Gingival Recession At Glance: A Review

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Abstract

One of the most common esthetic concerns associated with the periodontal tissues is gingival recession. Gingival recession is the exposure of root surfaces due to migration of the gingival margin apical to the cemento-enamel junction. Although it rarely results in tooth loss, marginal tissue recession is associated with thermal and tactile sensitivity, esthetic complaints and a tendency toward root caries. This article reviews etiology, classification, consequences and the available treatment modalities for the coverage of exposed root surfaces.

Key Words: *Classification; Gingival Recession, Free gingival Graft*

Background

Gingival recession is displacement of marginal tissue apical to the cemento-enamel junction. [1]The term "marginal tissue recession" is considered to be more accurate than "gingival recession," since the marginal tissue may have been alveolar mucosa. [2],[3]The prevalence, extent -and severity of gingival recession **increases**with age and are more prevalent in males.Recession refers to location of the gingiva not its condition. Receded gingiva can be inflamed but may be normal except for its position. Recession may be **localized** to one tooth or a group of teeth, or it may be **generalized** throughout the mouth.

Etiology:

1. Anatomical / Developmental Factors:

a. Dehiscence / fenestrations

b. Tooth malposition

c. Lack of attached gingiva

d. Thin gingival biotype

e. Root-bone angle

f. Mesio-distal curvature of the tooth surface

2. Pathological factors:

a. Periodontal disease

b. Trauma from occlusion has been suggested in the past, but its mechanism of action has never been demonstrated.

c. Abnormal frenum attachment.

d. Smoking / tobacco chewing / mishri application.

e. Chronic gingival inflammation

3. Iatrogenic dentistry:

a. Pressure from a poorly designed partial denture, such as an ill-fitting denture clasp, can cause gingival trauma and recession.

b. Overhanging dental restorations

c. Placing restorative margins within the biologic width.

d. Improper orthodontic treatment

4. Oral hygiene habits:

a. Faulty tooth brushing technique (gingival abrasion),

b. improper use of interdental cleansing aids.

5. Other factors:

a.Friction from soft tissues (gingival ablation).

Classification of Gingival Recession

Classification is important for: diagnosis, prognosis, treatment planning, communication between clinicians.

a. Sullivan and Atkins 1968: It was 1st classifications proposed for gingival recession.The basis for the classification was**depth and width of the defect.**

The four categories are:

- Deep wide,
- Shallow wide,
- Deep narrow,

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- Shallow narrow.

This classification though simple is subjected inter- examiner variability and therefore it is not reproducible.[4]

b. Mlinek et al. (1973)

• Shallow narrow: Recession <3 mm.

• Deep wide: Recession >3 mm.

This modification reduced subjective variation, but it does not specify the landmark for horizontal measurement as variable measurement may be present at variable distances. [5]

c. Liu and Solt (1980)

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

This classification is not informative and does not classify visible recession, the focus being more on attachment loss than visible recession. [5]

d. Bengue et al. (1983)

Based on prognosis after root coverage procedure:

1. U-type - poor prognosis
2. V-type - fair prognosis
3. I-type - good prognosis. [6]

e. Miller (1985)

Primarily this classification of gingival recession is based on following aspects:

A. Extent of gingival recession defects

B. Extent of hard and soft tissue loss in interdental areas surrounding the gingival recession defects.

It is useful in predicting the final amount of root coverage following a free gingival graft procedure.

Class I: Marginal tissue recession not extending to the mucogingival junction (MGJ). No loss of interdental bone or soft-tissue.100% root coverage can be anticipated.

Class II: Marginal recession extending to or beyond the MGJ. No loss of interdental bone or soft-tissue. 100% root coverage can be anticipated

Class III: Marginal tissue recession extends to or beyond the MGJ. Loss of interdental bone or soft-tissue is apical to the CEJ, but coronal to the apical extent of the marginal tissue recession or there is a mild malpositioning of the tooth, this prevents the attempting 100% of root coverage.

Class IV: Marginal tissue recession extends to or beyond the MGJ. Loss of interdental bone extends to a level apical to the extent of the marginal tissue recession or malpositioning of tooth is so severe that root coverage cannot be anticipated.

Limitations of Millers Classification

1. The reference point for classification is mucogingival junction (MGJ). The difficulty in identifying the MGJ creates difficulties in the classification between Class I and II recession. There is no mention of presence of keratinized tissue in this classification.

