# On the Value of the 2017 Classification of Phenotype and Gingival Recessions

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One sentence summary: The 2017 classification of gingival recessions offers significant research- and treatment-related advantages compared to previous classifications.

**Abstract:**

The 2017 World Workshop completely restructured knowledge in periodontology with a series of official consensus statements jointly agreed upon by the American Academy of Periodontology and the European Federation of Periodontology. Among them, the 2017 classification of phenotype and gingival recession successfully incorporated the most relevant previous classifications into a treatment-oriented diagnostic matrix. Despite the significant advantages related with the implementation of this new classification of gingival recessions, recent articles still report data based on previous outdated systems. Therefore, the present commentary aimed to dive into the key advantages of the 2017 classification of phenotype and gingival recession, and to stress why it should be fully integrated into research and practice settings.

**Keywords**: Surgery, Plastic; Clinical Protocols; Gingival Recession; Gingiva; Classification.

## INTRODUCTION

Medical classification is the systematic arrangement of features of any medical field into category classes used to track diseases and other health conditions.[1] Establishing a classification system is essential for diagnosis and treatment planning, as well as for predicting both short- and long-term prognosis. Classifications facilitate communication among clinicians, researchers, patients, and insurance providers in order to create a system of standardized care. Changes in classifications over time mirror the evolution of the current state of knowledge within the field. The importance of classification systems in the context of research is to provide a basis for standardization of inclusion criteria for clinical trials with the goal of reducing heterogeneity between compared studies, and allowing integration of data from larger databases. Studies have the role to validate existing classifications and to explore additional factors that, in turn, allow proposal of more inclusive classifications.

Over the years, the classification of periodontal disease has evolved to reflect our knowledge and understanding of the disease and its progression.[2] The 2017 World Workshop on the classification of periodontal and peri-implant diseases and conditions completely restructured knowledge in Periodontology. New classifications were introduced to categorize periodontitis,[3] gingival recessions,[4] peri-implant diseases,[5] amongst other periodontal and peri-implant diseases and conditions. Consensus statements following the 2017 World Workshop were jointly agreed by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) and provided official classifications based on the latest evidence with the goal of improving both research and clinical practice. The AAP and EFP presidents, Daniel and Wimmer, explicitly reported that the new classifications aimed for a global implementation.[6]

The 2017 classification of phenotype and gingival recession represents the most updated and comprehensive diagnostic system for recession in the literature on plastic surgery. It does not refute previous classifications on recessions, rather it merges them into a new system that expresses the best features from each one while mitigating their individual drawbacks. Despite the strong advantages that the new classification offers in terms of diagnostics and therapeutics, for reasons of simplicity and historical heritage, recent trials still report data based on the 1985 Miller's classification.[7-9] Therefore, the aim of the present commentary is to dive into the key features of the 2017 classification of phenotype and gingival recession, stressing the key advancements that have been made in the field, and why it should be officially embraced for research protocols and clinical care.

## BODY

A new classification of phenotypes and gingival recessions was introduced during the 2017 World Workshop and approved by the AAP and EFP for its official use.[4, 10] For the first time, a single classification integrated recession related factors, phenotype related factors, and tooth related factors. Despite the significant advantages that the 2017 classification on phenotype and gingival recession provided compared to previous classifications, its use seems to have been accepted more slowly within the literature on periodontal plastic surgery which still often reports on previous classifications.[11, 12]

### Classifications of gingival recessions

Multiple classifications on gingival recessions have been proposed in the plastic surgery literature[13-16] but most of them were used to predict prognosis after free gingival graft (FGG),

currently not considered the standard of care for recession coverage. Sullivan and Atkins (1968)[13] provided a simplified anatomical description of recession that was used until the proposal of the Miller Classification in 1985.[15] The four classes by P.D. Miller aimed to anticipate the prognosis of root coverage using free gingival graft (FGG). The Miller classification system stressed the importance of interproximal tissue height as an important prognostic consideration, and also included extrusion and tooth rotation as key variables influencing treatment outcomes setting it apart from previous systems.

Despite the worldwide use of the 1985 Miller classification, multiple drawbacks raised the need for a more comprehensive classification system.[17] Decades of intensive research on periodontal plastic surgery found coronally advanced flap with connective tissue graft (CTG) to be the gold standard for root coverage, while the use of FGG remains limited for the increase of keratinized tissue width.[18] Regarding prognosis, the possibility of 100% root coverage for teeth with preserved interdental tissue height does not really guarantee predictable complete root coverage (CRC) in all cases of Miller Class I or II. Intense research clarified how prognosis after root coverage treatment would be influenced by additional variables like recession depth,[19] root surface anomalies,[20] or tissue thickness,[21] amongst others. The cutoff between the Miller classes was also often unclear and subjective.

