Classification Systems for Gingival Recession and Suggestion of a New Classification System

Abstract
Background: Gingival recession is one of the most usual esthetic concerns associated with the periodontal tissues. Classification of such condition is important to diagnose, determine the prognosis, and frame the treatment plan. Various classifications have been put forward since decades to classify gingival recession. Miller’s classification is the widely used classification among all classifications, but certain drawbacks have been noted in this classification. Therefore, an effort is made to review most commonly used classification systems for gingival recession, and their drawbacks further come up with a proposal of new classification system for gingival recession.

Keywords: Cementoenamel junction, classification, gingival recession, Miller’s classification

Introduction
Exposure of the tooth through apical migration of the gingiva is called gingival recession or atrophy.[1] It is a commonly occurring condition with varying etiologies such as anatomical, pathological, and physiological factors.[2] Gingival recession can either be localized or generalized; it may be a feature of periodontitis as depicted in the definition of periodontitis which is “as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with increased probing depth formation, recession, or both.”[3] In addition, other common etiologic factors for recession are chronic mechanical trauma from toothbrushing, iatrogenic damage from unfavorable restorations, and repeated scaling and root planing. Although it rarely results in tooth loss, marginal tissue recession is associated with thermal and tactile sensitivity, esthetic concerns/complaints, and a tendency toward root caries.[4]

A condition deviated from normal need to be diagnosed, with determination of prognosis and requires treatment planning for which a classification is required. Various classifications of gingival recessions have been put forward since decades starting from Sullivan and Atkins in 1968,[5] Mlinek et al. in 1973,[6] Miller in 1985,[7] Smith in 1997,[8] and Mahajan in 2010.[9] Among the various classification systems, Miller’s classification system is the most widely used of all the currently followed classification systems and various drawbacks have been noted in this classification. Classifications, defined as “systematic arrangements in groups or categories according to established criteria,”[10] have been conceived to facilitate the comprehension of the great amount of factors and information involved in complex systems. Classifications have proved useful and indispensable in many fields of knowledge, particularly in medicine.[11] In periodontology, classifications are widely used to categorize defects due to periodontitis according to their etiology, diagnosis, treatment, and prognosis. Classification of gingival recession is necessary for diagnosis, prognosis, treatment planning, and as well as for communication between academicians and clinicians.

Hence, an attempt is made in this article to overcome the drawbacks of various classification systems by presenting a new classification system for gingival recession.

Review of Previous Classification Systems
Classification systems are necessary to provide a framework to scientifically study the etiology, pathogenesis, and treatment of gingival recession. Several classification systems have been proposed to study gingival recession, however, each system has its own shortcomings.

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Address for correspondence: Dr. Nagappa Guttiganur, Department of Periodontics and Oral Implantology, AME’s Dental College and Hospital, Raichur - 584 103, Karnataka, India. E-mail: nagunags@yahoo.co.in

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in diseases in an orderly fashion. In addition, such systems give clinicians a way to organize the health care needs of their patients. Since era, several classifications have been proposed in the literature to facilitate the diagnosis of gingival recessions which are discussed as follows:

Way back in 1968, Sullivan and Atkins classified soft-tissue defects at mandibular incisors into four classes: “narrow,” “wide,” “shallow,” and “deep,” and better root coverage outcomes following a gingival graft procedure for narrow-shallow defects were reported.[5]

In 1973, Mlinek et al. identified “shallow-narrow” defects as recession <3 mm, while “deep-wide” defects were recessions >3 mm.[6]

Miller in 1985 proposed four classes of marginal tissue recessions which are based on the level of gingival margin with respect to the mucogingival junction (MGJ) and the underlying alveolar bone. Class I: Marginal tissue recession not extending to the MGJ. No loss of interdental bone or soft tissue. Class II: Marginal recession extending to or beyond the MGJ. No loss of interdental bone or soft tissue. Class III: Marginal tissue recession extends to or beyond the MGJ. Loss of interdental bone or soft tissue is apical to the cementoenamel junction (CEJ) but coronal to the apical extent of the marginal tissue recession. 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 [Figure 1].[7]

Smith in 1997 proposed classification to assess both vertical and horizontal extent of the defect. The degree of horizontal component was expressed as a value ranging from 0 to 5 depending on the severity of CEJ exposure, while the vertical extent of the recession was measured in millimeters using a periodontal probe on a 0–9 range.[8]
In 2010, Mahajan proposed a modification of Miller’s classification into four classes Class I: Gingival recession defects not extending to MGJ. Class II: Gingival recession defects extending to MGJ or beyond it. Class III: Gingival recession defects with bone or soft-tissue loss in the interdental area up to cervical one-third of the root surfaces and/or malpositioning of the teeth. Class IV: Gingival recession defects with severe bone or soft-tissue loss in interdental area greater than cervical one-third of the root surface and/or severe malpositioning of teeth.\(^9\)

Among all the classification systems, Miller’s classification is still the most widely used, but various drawbacks have been noted which are as follows:\(^{11}\)

