



Gingival Recession- a stigma to the tooth!

Dr. Grishmi Niswade

Senior lecturer, Department of Periodontology, Swargiya Dadasaheb Kalmegh Smruti Dental college and hospital, Nagpur

ABSTRACT

Gingival recession is an apical shift of the gingival margin with exposure of the root surface to the oral cavity. Gingival recession may be present in healthy gingival sulcus with normal interdental crestal bone levels or it may occur in an ailing periodontium with alveolar bone loss. Patients often visit the dentist for treatment of gingival recession due to aesthetic reasons. Other glitches faced by the patients are hypersensitivity due to exposed roots and root abrasion or caries. The definitive objective of a root coverage technique is complete coverage of the recession defect with the gingival tissues in good appearance and harmony with the adjacent tissues after healing.

KEYWORDS

gingival recession, root coverage, gingival margin, interdental bone, cements enamel junction

Introduction

Gingival recession is defined as the displacement of the marginal tissue apical to cements enamel junction. (American Academy of Periodontology. Glossary of Periodontal terms 1992).¹ It may be localized or generalized and can be related with one or more tooth surfaces.² Marginal tissue recession is a more appropriate term than gingival recession as the marginal tissue may have been alveolar mucosa.³ It is a malady affecting mostly older adults and is one of the most common aesthetic grievances of the patient. This bares the problem of hypersensitivity and root caries.

Etiological factors of Marginal tissue recession⁴

I. Anatomical/ developmental factors

A. Dehiscence/ Fenestration- Gingival recession is often a finding in areas where there is developmental absence of bone. Such conditions are termed as dehiscence. It occurs in conditions where the periodontal biotype is thin or when the teeth are aligned far too buccally or lingually. Many such dehiscences remain hidden until gingival recession ensues.

B. Lack of attached gingiva/ Thin periodontal biotype- Earlier it was suggested that at least some amounts of attached gingiva is required to prevent gingival recession. However, recent reports suggest that even with little or no width of attached gingiva, periodontal health can be maintained if traumatic toothbrushing and inflammation were controlled. Thickness and texture of attached gingiva are important features as thin gingiva is predisposed to gingival recession due to trauma or inflammation.

C. Abnormal path of tooth eruption- Malocclusions such as Class II Division II have a classical feature of increased overbite and reduced overjet. This results in trauma to gingiva in lower anteriors and palatal surface of upper anteriors. Such trauma can result in gingival recession.

D. Individual tooth shape

E. Tooth eruption compensation- Gingival recession may occur in isolated areas due to the position of the tooth in the arch. The way in which the tooth erupts in the oral cavity affects the amount of gingival tissues around the tooth.

F. Abnormal tooth position in arch- In rotated or buccally or lingually placed teeth, the bony plate is thinned or reduced in height. In such cases, minor trauma leads to recession.⁵

G. Root bone angle- This is often observed in the maxillary molar area. If the palatal root is far too lingually inclined or if the buccal root is positioned far too buccally, then the bone plate is thinned in the cervical area and repeated trauma gives rise to recession.

H. Mesiodistal curvature of tooth surface

I. Deep over bite- Excessive incisal overlap may result in trauma to the gingiva and gingival inflammation and recession.

J. Shallow vestibule- Vestibular depth is measured from the gingival margin to the bottom of the vestibule. Reduced vestibular depth jeopardizes the oral hygiene procedures.

II. Physiological factors

A. Senile atrophy/ aging process- Gingival recession increases with age, the incidence ranging from 8% in children to 100% after the age of 50 years.