**Additional factors affect prognosis after recession coverage**

To overcome the mentioned ambiguities, later classifications explored adjunctive factors related to complete root coverage. Pini Prato et al. (2010)[22] raised the need to record possible anomalies occurring on the root surface. Root caries or non-carious cervical lesions (NCCL) create physical challenges for CTG adaptation and reduce the probability of complete root coverage.[23, 24] At the same time, NCCLs may alter the morphology of and obscure the

position of the cementoenamel junction (CEJ), making the estimation of the biological limits for root coverage more complex. Description of the root surface is of crucial importance for communication between researchers and clinicians and was classified based on CEJ detectability (A vs. B), and presence of root concavities (plus vs. minus).[22]

Cairo et al. (2011)[25] clarified the grey areas between the Miller classes and regrouped them based on interproximal attachment level. Recession type (RT) 1 joined together Miller classes I and II, as the expected treatment outcomes are both favorable. RT2 and RT3 aimed to clarify the cutoff point between Miller classes III and IV. If the interproximal tissue is positioned coronal or at the level of the midfacial attachment level, the recession is classified as RT2, while cases of more severe interproximal loss fall into the RT3 category.

Zweers et al. (2014) focused on periodontal phenotype, and classified it as thin scalloped, thick flat, or thick scalloped.[26] Thin-phenotype patients have thin gingiva, thin bone, narrow KT width, and are more prone to dehiscence apical to the gingival margin.[27, 28] Clinical implications for recording the periodontal phenotype rely on expected complete root coverage outcomes. Indeed, a thicker gingival phenotype and a wider band of KT were found to affect complete root coverage outcomes both in the short- and long-term.[29-33]

**New classification of phenotype and gingival recession**

Before the 2017 World Workshop, most classifications were unsuccessful in providing a globally accepted view of the clinical presentation of recessions. Indeed, they considered only a limited focus on either soft tissue components or root-surface characteristics. No single classification system was ideal to allow for a precise communication of all the key features of

recession, and thus the literature tended to retain the 1985 Miller classes. Periodontal literature was affected by unfair comparisons between teeth with or without cervical abrasions, or unknown CEJ characteristics. Tissue thickness, that has been largely acknowledged as one of the strongest outcome predictors, was completely neglected in most of the trials. Implications of the discussed heterogeneity regarding the type of recessions and key root surface characteristics appeared very clear among researchers and practitioners. Surgeons noted the high variability regarding recession characteristics within cases that could all be classified as Miller Class I, and learned to never promise complete root coverage to a patient despite the favorable outcomes anticipated by the literature.

In the context of the 2017 World Workshop, Cortellini and Bissada were asked to propose a classification system that was clinically oriented and that organically summarized all previously reported anatomical factors. The primary goal was to introduce a system that would improve homogeneity in research, facilitate communication among practitioners, as well as to guide treatment planning and expected prognosis. As a result, the 2017 classification of phenotype and gingival recession was based on three components defined as follows: (i) recession characteristics, recorded as midfacial recession depth and interproximal recession type (RT); (ii) phenotype characteristics, recorded as gingival thickness and KT width; and (iii) root surface characteristics, recorded as detectability of the CEJ or presence of root steps.[4] This group of prognostic factors was used to construct a 4x5 matrix with the ultimate aim of guiding treatment planning (Figure 1). On one end of the spectrum, the absence of recession in thick phenotypes requires no intervention (Figure 2 Case A); on the other hand, prophylactic treatment may be recommended for thin phenotypes planned for orthodontic, restorative, or implant work,[4] or if longitudinal observation reveals a high risk of recession[34, 35] (Figure 3 Case B). In case of recession, the severity of the interdental attachment loss dictates the expected treatment outcomes for root coverage, whereas root

surface characteristics guide the need for CEJ reconstruction, and phenotype characteristics control the short- and long-term stability after treatment. Shallow recessions with preserved interdental attachment, unaltered root surface, and a thick phenotype present the perfect therapeutic indication for root coverage procedures for patients concerned about further progression and esthetics (Figure 4 Case C). Deep recessions with loss of interdental attachment and cervical tooth structure, narrow keratinized tissue width, and a thin phenotype are best treated with surgical intervention, but complete root coverage is generally unpredictable (Figure 5 Case D).