1. Difficulty in locating MGJ
2. This classification does not provide information about keratinized tissue and its components. He refers to the MGJ only, and it is difficult to identify the MGJ which makes tough to distinguish between Class I and II. Due to the fact that a tooth with gingival recession always presents a certain amount of keratinized tissue, the marginal tissue recession cannot extend to or beyond the MGJ. Therefore, Class II could never exist and Classes I and II would represent a single category. With regard to Class III and IV, the bone or soft-tissue losses in the interdental areas are considered the strategic issues to identify these categories. On the other hand, the amount and characteristics of bone loss (horizontal or vertical) are not reported
3. Class III considered tooth malpositioning as an alternative criterion to bone or soft-tissue loss without a comprehensive explanation as it is unclear when it comes to establishing the degree of malposition for including a recession in one or the other class. Therefore, the inclusion of a recession in a precise class may be difficult
4. From the prognostic standpoint, Classes I and II cannot be distinguished from each other as they both anticipate 100% root coverage
5. As regards Class III, partial root coverage is anticipated while some recent studies demonstrate that root
coverage can be unpredictable in treating Class III recession-type defects.\cite{12}

**Drawbacks of Other Classification Systems**

Sullivan and Atkins – this classification, although simple, is subject to open interpretation of the examiner and interexaminer variability and is therefore not reproducible.\cite{5,13}

Mlinek \textit{et al.} – this classification does not specify the landmark for horizontal measurement as variable measurement may be present at variable distances.\cite{6}

Smith in 1990 – the author proposed that in cases of extensive vertical component, further horizontal component may be allotted at an intermediate distance between CEJ and base of the defect, which is not clearly specified. Furthermore, separate values can be assigned for multirooted teeth, which make it more complex. It may lead to overestimation of the condition as it utilizes subjective awareness of sensitivity. It is also difficult to detect the midpoints of mesial and distal surfaces, in the presence of intact interdental papilla.\cite{8}

In 2010, Mahajan proposed a modification of Miller’s classification. This modification still does not accommodate all clinical conditions. For example, a tooth with gingival recession not extending up to MGJ but with interdental soft and hard tissue loss can neither be placed in Class I nor in Class III since there is no mention of the involvement of MGJ in Class III.\cite{9}

**Proposed Classification System for Gingival Recession (Nagappa and Mukta’s Classification)**

Considering the above limitations, a new classification system is being proposed which is more informative and lucid which is based on Miller’s classification. This new classification can be applied for facial surfaces of maxillary teeth and facial and lingual surfaces of mandibular teeth, and interdental papilla recession can also be classified. This proposed classification system allows for easy means to assess progressive degrees of gingival recession using readily observed anatomical landmarks for reference. It provides a description of the extent of gingival recession. The use of such a system should assist future communication among clinicians and researchers.

It is classified into four classes with subdivisions a and b.

**Class I** – Apical shift in the crest of marginal gingiva 1–2 mm from CEJ
- I a – without any interproximal tissue loss clinically [Figure 2]
- I b – with interproximal tissue loss coronal to interproximal CEJ clinically [Figure 3].

**Class II** – Apical shift in the crest of marginal gingiva >2 mm <3 mm from CEJ
- II a – without any interproximal tissue loss clinically [Figure 4]
- II b – with interproximal tissue loss coronal to interproximal CEJ clinically [Figure 5].

**Class III** – Apical shift in the crest of marginal gingiva ≥3 mm from CEJ
- III a – without any interproximal tissue loss clinically [Figure 6]
- III b – with interproximal tissue loss apical to interproximal CEJ clinically [Figure 7]

**Class IV** – Apical shift in the crest of marginal gingiva >3 mm from CEJ with severe malposed tooth
- IV a – without any interproximal tissue loss clinically [Figure 8]
- IV b – with interproximal tissue loss apical to interproximal CEJ clinically [Figure 9].

**Limitations of Proposed Classification System**

- Undetectable or missing CEJ in some situations because of restorations, abrasion, and abrasion creates difficulty to classify recession, as CEJ is the landmark used in this proposed classification.
- Prognosis for root coverage procedures is not mentioned.

**Comparison of Various Classification Systems for Gingival Recession**

When compared with various classification systems for gingival recession, the new system has the advantages summarized in Table 1. This current classification system is user-friendly, there is no confusion, it is more precise, and it requires less time to be understood which is described in Table 1.

**Conclusion**

Various classification systems have been put forward which have certain drawbacks; hence, there is an effort to combat
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**Table 1: Comparison of various classification systems for gingival recession**

| Salient features                                      | Sullivan and Atkins | Mlinek’s | Miller’s | Smith’s | Mahajan’s | New |
|--------------------------------------------------------|---------------------|----------|----------|---------|-----------|-----|
| Anatomical landmarks considered                        | No                  | No       | Yes      | Yes     | No        | Yes |
| Can be easily understandable?                          | Yes                 | Yes      | Yes      | No      | Yes       | Yes |
| Can it make easy conversation vice versa (speed of recall)? | Yes                 | Yes      | Yes      | No      | Yes       | Yes |
| Can be followed by beginners?                          | Yes                 | Yes      | Yes      | No      | Yes       | Yes |
| Covers all the clinical situations                     | No                  | No       | No       | No      | No        | Yes |
| Prognosis mentioned?                                   | No                  | No       | No       | No      | Yes       | No  |

those drawbacks and frame a new classification system for gingival recession which considers all clinical situations of gingival recession. This new classification system is more of a diagnostic classification which is simple to use, more convenient to record, easy to understand, and it reduces miscommunications. This system can be used routinely by periodontists, as well as general dentists worldwide.

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**Conflicts of interest**

There are no conflicts of interest.

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