B. Genetic predisposition- Hereditary thin, fragile or insufficient gingival tissue predisposes to gingival recession.

C. Orthodontic movement of teeth- controlled and erratic. Orthodontic tooth movement allows the teeth to be repositioned in the jaws. There is minimal risk of gingival recession if orthodontic treatment moves the teeth within the alveolar processes of the jaws.⁶

III. Pathological factors

A. Periodontal disease- Periodontal disease is characterised by loss of supporting tissues of the teeth including alveolar bone. Apical migration of junctional epithelium occurs in the process of pocket formation. These features can lead to gingival recession. Periodontal therapy including non-surgical and surgical, of patients with periodontitis also results in some degree of gingival recession due to shrinkage of tissues following healing. It is an inevitable part of therapy. Root planing induces tissue trauma which leads to recession and exposure of root surface to the oral cavity. Flap surgery such as apically positioned flap surgery, which is a pocket elimination surgery results in marked tooth exposure. Modified Widman flap on the other hand, preserves tissue by approximating the flaps without attempting to reduce the pockets.

B. Trauma- Injuries such as impaction of foreign bodies against the gingiva or factitious injuries such as those caused by nail picking at the gingival margin.

C. Frenal pull- High frenum attachment can cause oral hygiene procedures difficult for the patient. It leads to gingival recession due to the pull on marginal gingiva.⁷

D. Smoking/ Tobacco chewing- Martinez- Canut 1995 suggests that smokers have a higher prevalence of gingival recession as compared to non-smokers. The most prevalent sites were buccal surfaces of maxillary molars and pre-molars and mandibular

central incisors and pre-molars. There are alterations in immune response and local changes such as reduction in blood flow in smokers. Also, a hypothesis has been proposed for higher prevalence gingival recession in smokers, that smokers practise a vigorous brushing technique in order to remove the staining due to smoking habit.⁸

E. Psychological factors

IV. Tooth brushing- It is the most common factor associated with gingival recession and also explains the relatively low levels of plaque at the sites of recession. Controversial reports exist in the literature as to whether tooth brushing with a hard tooth brush or the frequency of brushing causes gingival recession.⁵

V. Improperly designed partial dentures- Improperly designed partial dentures can cause soft tissue trauma and also act as plaque retention factors. Both these factors can lead to gingival recession. Parallel results were reported by Wright and Hellyer 1995 in 146 patients which were followed for 3 years. They found a significant relationship between gingival recession and partial dentures.⁹

VI. Restorations- Margins of the restorations if placed subgingivally, can cause pocket formation, gingival recession and alveolar bone loss if biologic width is violated. As stated by Garguilo 1961, mean biologic width is approximately 2.04mm. 1.07mm is occupied by connective tissue attachment and 0.97 by junctional epithelium.¹⁰

VII. Chemicals- Topical application of chemicals such as Cocaine have reported to cause alterations in the gingival morphology including gingival recession.¹¹

VIII. Friction from soft tissue (gingival ablation)

Prevalence of Gingival Recession

Prevalence of gingival recession increases with age.¹² Recession is found commonly on Maxillary first molars and mandibular central incisors with buccal surfaces more commonly affected than interproximal ones. A study by Addy et al 1999 showed the prevalence of recession to be higher on upper canine and first premolar teeth and lower canine, first premolar and incisor teeth, in a group of 92 subjects with a mean age of 35 years.¹³ Some studies show that the prevalence of gingival recession is higher on the left side of the jaw.¹⁴ Higher levels of recession have been found in males than females and in Afrocarribeans and African-american than White Caucasians and other racial or ethnic groups.¹⁵ Recession is also found in patients with good oral hygiene as well as in patients with poor oral hygiene. In patients with good oral hygiene, recession is located commonly on buccal surfaces and in those with poor oral hygiene other tooth surfaces are also affected.^{16,17} Studies also show a correlation between calculus and gingival recession. One such study by Van der Weijden et al 1998 shows a higher prevalence of recession on lingual surfaces of lower anterior teeth in the age group of 20-34 years.¹⁸ Habits such as lip and tongue piercings are associated with increased prevalence of recession in mandibular anterior teeth.¹⁹ In patients with periodontitis attachment loss, bone loss and gingival recession is located mainly interdentially. It has been estimated that approximately 60% of human population has gingival recession. In India, a study by Dodwad et al 2001 showed that 804 subjects out of 1200 showed defect in gingival morphology, 67% of which were males and 33% females and 87% showing recession in mandibular anterior region.²⁰