In addition to the aforementioned variables, the official review by Cortellini and Bissada carefully evaluated a panel of adjunctive factors relating to mucogingival deformities and conditions. These include dentinal hypersensitivity, patient esthetic concerns, abnormal mucogingival color, local frenum insertion, and others. This updated list of "Mucogingival Deformities and Conditions" needs to be considered before choice of the treatment modality.[4]

# CONCLUSIONS

The 2017 classification of phenotype and gingival recession is the most updated and inclusive classification system to date on gingival recessions within the periodontal plastic literature. This novel system provided for the first time a big picture view of the many variables which must be taken into account when diagnosing and treating mucogingival deformities and conditions. It effectively summarized the current state of the evidence on this topic to reduce heterogeneity in clinical research and to facilitate comparisons in clinical practice. Trials approved before the publication of the World Workshop might maintain older classifications to avoid protocol deviations in the enrollment process. However, in light of the significant

advantages related with the adoption of the new matrix, newly proposed trials and case series should consider its implementation. This new classification system improves the quality of clinical research and represents the official diagnostic language of the periodontal community. Therefore, it would be beneficial that editors require the incorporation of the new classification as part of the standard of quality for submitted articles.



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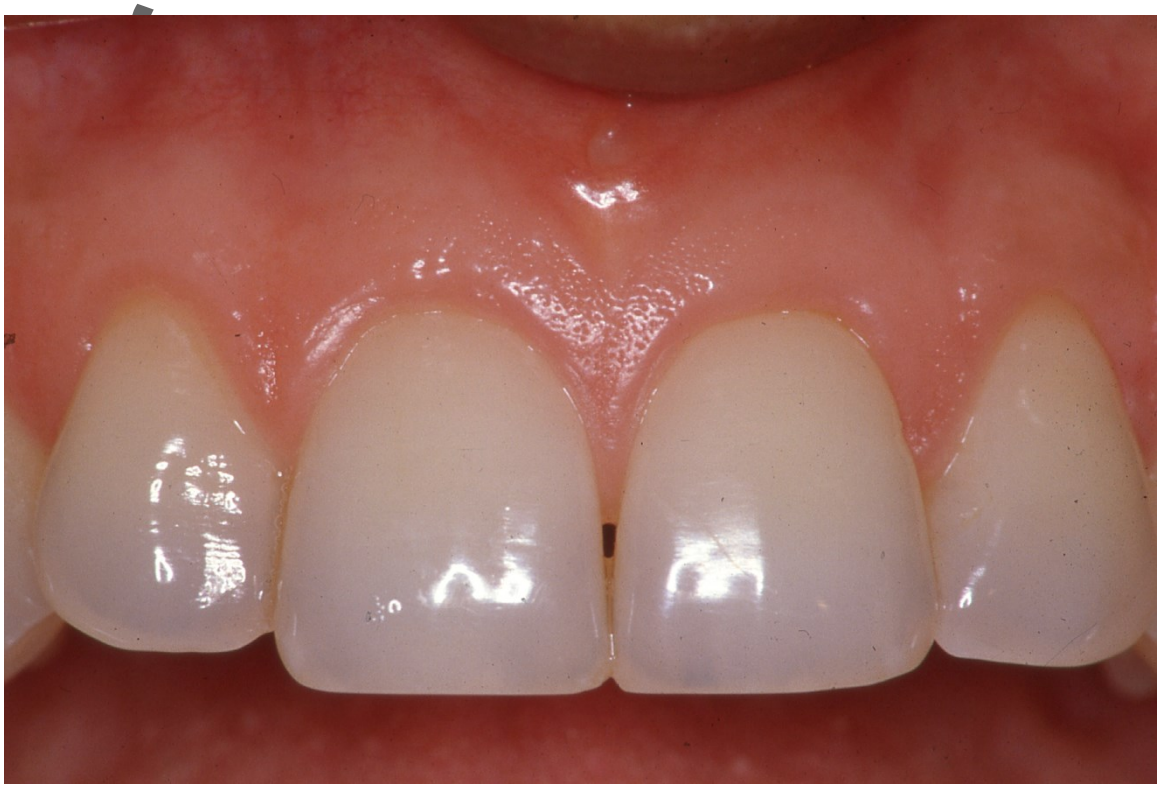
**Legend**

**Figure 1:** 2017 classification of phenotype and gingival recession. Recession depth, interdental attachment height, gingival thickness, keratinized tissue width, cementoenamel junction detectability, and occurrence of root surface concavities were merged in a 4x5 matrix aimed to be treatment oriented. Table adapted from Cortellini and Bissada (2018).

Abbreviations. RT: recession type, REC Depth: depth of the gingival recession, GT: gingival thickness, KTW: keratinized tissue width, CEJ: cementoenamel junction (A: detectable CEJ, B: undetectable CEJ), Step = root surface concavity (+: presence of a cervical step >0.5 mm.– : absence of cervical step).

