Acta Scientific Dental Sciences

Volume 9 Issue 11 November 2025

Review Article

The Evolution of Periodontitis Diagnosis: Understanding the 2017 Grading Criteria

Vishnusripriya J[1]*, Hemalatha DM[2], Sharon S George[3] and Sheza Nouren[3]

[1]*Senior Lecturer, Department of Periodontics, Mahe Institute of Dental Sciences and Hospital, India*

[2]*Reader, Department of Periodontics, Mahe Institute of Dental Sciences and Hospital, India*

[3]*Third Year BDS Student, Department of Periodontics, Mahe Institute of Dental Sciences and Hospital, India*

***Corresponding Author:** Vishnusripriya J, Senior Lecturer, Department of Periodontics, Mahe Institute of Dental Sciences and Hospital, India.

DOI: 10.31080/ASDS.2025.09.2073

Received: October 15, 2025

Published: October 30, 2025

Abstract

The 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions introduced a revised framework for the diagnosis and management of periodontitis. A major innovation was the incorporation of grading, designed to supplement disease staging by providing insights into the biological characteristics of periodontitis. Grading reflects the rate of disease progression, anticipated response to therapy, and influence of systemic and behavioral risk factors. Patients are classified as Grade A (slow progression), Grade B (moderate progression), or Grade C (rapid progression), based on clinical attachment loss, radiographic bone loss, and supporting factors such as smoking and diabetes. This system shifts the diagnostic process from a static description of severity to a dynamic model that incorporates risk assessment and future disease trajectory. By integrating both staging and grading, the 2017 classification promotes a more individualized and evidence-based approach to patient care, improving diagnosis, prognosis, and treatment planning in periodontitis.

Keywords: Periodontitis; Classification; Grading; Progression; Risk Modifiers

Introduction

The 2017 classification of periodontal and peri implant diseases and condition, developed through a collaborative effort between the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EEP), represents a significant update from the previous classification system of 1999. This revised framework was designed to reflect current scientific evidence and clinical understanding of periodontal disease. One of the key highlights is the redefinition of the periodontitis, now categorized under single disease entity with stages and grades to reflect severity, complexity, and progression risk. This classification allows for more personalized diagnosis and treatment approach, enhancing both clinical management and patient outcome.

Classification of periodontitis in 1999

From 1977 to 1989 American Academy of Periodontology (AAP) went from 2 main periodontal disease categories to 5. The 1989 was significant improvement over previous classification. However the 1989 classification has its shortcomings including; difficulty in fitting patients into certain categories, similarity in microbiological and host response features and some unclear classifi-

cation criteria. A new periodontal disease classification system was recommended by the 1999 International workshop for a classification of Periodontal disease and Conditions and has been accepted by AAP. This new classification has numerous subcategories and only major categories will be discussed here.

Limitation of 1999 classification of periodontitis

The 1999 classification of periodontitis has several limitations**.** It struggled to clearly distinguish between chronic and aggressive periodontitis due to overlapping clinical features. It also lacked a standardized method to assessed disease progression and did not account for important risk factors like smoking and diabetes. Additionally, it provided little guidance on the complexity of treatment. Importantly it does not include peri-implant disease, which are now significant concern in modern history.

Chronic Periodontitis (slight: 1-2 mm CAL; moderate: 3-4 mm; Severe; > 5 mm CAL)
• Localized
• Generalized (> 30% of sites are involved)
Aggressive periodontitis (slight :1-2 mm CA; moderate: 3-4 mm CAL; severe: > 5 mm CAL)
• Localized
• Generalized (> 30% of sites are involved)
Periodontitis as a manifestation of systemic disease
• Associated with hematological disorders
• Associated with genetic disorder
• Not otherwise specified
Periodontitis as a manifestation of systemic disease.
• Necrotizing periodontal disease
• Abscess of periodontium
Periodontitis associated with Endodontic Lesions
• Combined periodontic
• Endodontic lesions

Table 1: Categories of periodontitis according to 1999 classification.

Classification of periodontitis in 2017

Periodontitis is characterized by microbially –associated, host mediated inflammation that results in loss of periodontal attachment. This is detected by clinical attachment loss (CAL) by circumferential assessment of the erupted dentition with a standardized periodontal probe with reference to cement enamel junction (CEJ).

Periodontitis is classified as

- Necrotizing periodontal disease
- Periodontitis
- Periodontitis as manifestation of systemic disease

Necrotizing periodontitis

This is a particularly virulent, rapidly progressing disease characterized by necrosis, bleeding gingiva and pain It often occurs in patients with impaired immune system and thus it's called HIV associated periodontitis.

