental area greater than cervical 1/3 of the root surface and/or severe malpositioning of the teeth.

Cairo et al. (2011): Classified gingival recession based on the assessment of clinical attachment level(CAL) at both buccal and interproximal sites. ⁽¹⁰⁾

- **Recession Type 1:** Gingival recession with no loss of interproximal attachment. Interproximal CEJ was clinically not noticeable at both mesial and distal sides of the tooth.
- **Recession Type 2:** Gingival recession associated with loss of interproximal attachment. The amount of interproximal attachment loss (measured from the interproximal CEJ to the depth of the interproximal pocket) was smaller amount than or equal to the buccal attachment loss (measured from the buccal CEJ to the depth of the buccal pocket).
- **Recession Type 3:** Gingival recession related with loss of interproximal attachment. The amount of interproximal attachment loss was higher than the buccal attachment loss.

Rotundo et al. (2011): Classified gingival recession taking into consideration both soft and hard dental tissues. For this classification, specific taxonomic variables have been considered, and in particular, the amount of keratinized tissue (KT = 2 mm); the presence/absence of non carious cervical lesion (NCCL), with a consequent unidentifiable CEJ; and the presence/absence of interproximal attachment loss⁽¹¹⁾.

Considering these variables, the following method of assessment is suggested:

- A. $KT \geq 2$ mm
 - NCCL – absent.
 - Interproximal attachment loss – absent.
- B. $KT < 2$ mm
 - NCCL – present.
 - Interproximal attachment loss – present.

Kumar and Masamatti(2013): A new classification system was proposed based on incorporation of certain principles of Miller's classification with the certain features of Nordland and Tarnow's classification. It can be used for facial surfaces of upper jaw teeth and facial and lingual surfaces of mandibular teeth. Interdental papilla recession can also be classified according to this new classification⁽⁵⁾.

Prashant et al. (2014): Proposed a classification that describes the dental surface defects that are of paramount importance in diagnosing gingival recession areas which might help in selecting definite treatment approach. Two variables were considered, CEJ and cervical discrepancies. Considering the presence of the CEJ on the buccal surface, two classes were identified: Class A, identifiable CEJ on the entire buccal surface

and Class B, unidentifiable CEJ totally or partially. Class (+), presence of cervical step (>0.5 mm) involving the root or the crown and the root and Class (-), absence of cervical step as shown in (Table 1). Therefore, a working classification identifies four different conditions as follows: ⁽³⁾

Table 1: Prashant et al's classification⁽³⁾

CEJ	Step	Descriptions
Class A	-	CEJ visible, without step
Class A	+	CEJ visible, with step
Class B	-	CEJ not visible, without step
Class B	+	CEJ not visible, with step

Treatment of gingival recessions

The management of gingival recession is established on a comprehensive assessment of the etiological causes and the amount of tissue envelopment. The treatment choices available include ⁽¹²⁾

A- Non surgical treatment include:

1. Monitoring and prevention.
2. Use of desensitizing agents, varnishes and dentine bonding agents.
3. Composite restoration.
4. Pink porcelain or composite.
5. Removable gingival veneers.
6. Orthodontics.

B- Surgical treatment of gingival recession

In which tries to increase the thickness of keratinised tissue around a tooth and protection any visible root surface associated with the recession defect. ⁽¹³⁾

Factors affecting outcome of periodontal plastic surgery

Factors should be assessed and corrected where possible such as⁽¹³⁾

1. Situation of root surface:- presence of caries, calculus, unclean cementum or restorations.
2. Noticeable frenum attachments.
3. Depth of vestibule.
4. Tissue kind.
5. Extent of the recession defect and graft material.
6. Thickness of split thickness flaps elevated.
7. Smoking.
8. Bad oral hygiene.

The followings are the surgical treatment of gingival recession:

1- Free grafts in the management of gingival recession

- A- The epithelialized free gingival graft.

Is obtained from the palate between the palatal root of the upper first molar and the distal aspect of the upper canine as this is the area where the thickest tissue can be found. The graft should then be sutured in place. ⁽¹³⁾

B- Subepithelial connective tissue graft.

The disadvantages of epithelial graft have been overwhelmed via the placement of connective tissue (CT) grafts into the recession defect. The donor site will be healed by primary intention, decreasing distress for the patient. The colour match is also better with the tissues. ⁽¹⁴⁾

2- The pedicle soft tissue grafts procedures

A- Rotational flap procedures, including laterally positioned flap, and double papilla flap which are indicated while a narrow deficiency occurs with sufficient attached gingiva at the donor place. ⁽¹⁵⁾

B- Flap advancement procedures

Including coronally repositioned flap and semilunar coronally advanced flap. A coronally positioned flap: is a technique that requires creating an incision in the sulcus and across the papillae of affected teeth, elevating a flap (either full or split thickness), pulling the flap coronally, and suturing it into place. ⁽¹⁶⁾ Tarnow has described the semilunar coronally repositioned flap to cover isolated denuded root surfaces ⁽¹⁷⁾ It can be performed on several adjoining teeth. This technique is indicated where the recession is not extensive (3 mm) and the facial gingival biotype is thick. It is successful for the maxilla, particularly in covering roots left exposed by the gingival margin receding from a recently placed crown margin. It is not recommended for the mandibular dentition. ⁽¹⁸⁾