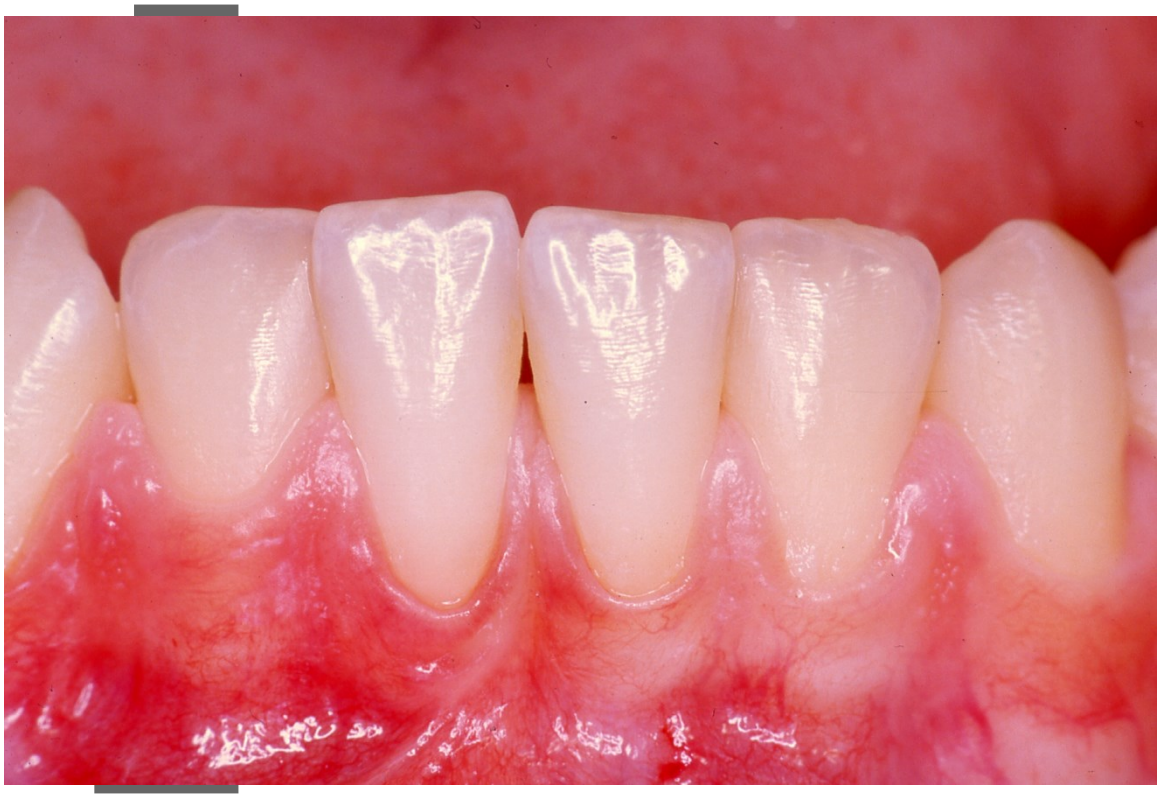
| **2017 Classification of Phenotype and Gingival Recession** | | | | | |
|---|---|---|---|---|---|
| | Gingival site | | | Tooth site | |
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| No Recession | | | | | |
| RT1 | | | | | |
| RT2 | | | | | |
| RT3 | | | | | |

**Figure 2 Case A:** Healthy periodontium without recession and with thick gingival phenotype. No surgical intervention is required as health is maintained with prevention and periodical monitoring. The matrix stresses the favorable anatomical scenario related with Case A.



| 2017 Classification of Phenotype and Gingival Recession | | | | | |
|---|---|---|---|---|---|
| Gingival site | | | | Tooth site | |
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| **No Recession** | | **Thick** | **≥ 2mm** | **A** | - |
| RT1 | | | | | |
| RT2 | | | | | |
| RT3 | | | | | |

**Figure 3 Case B:** Buccally erupted lower central incisors presented with thin phenotype and narrow band of keratinized tissue. No recession is noted at this point. Matrix related with Case B stresses the risk for future development of gingival recessions. Surgical intervention would be indicated to prevent future recessions in cases of additional treatment like orthodontics or prosthetic intrasulcular margins.