2. In Miller's Class III and IV recession, the interdental bone or soft tissue loss is an important landmark to categorize the recessions. The amount and type of bone loss have not been specified. Mentioning Miller's Class III and IV does not exactly specify the level of interdental papilla and amount of loss and also does not give clear picture of severity of recession.

3. Class III and IV categories of Miller's classification states that marginal tissue recession extends to or beyond the MGJ with the loss of interdental bone and or soft tissue apical to the CEJ. The cases, which have interproximal bone loss and the marginal recession that does not extend to MGJ cannot be classified either in Class I recession because of interproximal bone or in Class III recession because the gingival margin does not extend to MGJ.

4. The difference between Class III recession and IV recession is based on the position of the gingival margin of the two neighbouring teeth. Class III recession and Class IV gingival recession can be identified if there are adjacent teeth; however, in case of a missing adjacent tooth, there is no reference point and it is impossible to include this case in the Class III or Class IV gingival recession.

5. Miller's gingival recession classification does not specify facial (F) or lingual (L) involvement of the marginal tissue.

6. Recession of interdental papilla alone cannot be classified according to the Miller's classification system. It requires use of an additional classification system.

7. Classification of gingival recession on palatal aspect is another area of concern because there is difficulty of the applicability of Miller's classification criteria on the palatal aspect of the maxillary arch because there is no MGJ on palatal aspect.

8. Miller's classification estimates the prognosis of root coverage following grafting procedure. Miller stated that 100% coverage can be anticipated in Class I and II recessions, partial root coverage in Class III, and no root coverage in Class IV.[4]

f. Smith (1990): [6]

Proposed index of recession.

Contains two digits, the first digit denotes the horizontal and the second digit denotes the vertical component of a site of recession.

Horizontal Extent of Recession

• Score 0 - No clinical evidence of root exposure

• Score 1 - No clinical exposure of root exposure plus a subjective awareness of dentinal hypersensitivity in response to a 1 s air blast is reported, and/or there is clinically detectable exposure of the CEJ for up to 10% of the estimated mid-mesial to mid-distal distance

• Score 2 - Horizontal exposure of the CEJ more than 10% but not exceeding 25% of the estimated mid-mesial to mid-distal distance

• Score 3 - Exposure of the CEJ more than 25% of the mid-mesial to mid-distal distance but not exceeding 50%

• Score 4 - Exposure of the CEJ more than 50% of the mid-mesial to mid-distal distance but not exceeding 75%

• Score 5 - Exposure of the CEJ more than 75% of the mid-mesial to mid-distal distance up to 100%.

Vertical Extent of Recession

• Score 0 - No clinical evidence of root exposure

• Score 1 - No clinical exposure of root exposure plus a subjective awareness of dentinal hypersensitivity is reported and/or there is clinically detectable exposure of the CEJ not extending more than 1 mm vertically to the gingival margin

• Score 2–8 - Root exposure 2–8 mm extending vertically from the CEJ to the base of the soft tissue defect

• Score 9 - Root exposure more than 8 mm from the CEJ to the base of the soft tissue defect

• Score * - An asterisk is present next to the second digit whenever the vertical component of the soft tissue defect encroaches into the MGJ or extends beyond it into alveolar mucosa; the absence of an asterisk implies either absence of MGJ involvement at the indexed site or its non-involvement in the soft tissue defect.

g. Nordland WP and Tarnow DP (1998)[7]

Developed a classification system for loss of papillary height.

The system utilizes three landmarks:

- Interdental contact point
- Apical extent of the facial CEJ
- Coronal extent of the interproximal CEJ.

Normal: Interdental papilla fills embrasure space to the apical extent of the interdental contact point/area.

Class I: Tip of the interdental papilla lies between the interdental contact point and the most coronal extent of the interproximal CEJ.

Class II: Tip of the interdental papilla lies at or apical to the interproximal CEJ but coronal to the apical extent of the facial CEJ.

Class III: Tip of the papilla lies level with or apical to the facial CEJ.

h. Mahajan (2010) [8]

Class I: Gingival recession defect not extending to the MGJ

Class II: Gingival recession defect extending to the MGJ/ beyond it

Class III: Gingival recession defect with bone or soft tissue loss in the interdental area up to cervical 1/3 of the root surface and/ or malpositioning of the teeth

Class IV: Gingival recession defect with severe 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.