Classifications of Gingival Recession

- **Sullivan and Atkins (1968)²¹**
Morphological categories (All 4 categories fall into Miller's Class I and Class II recession)-
- Shallow narrow
- Shallow wide
- Deep narrow
- Deep wide

- **Liu and Solt (1980)²²**
- Visual Recession- Measured from CEJ to the soft tissue margin
- Hidden Recession- refers to loss of attachment within the pocket that is apical to tissue margin
- **Bengue et al (1983)²³** classified recession according to coverage prognosis-
- "U" type- poor prognosis
- "V" type- fair prognosis
- "I" type- good prognosis

• **P.D Miller (1985)²⁴**

Class I- Marginal tissue recession not extending to the MGJ. No loss of interdental bone or soft tissue

Class II- Marginal tissue recession extending to or beyond the MGJ. No loss of interdental bone or soft tissue

Class III- Marginal tissue recession extending to or beyond the MGJ. Loss of interdental bone or soft tissue which is apical to CEJ but coronal to the apical extent of marginal tissue recession. Malpositioning of teeth.

Class IV- Marginal tissue recession extending to or beyond the MGJ with severe loss of interdental bone or soft tissue and / or severe malpositioning of teeth

- **Index of recession by Smith (1997)²⁵** - Smith proposed an index of recession. In this two figure index, the first digit relates to the proportional evaluation of the horizontal extent of gingival recession at the Cementoenamel junction (CEJ) and the second digit is the vertical extent of recession from CEJ in millimetres. An asterisk denotes involvement of Mucogingival junction (MGJ). For example, F2-4, where the prefixed letter F or L denotes whether the recession is on facial and lingual aspect of tooth.

Horizontal extent of recession

Score	Criteria
0	No clinical evidence of root exposure
1	Clinically detectable exposure of CEJ up to 10% of estimated midmesial to middistal distance
2	Horizontal exposure of CEJ more than 10% but not exceeding 25% of estimated midmesial to middistal distance
3	Exposure of CEJ more than 25% but not exceeding 50%
4	Exposure of CEJ more than 50% but not exceeding 75%
5	Exposure of CEJ more than 75% upto 100% of estimated midmesial to middistal distance

Vertical extent of recession (mm)

Score	Criteria
0	No clinical evidence of root exposure
1	Clinically detectable exposure of CEJ not extending more than 1mm vertically to the gingival margin
2-8	Root exposure 2-8 mm extending vertically from CEJ to the base of soft tissue defect
9	Root exposure more than 8 mm from CEJ to the base of soft tissue defect
*	Encroachment of MGJ

• **Mahajan's modification of Miller's classification (2010)²⁶**

Class I- Gingival tissue recession not extending to MGJ
Class II- Gingival tissue recession extending to MGJ or beyond it

Class III- Gingival tissue recession with bone or soft tissue loss in the interdental area up to cervical one third of root surfaces and/or malpositioning of the teeth

Class IV- Gingival tissue recession with severe bone or soft tissue loss in the interdental area greater than cervical one third of root surfaces and/ or severe malpositioning of the teeth

Prognosis according to Mahajan's classification
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

- **Pini Prato et al (2010)²⁷**
 Pini-Prato et al. (2010) recently proposed a clinical classification of surface defects in teeth associated with gingival recession. Four classes of dental-surface defects in areas of gingival recession were identified on the basis of the presence (Class A) or absence (Class B) of the cemento-enamel junction and of the presence (Class+) or absence (Class-) of surface discrepancy (a step).
- **Cairo et al (2011)²⁸**
 Cairo et al. (2011) recently introduced a new classification system of gingival recessions using the level of interproximal clinical attachment as an identification criterion; they also explored the predictive value of the resulting classification system on final root coverage outcomes following surgery. Three recession types (RT) were identified: class RT1 included gingival recession with no loss of interproximal attachment; class RT2 comprised recession with loss of interproximal attachment less than or equal to the buccal site; and class RT3 showed interproximal attachment loss higher than the buccal site. The results of this study show that the recession type class is a strong predictor of the final recession reduction after different surgical procedures.
- **Ashish Kumar (2013)²⁹**
 This classification system is based on an amalgamation of certain criteria of Miller's classification with the certain features of Nordland and Tarnow's classification. This classification can be applied for facial surfaces of maxillary teeth and facial and lingual surfaces of mandibular teeth. Interdental papilla recession can also be classified according to this new classification. Class I deals with marginal tissue recession with no loss of interdental bone or soft-tissue. Class II and III deal with the loss of interdental bone/soft-tissue with/without marginal tissue recession.