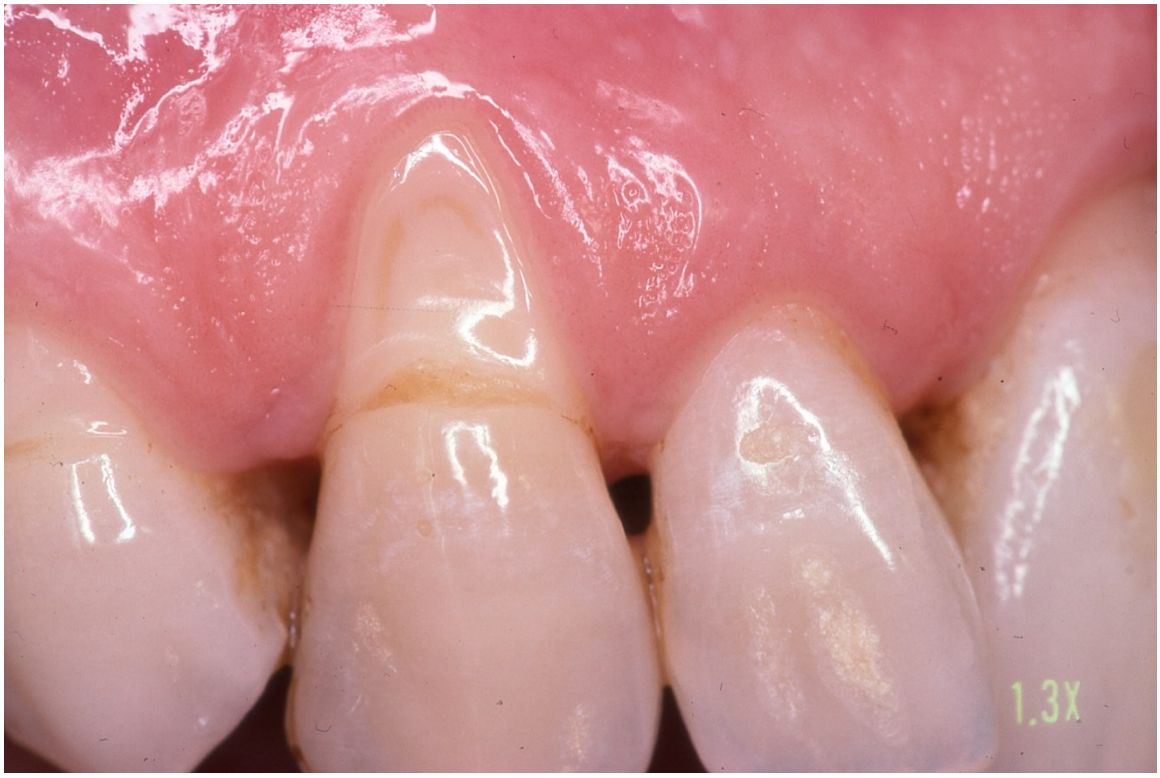


| 2017 Classification of Phenotype and Gingival Recession | | | | | |
|---|---|---|---|---|---|
| Gingival site | | | | Tooth site | |
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| **No Recession** | | **Thin** | **< 2mm** | **A** | **-** |
| RT1 | | | | | |
| RT2 | | | | | |
| RT3 | | | | | |

**Figure 4 Case C:** Upper right anterior sextant presented with thick phenotype, shallow narrow recessions, preserved interdental attachment height, identifiable cementoenamel junction and negative for root steps. Patient oriented evaluation recorded hypersensitivity and concern for recession progression. The matrix related with Case C organizes the diagnosis to make it visually simple and direct. The favorable clinical scenario can be successfully treated via periodontal plastic surgery for root coverage.

| 2017 Classification of Phenotype and Gingival Recession | | | | | |
|---|---|---|---|---|---|
| | Gingival site | | | Tooth site | |
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| No Recession | | | | | |
| **RT1** | **1.5 mm** | **Thick** | **≥ 2mm** | **A** | **-** |
| RT2 | | | | | |
| RT3 | | | | | |

**Figure 5 Case D:** Upper right canine showed deep recession, incipient loss of interdental tissue, thin phenotype, narrow keratinized tissue apical to the recession, altered contour of the cementoenamel junction (CEJ) and significant root abrasion. The matrix related with Case D underlines the challenges in treating the patient. Successful outcome relies into connective tissue graft adaptation on the altered root surface, thickening the phenotype for long-term stability and CEJ reconstruction by restorative composites.



| 2017 Classification of Phenotype and Gingival Recession | | | | | |
|---|---|---|---|---|---|
| Gingival site | | | | Tooth site | |
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| No Recession | | | | | |
| RT1 | | | | | |
| **RT2** | **5 mm** | **Thin** | **< 2mm** | **B** | **+** |
| RT3 | | | | | |