Prognosis as per Mahajan's classification of recession:

• **Best:** Class I and Class II with thick gingival profile

• **Good:** Class I and Class II with thin gingival profile

• **Fair:** Class III with thick gingival profile

• **Poor:** Class III and Class IV with thin gingival profile.

This modification still does not accommodate all clinical conditions associated with recession.

I. Cairo et al. (2011) [9]

Based on the assessment of CAL at both buccal and interproximal sites.

Recession Type 1: Gingival recession with no loss of interproximal attachment. Interproximal CEJ was clinically not detectable at both mesial and distal aspects 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 less 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 associated with loss of interproximal attachment. The amount of interproximal attachment loss (measured from the interproximal CEJ to the depth of the pocket) was higher than the buccal attachment loss (measured from the buccal CEJ to the depth of the buccal pocket).

It does not consider the remaining width of attached gingiva, relationship of gingival margin, and MGJ, which play a very important role and govern the choice of treatment procedure; and tooth malposition which greatly affects the treatment outcome.

j. Rotundo et al. (2011) [10]

Both soft and hard dental tissues were considered in classification.

Specific taxonomic variables have been considered,

- Amount of keratinized tissue (KT = 2 mm);
- Presence/absence of carious cervical lesion (NCCL),
- With a consequent unidentifiable CEJ; and the presence/absence of interproximal attachment loss were considered.

Considering these variables, the following method of assessment suggested:

A. KT e"2 mm • NCCL – absent • Interproximal attachment loss = absent.

B. KT <2 mm • NCCL – present • Interproximal attachment loss = present.

The following classes may be identified within the population:

• KT e”2 mm – no NCCL – no interproximal attachment loss (AAA)

• KT e”2 mm – NCCL – no interproximal attachment loss (ABA)

• KT e”2 mm – no NCCL – interproximal attachment loss (AAB)

• KT e”2 mm – NCCL – interproximal attachment loss (ABB)

• KT <2 mm – no NCCL – no interproximal attachment loss (BAA)

• KT <2 mm – NCCL – no interproximal attachment loss (BBA)

• KT <2 mm – no NCCL – interproximal attachment loss (BAB)

• KT <2 mm – NCCL – interproximal attachment loss (BBB).

k. Kumar and Masamatti (2013) [6]

Certain criteria of Miller’s classification were combined with features of Nordland and Tarnow’s recession classification.

Class I: There is no loss of interdental bone or soft tissue.

This is sub classified into two categories:

Class IB: Gingival margin on F/L aspect lies apical to CEJ, but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ.

Class IB: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ.

Class II: The tip of the interdental papilla is located between the interdental contact point and the level of the CEJ midbuccally/ midlingually. Interproximal bone loss is visible on the radiograph.

This is subclassified into three categories:

Class IIA: There is no marginal tissue recession on F/L aspect.

Class IIB: Gingival margin on F/L aspect lies apical to CEJ but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ.

Class IIC: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ.

Class III: The tip of the interdental papilla is located at or apical to the level of the CEJ midbuccally/midlingually. Interproximal bone loss is visible on the radiograph.

This is sub classified into two categories:

Class IIIA: Gingival margin on F/L aspect lies apical to CEJ, but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ.

Class IIIB: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ.

l. Classification of Palatal Gingival Recession. [4]

The position of interdental papilla is the basis of classifying gingival recession on palatal aspect of maxillary arch as there is absence of MGJ on palatal aspect.

Palatal recessionI There is no loss of interdental bone or soft tissue.

This is sub-classified into two categories:

• **Palatal recession-IA (PR-IA):** Marginal tissue recession d”3 mm from CEJ.

• **PR-IB:** Marginal tissue recession >3 mm from CEJ.

Palatal recessionII The tip of the interdental papilla is located between the interdental contact point and the level of the CEJ mid-palatally. Interproximal bone loss is visible on the radiograph. This is sub-classified into two categories:

• **PR-IIA**: Marginal tissue recession d”3 mm from CEJ.

• **PR-IIB:** Marginal tissue recession >3 mm from CEJ.

Palatal recessionIII The tip of the interdental papilla is located at or apical to the level of the CEJ mid-palatally. Interproximal bone loss is visible on the radiograph.