Class I: There is no loss of interdental bone or soft-tissue. This is sub-classified into two categories:

Class I-A: Gingival margin on F/L aspect lies apical to CEJ, but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ
 Class I-B: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ

Either of the subdivisions can be on F or L aspect or both (F and L):

- Class II: The tip of the interdental papilla is located between the interdental contact point and the level of the CEJ mid-buccally/mid-lingually. Interproximal bone loss is visible on the radiograph. This is sub-classified into three categories:
- Class II-A: There is no marginal tissue recession on F/L aspect
- Class II-B: Gingival margin on F/L aspect lies apical to CEJ but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ
- Class II-C: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ

Either of the subdivisions can be on F or L aspect or both (F and L).

- Class III: The tip of the interdental papilla is located at or apical to the level of the CEJ mid-buccally/mid-lingually. Interproximal bone loss is visible on the radiograph. This is sub-classified into two categories:
- Class III-A: Gingival margin on F/L aspect lies apical to CEJ, but coronal to MGJ with attached gingiva present between marginal gingiva and MGJ
- Class III-B: Gingival margin on F/L aspect lies at or apical to MGJ with an absence of attached gingiva between marginal gingiva and MGJ

Either of the subdivisions can be on F or L aspect or both (F and L).

Classification of palatal gingival recession

The position of interdental papilla remains the basis of classifying gingival recession on palatal aspect. The criteria of sub-classifications have been modified to compensate for the absence of MGJ.

PR-I deals with marginal tissue recession on palatal aspect with no loss of interdental bone or soft-tissue.

PR-II and PR-III deal with the loss of interdental bone/soft-tissue with marginal tissue recession on palatal aspect.

Palatal recession-I

There is no loss of interdental bone or soft-tissue. This is sub-classified into two categories:

PR-I-A: Marginal tissue recession 3 mm from CEJ.

PR-I-B: Marginal tissue recession of >3 mm from CEJ.

Palatal recession-II

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-II-A: Marginal tissue recession 3 mm from CEJ.

PR-II-B: Marginal tissue recession of >3 mm from CEJ.

Palatal recession-III

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-III-A: Marginal tissue recession 3 mm from CEJ.

PR-III-B: Marginal tissue recession of >3 mm from CEJ.

LIMITATIONS OF MILLERS CLASSIFICATION OF RECESSION³⁰

- The reference point for classification is MGJ. The struggle in identifying the MGJ creates difficulties in classification amid Class I and Class II. There is no mention of presence of keratinised tissue. A certain amount of keratinised gingiva (in the form of free gingiva) will be evident in any tooth with recession. Therefore the marginal tissue recession cannot extend to or beyond MGJ. In such cases, Class II cannot be a distinct class and Class I and Class II would represent a single group.
- In Miller's Class III and Class IV recession, the interdental bone or soft tissue is an important criterion to categorize the recessions. The amount and type of bone loss has not been specified. Mentioning Miller's Class III and Class IV doesn't exactly specify the level of interdental papilla and amount of loss. A clear picture of severity of recession is hard to project.
- Class III and Class IV categories of Miller's classification stated that marginal tissue recession extends to or beyond the MGJ with the loss of interdental bone or soft tissue is apical to CEJ. The cases which have interproximal bone loss and marginal recession that does not extend to MGJ cannot be classified either in Class I because of the presence of bone loss or in class III as recession does not extend to MGJ.
- Facial or lingual involvement of soft tissue is not stated in the Miller's classification.
- Tissue recession pertaining to the interdental papilla alone cannot be classified as stated by Miller's classification.
- Palatal gingival recession in the maxillary arch cannot be classified as there is no MGJ on the palatal surface of maxillary arch. This is another drawback of Miller's classification.
- Miller's classification also states the prognosis of root coverage procedures. He stated that 100 % root coverage can be expected in Class I and Class II type of recessions, partial root coverage in Class III and no coverage in Class IV. According to Pini Prato, complete root coverage cannot be obtained in every case of Class I type of recessions. There are other factors on

which prognosis of the root coverage procedure depends which are not stated in the Miller's classification.