Periodontitis

Disease severity is classified from stage 1 to 4 and rate of progression as grade A to C. Periodontitis can begin from anywhere between childhood and older adulthood. Important severity factors include amount of loss of attachment, depth of pocket and amount of bone loss in X -ray.

Periodontitis as a direct manifestation of systemic disease

This is considered in patients who have inflammation disproportionate to plaque or other local factors and also who have systemic disease.

Diagnosing periodontitis

Clinical features of periodontitis

Early stages are not recognized as they are asymptomatic inflammatory responses in the oral cavity. Often, the first reported symptom of periodontal diseases is bleeding during brushing or flossing. Another symptom that may be noted by the patient is halitosis. More severe symptoms at the time of presentation include pain and tenderness during chewing of specific substances, sensitive teeth, receding gums, the formation of discoloring plaque, tooth mobility, and even loss of teeth. Chronic periodontitis can present in patients of any age, but most often affects middle-aged to older adults. The severity of the disease is based on the amount of clinical attachment loss (CAL). It is described as mild when the CAL is 1 to 2 mm, moderate the CAL is 3 to 4 mm, or severe when the CAL is more than 5 mm.

Clinical feature	Assessment measure
Gingival color and contour	Visual assessment
Gingival phenotype	Visual transparency of tissues on probing
Pocket depth and recession	Visual use of probe
Attachment loss	Visual use of probe/or calculated from probing depth and recession measurements
Bleeding on probing	Visual use of probe Performed as part of BPE, marginal bleeding score or detailed periodontal chart
Tooth mobility (or hypermobility)	Visual assessment using index Eg: Millers mobility index
Furcation involvement of tooth	Visual assessment and use of probe using score or index
Levels of plaque, presence and location of calculus	Visual assessment and use of probe
Presence and location of plaque retention factors	Visual assessment and use of probe

Table 2: Clinical indicators and measurement tools for periodontitis.

Clinical examination

This is the only way to properly assess the condition of gingiva. The basic periodontal examination is done to determine quickly whether there are many gingival problems. It is simple way of determining if there is gingivitis or detecting periodontitis. Using a periodontal probe, the depth of penetration at the gingival line is measured gently and precisely. Depth of >4 mm suggest periodontitis. In clinical practice, periodontitis is assessed by full mouth examination that includes: Calculation of CAL, recording of true periodontal pocket, recording of recession, bone resorption, mobility, furcation involvement.

Probing technique used

Probe must be parallel to long axis of tooth in six point buccally and lingually. Gently "WALK" the probe. Interproximal probing to detect deep pockets in posterior teeth. Probe should be inserted with 10-15 degree. Slightly tilted apical to the contact point.

Radiographic features of periodontitis

The most important radiographic feature seen in periodontitis is fuzziness and discontinuity of lamina Duravit is the result of extension of inflammation in alveolar bone, leading to reduction in calcified tissue and widening of vessel channels in bone lining the socket. Due to bone resorption in lateral aspect of interdental septum a wedge-shaped radiolucent area is formed on mesial or distal aspect of tooth with its apex pointing apically. These changes are associated with widening of PDL space. In localized Grade C periodontitis with molar incisor pattern, the bone loss is observed in maxillary and mandibular incisor or first molar areas, usually bilaterally with a vertical, arc like destructive pattern. As the disease progresses, bone loss may become generalized. In generalized Grade C periodontitis, the bone loss is severe with a horizontal or vertical destructive pattern; however angular bone loss is more commonly observed. In Grade A/B Periodontitis, horizontal bone loss is observed with crestal bone, demonstrating well demarcated margins.

Staging of periodontitis

Staging relies on the standard dimensions of severity and extent of periodontitis at presentation but introduces the dimension of complexity of managing the individual patient.

There are 4 stages:

- STAGE 1: Initial periodontitis
- STAGE 2: Moderate periodontitis
- STAGE 3: Severe periodontitis with potential for additional tooth loss
- STAGE 4: Advanced periodontitis with extensive tooth loss and potential for loss of dentition.