This is sub-classified into two categories

• **PR-IIIA:** Marginal tissue recession d”3 mm from CEJ.

• **PR-IIIB:** Marginal tissue recession >3 mm from CEJ.

l. Prashant et al. (2014)

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.

Considering the presence of cervical discrepancies (step), measured with a periodontal probe perpendicular to the long axis of the tooth in the deepest point of the abrasion, two classes were identified:

Class (+), presence of cervical step (>0.5 mm) involving the root or the crown and the root and

Class (“), absence of cervical step.

- **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 Recession

Management of aetiological factors associated with recession

a. Oral hygiene advice: advise an atraumatic brushing technique using:

• manual tooth brushing • electric tooth brushing.

b. Smoking cessation advice.c**. Correction of traumatic habits.**

d. Partial denture design and restorations:

• good support of dentures

• supra-gingival restorations where possible

• regular review and maintenance of restoration and prosthesis.

e**. Treatment of periodontal disease**.

Management of Consequences of Recession

If patient has complaints of dentine hypersensitivity then,

- Dietary advice
- Anti - sensitivity dentifrices
- Topical products for professional application

  containing ûuoride (e.g. Duraphat®, Colgate-Palmolive, Guildford, UK)

  (ii) other (e.g. containing chlorhexidine and thymol)

  (iii) sealants; restorations.

Root caries:

- Prevention: diet, oral hygiene instruction and uoride application
- Reshaping of shallow lesions
- Restorations

Restoration of aesthetics:

❖ **Gingival veneer**: Silicone mask for interdental spaces (note this will act as a plaque retention factor.

❖ **Restorations:** These can camouûage the exposed root surface in some cases; pink porcelain or composite can try to disguise exposed roots.

The Surgical Management of Gingival Recession

· **Criteria For Selection of Mucogingival Techniques:**

1**.** Surgical site should be free of plaque, calculus, and inflammation.

2. Adequate blood supply to the donor tissue.

3. Anatomy of the recipient and donor sites should be considered.

4. Stability of the grafted tissue to the recipient site should be maintained.

5. There should be minimal trauma to the surgical site.

❖ **Predetermination of Root Coverage [11]**

❑ This method to pre-determine the maximum root coverage level (MRC) based on the measurement of the ideal height of the anatomic interdental papilla. The ideal height of the papilla in a tooth is the apical-coronal dimension of the interdental papilla capable of ''supporting'' complete root coverage.

❑ This height was measured as the distance between the mesial-distal line angle of the tooth and the contact point of that tooth. The line angle is easily recognisable even in a tooth with buccal abrasion defect by elevating the interdental soft tissues (with a probe) and searching for the interdental cemento-enamel junction.

❑ The horizontal projections on the recession margin of these measurements allowed for identication of two points that were connected by a scalloped line, representing **the line of root coverage**achievable.

❑ **Surgical Techniques:**

▪ **Pedicle grafts:**They are so called because they maintain their connection to the donor site after placement at the recipient site.

- ❖ **Laterally repositioned ap**
- ❖ **Double papilla ap**
- ❖ **Oblique rotational flap**

▪ **Free grafts:** They are so called because that are completely deprived of their connection with the donor area.

- ❖ **Epithelialized gingival grafts**
- ❖ **Sub epithelial connective tissue graft**

▪ **Guided Tissue Regeneration (GTR)**

❑ **Laterally Repositioned Flap: [12]**

This flap wasdescribed by **Gruppe and Warren in 1956.**

❑ **Oblique Rotational Flap:** This is a variation of the laterally positioned ap **(Pennel et al. 1965).** The pedicle is rotated obliquely (90°) and sutured to the underlying connective tissue bed.

❑ **Coronally Advanced Flap: [13]**

- ❖ **Bernimoulin et al. (1975)** rst reported the coronally positioned graft succeeding grafting with a free gingival autograft. This was a two-stage procedure.
- ❖ **In 1986, Tarnow** described the semilunar coronally positioned ap. This was a one-stage, no-suture, coronally repositioned ap aimed at correcting mild gingival recessions.
- ❖ **In 1989, Allen and Miller** reported the use of a one stage, coronally positioned ap associated with citric acid root conditioning aimed at correcting shallow marginal recessions (2.5–4.0 mm).