Consequences of gingival recession

- Aesthetics- Teeth with gingival recession appear to be longer than the adjacent teeth and patients become aesthetically conscious.³¹
- Plaque accumulation- It is difficult for the patient to keep the site of gingival recession free of plaque and debris which results in plaque accumulation in that area.
- Gingivitis/Periodontitis- As bacterial plaque is the primary etiologic factor for initiation of periodontal disease, increased amount of plaque accumulation at the site of recession gives rise to periodontal disease.
- Hypersensitivity- Recession will uncover the cervical dentine which results in hypersensitivity.³²
- Caries- As a result of recession, in addition to plaque accumulation, the root surfaces are exposed to the oral environment. This may result in root caries.³³
- Abrasion- Abrasion may result if the patient practices an aggressive type of brushing technique.

Conclusion

This article analyses the literature on gingival recession. The main signs for root coverage procedures are aesthetic demands by the patient and root hypersensitivity. Mucogingival surgery or periodontal plastic surgery attempts to reinstate the periodontium to a healthy state. For root coverage, there are multiple procedures that can be used. The choice of procedure depends upon a number of factors such as number of teeth involved, amount and thickness of keratinised gingiva at the site of recession, degree of recession, postoperative colour harmony and labial protrusion of recession area. The treatment of gingival recession due to aesthetic reasons should only be carried out in patients who have a healthy remaining periodontium and a good oral hygiene regimen.

References-

1. American Academy of Periodontology (AAP). Glossary of periodontal terms. 3rd ed. Chicago: The American Academy of Periodontology; 1992.
2. Kassab M.M., Cohen R.E. The etiology and prevalence of gingival recession. *J. Am. Dent. Assoc.* 2003;134(2):220-225
3. Wennström J.L. Mucogingival therapy. *Ann Periodontol* 1996;1:671-701.
4. Hall WB (1984) Recession and the pathogenesis of recession in pure mucogingival problems. Quintessence, Chicago: 29-47
5. A. Khocht, G. Simon, P. Person, and J. L. Denepitiya, "Gingival recession in relation to history of hard toothbrush use," *Journal of Periodontology*, vol. 64, no. 9, pp. 900-905, 1993
6. J. Artun and O. Krogstad, "Periodontal status of mandibular incisors following excessive proclination A study in adults with surgically treated mandibular prognathism," *American Journal of Orthodontics and Dentofacial Orthopedics*, vol. 91, no. 3, pp. 225-232, 1987.
7. J. R. Trott and B. Love, "An analysis of localized gingival recession in 766 Winnipeg High School students," *The Dental Practitioner and Dental Record*, vol. 16, no. 6, pp. 209-213, 1966.
8. J. C. Gunsolley, S. M. Quinn, J. Tew, C. M. Gooss, C. N. Brooks, and H. A. Schenkein, "The effect of smoking on individuals with minimal periodontal destruction," *Journal of Periodontology*, vol. 69, no. 2, pp. 165-170, 1998.
9. P. S. Wright and P. H. Hellyer, "Gingival recession related to removable partial dentures in older patients," *The Journal of Prosthetic Dentistry*, vol. 74, no. 6, pp. 602-607, 1995.
10. S. Parma-Benfenati, P. A. Fugazzato, and M. P. Ruben, "The effect of restorative margins on post-surgical development and nature of periodontium," *The International Journal of Periodontics & Restorative Dentistry*, vol. 5, pp. 31-51, 1985.
11. A. M. Quart, C. Butkus Small, and R. S. Klein, "The cocaine connection. Users imperil their gingiva," *The Journal of the American Dental Association*, vol. 122, no. 1, pp. 85-87, 1991
12. Loe H et al. The natural history of periodontal disease in man: prevalence, severity, and extent of gingival recession. *J Periodontol.* 1992 Jun;63(6):489-95.
13. Addy M, Mostafa P, Newcombe RG. Dentine hypersensitivity: the distribution of recession, sensitivity and plaque. *Journal of Dentistry.* 1987; 15: 242-248.
14. L Checchi et al. Gingival Recession and Toothbrushing in an Italian School of Dentistry: A Pilot Study. *J Clin Periodontol* 26(5), 276-280. 5 1999.
15. J. M. Albandar and A. Kingman, "Gingival recession, Gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994," *Journal of Periodontology*, vol. 70, no. 1, pp. 30-43, 1999.
16. Sangnes G., Gjermo P. Prevalence of oral soft and hard tissue lesions related to mechanical tooth cleansing procedures. *Community Dent. Oral Epidemiol.* 1976;4(2):77-83.
17. Serino G., Wennstrom J.L., Lindhe J., Eneroth L. The prevalence and distribution of gingival recession in subjects with a high standard of oral hygiene. *J. Clin. Periodontol.* 1994;21(1):57-63
18. Timmerman MF, Van der Weijden GA. Untreated periodontal disease in Indonesian adolescents. Clinical and microbiological baseline data. *J Clin Periodontol.* 1998 Mar;25(3):215-24.