3- Vestibular incision subperiosteal tunnel access (VISTA) technique

The VISTA technique is essentially a modification of the double-layer tunneling technique that requires a single incision serving in the creation of the subperiosteal tunnel flap and an opening for the graft. This modified technique is as follows: the affected by the recession teeth are cleaned, smoothed and polished with machinery tools. A vertical incision is made on the mucous membrane and the periosteum. The incision is 8-10mm long, beginning from the mobile mucosa and reaching the apical end of the keratinized gingiva. A subperiosteal elevator is used to free the subperiosteal tunnel flap. Then intrasulcular incisions covering up to a third of the papilla width medially and distally ⁽¹⁸⁾. The mucosa and the periosteum, below adjacent unaffected teeth

laterally and medially from the affected ones, are freed. The previously prepared platelet-rich fibrin (PRF) membranes are inserted through the entrance vertical incision then the vertical incision is stitched ⁽¹⁹⁾. Single horizontal sutures are made 2-3 millimeters below the gingival margin in the area of the affected teeth.

4- The use of Allografts in management of gingival recession

The disadvantages of harvesting free soft tissue autografts lie in the postoperative discomfort associated with an extra surgical site, as well as the limitations of available donor tissue. Consequently, several soft tissue allograft alternatives have been introduced such as an acellular dermal matrix (ADM) allograft. ⁽²⁰⁾

5- Guided tissue regeneration

These procedures have frequently been used in combination with other procedures for root surface coverage, for instance with pedicle grafts where the membrane is sited between the graft and the root to approval connection of the root with periodontal ligament cells and true new periodontal ligament attachment creation. ⁽¹⁴⁾

6- The Pinhole Surgical Technique

The Pinhole Surgical Technique (PST), a minimally invasive treatment option to reverse gingival recession without grafting or sutures. ⁽¹⁶⁾

Pinhole Surgical Technique procedure

Like a coronally positioned flap, the PST allows coronal positioning of the gingival margin to cover recession defects through a small pinhole that is created by piercing the mucosa apical to the mucogingival junction in the area of recession, and then inserting specialized instruments through that hole to elevate a full-thickness "flap" in an apico-coronal direction, hence it easily can be pushed coronally and it stay in the new coronal position during the healing period without stitching by collagen strip that are actually pieces of a resorbable collagen membrane called Bio-Gide that is cut into strips and placed through the pinhole. The strips are then pushed under the gingiva into the interproximal spaces, covering the facial surfaces of the previously exposed roots. And the tissue is supported at the new position, and the strips assist in wound stabilization during healing to ensure root coverage. ⁽¹⁶⁾

Limitations

There are limitations to the success of PST for reversing gingival recession. For example, root coverage is less predictable in areas of advanced bone loss due to a lack of bone support for the newly positioned tissue. Additionally, the patient must be free of inflammation and active

periodontal disease at the time of surgery, compliant with postoperative instructions, and cease any traumatic activities that may have contributed to the recession, such as aggressive brushing. It is also recommended that the patient wear an appliance to protect from bruxism-induced occlusal trauma when indicated. ⁽¹⁶⁾

Advantages

A major advantage of PST compared to traditional autogenous grafting is the ability to treat as many teeth in one sitting as the patient desires. When using the patients' own tissue, there are inherent limitations in the number and size of the area that can be treated at one time. It is not uncommon to take over a year to treat an entire mouth, requiring multiple rounds of palatal grafting. In contrast, PST can be used to treat the whole mouth and be completed in a single sitting. Additional advantages include significantly less chair time than conventional procedures, better patient acceptance, less postoperative pain, decreased risk of postoperative trismus, and even fewer insurance restrictions. ⁽¹⁶⁾

CONCLUSION

Gingival recession is the foremost esthetic objections of patients and exposures patients to sensitivity and more threat for root caries. The patient complain basically will determine the management of gingival recession. The treatment of gingival recession is depend on a full assessment of the etiological factors and the degree of envelopment of the tissues. The first part of the treatment of the patient with gingival recession must be preventive and any pain must be removed and disease should be treated. The amount of gingival recession must be observed for signs of additional progression. When esthetics is the main concern and periodontal condition is good then surgical root coverage is an appropriate treatment. For coverage of exposed roots, there is a huge choices of mucogingival grafting procedures existing in the present period. These techniques are reasonably expectable and create acceptable resolutions to the fears present by gingival recessions. If the recession is not continuing and does not aggravate tooth sensitivity or reduced aesthetics, then tooth cleaning instructions and ordered observation through a stringent maintenance program would be the best management.

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الخلاصة:

الخلفية: انحسار اللثة وهي حالة تنحسر فيها اللثة عن عنق السن وينكشف فيها جزء من الجذر. وهي واحدة من المشاكل الرئيسية التي يشكو منها المريض والتي تؤثر على جمالية المريض. علاج انحسار اللثة وتبعاتها يعتمد على التقدير الشامل للعوامل المسببة لانحسار اللثة وكذلك على مقدار الأنسجة التي تضمنها انحسار اللثة.