Periodontitis grading

Grading" aims to help identify how suspectable a patient is to periodontal disease by using the worst site of bone loss due to periodontal disease with the patient's age. This will give an assessment of the rate of progression. In order to determine a grade for the patient, the worst site of bone loss due to periodontal disease is calculated as a percentage (if radiographs aren't justified as previously discussed, estimate bone loss, as described in the previous staging section), then divide this by the patient's age. This gives a ratio, with <0.5, indicating a slow rate of progression and more than 1.0 a rapid rate of progression. The objective of grading is to use whatever information is available to determine the likelihood of the case progressing at a greater rate than is typical for the majority of the population or responding less predictably to standard therapy.

Clinicians should approach grading by assuming a moderate rate of progression (Grade B) and look for direct and indirect measures of actual progression in the past as a means of improving the establishment of prognosis for the individual patient. If the patient has risk factors that had been associated with more disease progression or less responsiveness.to bacterial reduction therapies, the risk factor information can be used to modify the estimate of patients future course of disease.

	Progression		Grade A: Slow rate	Grade B: Moderate rate	Grade C: Rapid rate
Primary Criteria	Direct evidence of progression	Radiographic bone loss or CAL	No loss over 5 years	<2 mm over 5 year	≥2 mm over 5 years
	Indirect evidence of progression	%bone loss/ age	<0.25	0.25 to 1.0	>1.0
		Case phenotype	Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits.	Destruction exceeds expectations given biofilm deposits; specific clinical pattern suggestive of periods of rapid progression and/or early inset disease
Grade modifiers	Risk factors	Smoking	Non-smoker	<10 cigarettes/day	≥cigarettes/day
		Diabetes	Normoglycemic/no diagnosis of diabetes	HbA1c<7.0% in patients with diabetes	HbA1C≥7.0% in patients with diabetes
Risk of systemic impact of periodontitis	Inflammatory burden	High sensitivity CRP (scup)	<1 mg/L	1 to 3 mg/L	>3 mg/L
Biomarkers	Indicators of CAL/bone loss	Saliva, gingival crevicular fluid, serum	?	?	?

Table 3: Grading system of periodontitis according to 2017.

Figure 1: Diagramatic represenation of periodontitis grading (2017 classification).

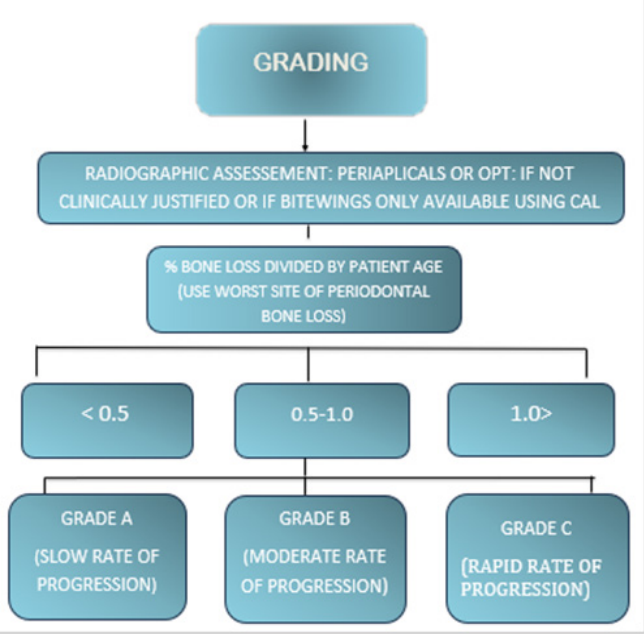

Figure 2: Guidelines for grading of periodontitis using percentage bone loss.

Clinical implication of grading of periodontittis

- **Predicting Treatment Responsiveness:** Grading helps determine how well a patient's periodontitis will respond to standard treatment based on biofilm reduction and plaque control.
- **Identifying Patients at Risk:** A "Path 2" patient (Grade C) is more likely to experience disease progression and may have less predictable responses to standard treatment.
- **Developing Tailored Treatment Plans:** Grading allows for more specific treatment approaches for patients with varying disease trajectories and systemic health considerations.
- **Assessing Systemic Impact:** Grading can help identify patients whose periodontitis may influence their overall health, warranting collaboration with their physicians.
- Monitoring Disease Progression

Conclusion

This article highlights the importance of considering not just the severity of the disease at presentation (grading) but also factors like the rate of progression, risk of further progression, and potential impact on systemic health.

Grading provides additional information about the biological features of the disease, which can influence treatment planning and prognosis, especially in patients with systemic risk factors. The proposed grading of periodontitis provides an individual assessment that classifies patient by two dimensions beyond severity and extent of disease that identify patient as to complexity of managing the case and risk of case exhibiting more progression and/or responding less predictability to standard periodontal therapy.

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