19. Kapferer I, Benesch T et al. Lip piercing: prevalence of associated gingival recession and contributing factors. A cross-sectional study. *J Periodontol Res.* 2007 Apr;42(2):177-83.
20. V Dodwad. *Ann Dent Univ Malaya*, 2001, 8, 1-6.
21. Sullivan HC, Atkins JH. Free autogenous gingival grafts. 3. Utilization of grafts in the treatment of gingival recession. *Periodontics* 1968;6:152-60.
22. Liu W, Solt C. A surgical procedure for the treatment of localized gingival recession in conjunction with root surface citric acid conditioning. *J Periodontol.* 1980;51(9):505-19.
23. Benque E.P., Brunel G., Gineste M., Colin L., Duffort J., Fonvielle E. Gingival recession. *Parodontol J* 1984; 3: 207-241
24. Miller PD Jr. A classification of marginal tissue recession. *Int J Periodontics Restorative Dent.* 1985;5:8-13.
25. Smith RG. Gingival recession. Reappraisal of an enigmatic condition and a new index for monitoring. *J Clin Periodontol* 1997;24:201-5.
26. Mahajan A. Mahajan's modification of miller's classification for gingival recession. *Dental Hypotheses* 2010;1:45-50.
27. Pini-Prato G, Franceschi D, Cairo F, Nieri M, Rotundo R. Classification of dental surface defects in areas of gingival recession. *J Periodontol* 2010; 81: 885-890.
28. Cairo F, Nieri M, Cincinelli S, Mervelt J, 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: 661-666.
29. Ashish Kumar, Sujata Surendra Masamatti. A new classification system for gingival and palatal recession. *Journal of Indian Society of Periodontology*, Vol. 17, No. 2, March-April, 2013, pp. 175-181
30. Pini-Prato G. The Miller classification of gingival recession: Limits and drawbacks. *J Clin Periodontol* 2011;38:243-5
31. P. R. Greene, "The flexible gingival mask: an aesthetic solution in periodontal practice," *British Dental Journal*, vol. 184, no. 11, pp. 536-540, 1998.
32. M. Brannstrom and A. Astrom, "The hydrodynamics of the dentine; its possible relationship to dental pain," *International Dental Journal*, vol. 22, no. 2, pp. 219-227, 1972.
33. J. Reiker, U. Van Der Velden, D. S. Barendregt, and B. G. Loos, "A cross-sectional study into the prevalence of root caries in periodontal maintenance patients," *Journal of Clinical Periodontology*, vol. 26, no. 1, pp. 26-32, 1999.