❑ **Free Gingival Autograft:**

- o **The Classic Technique:** Described by **Bjorn.**
- o **Variant Techniques**

❖ **Accordion technique**

- Described by **Rateitschak** and colleagues
- It attains expansion of the graft by alternate incisions in opposite sides of the graft

Strip technique

- Developed by **Han and associates**
- Two or three strips of gingival donor tissue about 3- to 5-mm wide and long to cover the entire length of the recipient site. These strips are placed side by side to form one donor tissue and sutured on the recipient site
- The advantages of this technique are the rapid healing of the donor site.

Or a combination of both.

❑ **Sub Epithelial Connective Tissue Graft: [14]**

It was described by **Langer and Langer in 1985**

A variant of the sub epithelial connective tissue graft, called a **Subpedicle Connective Tissue Graft**, was described by **Nelson in 1987.**

This technique uses a pedicle over the connective tissue that covers the denuded root surface.

The blood supply is increased over the donor tissue.

❑ **Guided Tissue Regeneration: [15]**

Guided tissue regeneration (GTR) is dened by the American Academy of Periodontology as a procedure attempting to re-generate lost periodontal structures through differential tissue responses. (American Academy of Periodontology 1996).It involves the use of resorbable or non-resorbable membranes to exclude epithelial and connective tissue cells from the root surface during wound healing period.

Conclusion

Gingival recession is most common and undesirable condition of gingiva. Its etiology is multifactorial. Various classification systems for gingival recession are in use and eachsystem has its ownmerits and demerits.The management of gingival recession and its sequelae is based on a thorough assessment of the causative factors and the degree of involvement of the gingival soft tissue and underlying bone. Various treatment modalities are available for the management of gingival recession and modified with time according to the evolution of clinical knowledge. Careful case selection and surgical management of gingival recession are critical if a successful outcome is to be achieved.

Reference

1. American Academy of Periodontology (AAP). Glossary of periodontal terms. 3rd ed. Chicago: The American Academy of Periodontology; 1992
2. Wennström JL. Mucogingival therapy. Ann Periodontol 1996; 1:671-701. 3.
3. Consensus Report. Mucogingival Therapy. Ann Periodontol 1996; 1:702-6.
4. Kumar A and Masamatti SS. A new classification system for gingival and palatal recession. J Indian Soc Periodontol 2013; 17:175-81.
5. Sanjeev Jain, Harjit Kaur, Ridhi Aggarwal Classification Systems of Gingival Recession: An Update Indian Journal of Dental Sciences2017; 9: 52-59
6. Reddy S, Kaul S, Prasad MGS, Agnihotri J, Amudha D, Kambali S. Gingival recession: A proposal for a new classification. Int J Dent Clinics 2012; 4:32-6.
7. Glover ME. Periodontal Plastic and Esthetic Surgery. Periodontics Medicine, Surgery and Implants, 1st edition. Philadelphia, PA, USA: Elsevier-Mosby;2004:405-87
8. Mahajan A. Mahajan's Modification of the Miller's Classification for Gingival Recession. Dental Hypotheses 2010; 1:45-9.
9. Cairo F, Nieri M, Cincinelli S, Mervelt J and Pagliaro U. The interproximal clinical attachment level to classify gingival recessions and predict root coverage outcomes: An explorative and reliability study. J Clin Periodontol 2011; 38:661-6.
10. Rotundo R, Mori M, Bonaccini D and Baldi C. Intra and inter-rater agreement of a new classification system of gingival recession defects. Eur J Oral Implntol 2011; 4:127-33.
11. Predetermination of Root Coverage Giovanni Zucchelli et al, J Periodontol 2010;81:1019 1026.
12. Zucchelli, G., Cesari, C., Amore, C., Montebugnoli, L., De Sanctis, M., 2004. Laterally moved, coronally advanced flap: a modified surgical approach for isolated recession-type defects. J. Periodontol. 75 (12), 1734–1741.S
13. Tarnow, D.P., 1986. Semilunar coronally repositioned flap. J. Clin. Periodontol. 13 (3), 182–185.
14. Langer, B., Langer, L., 1985. Subepithelial connective tissue graft technique for root coverage. J. Periodontol. 56 (12), 715–720.
15. Harris, R.J., 2002. GTR for root coverage: a long-term follow-up. Int. J. Periodont. Rest. Dent. 22 (1), 55–61.