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Periodontitis: implementation tools for daily practice

This article offers a practical approach for practitioners when classifying periodontitis following the publication of the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions.

Introduction and background

In 2017, a Joint European Federation of Periodontology (EFP) and American Academy of Periodontology (AAP) Workshop was held in Chicago to form a consensus on a new classification of periodontal diseases. Four working groups produced a consensus report, which was published in June 2018.¹ The main diagnostic cohorts are summarised in **Table 1**, and an overview of this scheme was previously published in this *Journal*.² While dental healthcare professionals are likely to be aware of the new classification, widespread integration into daily practice is expected to be a gradual process. This article looks at some pertinent considerations and suggests a simplified approach for implementation when classifying periodontitis cases.

Classification

Classification systems proffer significant utility to the clinical and scientific community:³

- they assist practitioners in categorising individual patients by clinical presentation – this can provide a guide by which practitioners can structure and implement treatment approaches for their patients;
- they provide a common terminology and interpretation for dental and other healthcare professionals to communicate about patients; and,
- they generate a framework for researchers to study the aetiology and pathogenesis of diseases, and develop and evaluate treatment strategies.

In this context, the 2017 periodontal classification accommodates evidence-based advances in dentistry that have occurred since the previous (1999) classification,⁴ to better reflect contemporary knowledge. Its design has also incorporated ‘future-proofing’, wherein the classification will be periodically




updated by a task force to reflect developments in knowledge over time. While some changes from the previous classification system could be considered academic to many practitioners, there has been a significant change of ethos – and evolution in terminology – in relation to the classification of periodontitis cases. This requires a shift in thinking and will no doubt take time to become embedded among the profession. The current system aims to capture several aspects of disease:

- severity of periodontitis and complexity of its management – denoted by disease *stage*;
- recognition of each patient’s individual susceptibility to disease (and risk of future progression) – denoted by disease *grade*;
- extent of disease (based on the number of teeth affected/pattern of distribution of affected teeth); and,
- application of point-in-time clinical measurements to reflect current periodontal status and patient risk profile – taking diagnosis beyond simple evidence of historic progression and making it more dynamic.

Practice resources

The central tenet of classifying periodontitis post 2017 involves staging (Stages I-IV) and grading (Grades A-C) each case.⁵ The classification provides detailed tables of criteria to characterise each stage and grade,⁶ which results in some complexity and potential for ‘grey areas’. As there have been concerns as to how the World Workshop proceedings could be implemented on a practical basis in general practice, the American Academy of Periodontology (AAP), European Federation of Periodontology (EFP) and British Society of



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Table 1: The 2017 classification of periodontal and peri-implant diseases and conditions.

PERIODONTAL DISEASES AND CONDITIONS										
Periodontal health, gingival diseases and conditions			Periodontitis			Other conditions affecting the periodontium				
Periodontal health and gingival health	Gingivitis: dental biofilm induced	Gingival diseases: non-dental biofilm induced	Necrotising periodontal diseases	Periodontitis	Periodontitis as a manifestation of systemic disease	Systemic diseases or conditions affecting the periodontal supporting tissues	Periodontal abscesses and endodontic-periodontal lesions	Mucogingival deformities and conditions	Traumatic occlusal forces	Tooth and prosthesis-related factors
PERI-IMPLANT DISEASES AND CONDITIONS										
Peri-implant health			Peri-implant mucositis			Peri-implantitis		Peri-implant soft and hard tissue deficiencies		

Table 2: Staging of periodontitis.

2017 World Workshop					British Society of Periodontology implementation of 2017 classification	
Stage	Interdental CAL at site of greatest loss	Radiographic bone loss	Tooth loss	Complexity	Severity/complexity of management	Interproximal bone loss at worst site
I	1-2mm	Coronal third (<15%)	No tooth loss due to periodontitis	Maximum probing depth ≤4mm Mostly horizontal bone loss	Early/mild	<15% maximum bone loss at worst site or <2mm from CEJ if bitewing only available
II	3-4mm	Coronal third (15-33%)	Tooth loss due to periodontitis of ≤4 teeth	Maximum probing depth ≤5mm Mostly horizontal bone loss	Moderate	Coronal third of root
III	≥5mm	Middle third extending to mid third of root and beyond		In addition to Stage II complexity: Probing depth ≥6mm Vertical bone loss ≥3mm Furcation involvement Class II or III Moderate ridge defect	Severe – potential for additional tooth loss	Middle third of root
IV	≥5mm	Apical third extending to mid third of root and beyond	Tooth loss due to periodontitis of ≥5mm teeth	In addition to Stage III complexity: Need for complex rehabilitation due to: Masticatory dysfunction Secondary occlusal trauma Severe ridge defect Bite collapse, drifting, flaring Less than 20 remaining teeth (10 opposing pairs)	Very severe – potential for dentition loss	Apical third of root

Table 3: Grading of periodontitis.

2017 World Workshop				British Society of Periodontology implementation of 2017 classification	
Grade	Rate of progression	Direct evidence of progression CAL/RBL	Indirect evidence of progression		Maximum % bone loss/age
			% bone loss/age	Case phenotype	
A	Slow	No evidence of CAL or RBL over 5 yrs	<0.25	Heavy biofilm deposits with low levels of destruction	<0.5
B	Moderate	<2mm over 5 yrs	0.25-1	Destruction commensurate with biofilm deposits	0.5-1.0
C	Rapid	≥2mm over 5 yrs	>1.0	Destruction exceeds expectation given biofilm deposits	>1.0

Periodontology (BSP) have each produced resources to help clinicians to work through the classification process; these resources are readily accessible through their websites.⁷⁻⁹ By their nature, these simplified implementation/decision tools are not exhaustive, so practitioners will still occasionally need to utilise additional resources when making diagnoses. In general, these user-friendly tools focus on decision-making in the patient cohorts most likely to present in dental practice, specifically:

- differentiating patients with periodontitis from those who do not have periodontitis;
- further characterisation of those patients with periodontitis; and,
- identifying patients with historic disease that is currently stable, but who are at high risk of future disease progression.

The AAP resources closely adhere to the format of the classification documents, while the EFP resources are most comprehensive and include a highly detailed algorithm to work through each case.¹⁰ For pragmatic reasons, the dental schools in Cork and Dublin have selected the BSP implementation tool in their teaching based on its clarity and ease of use. This tool¹¹ aligns diagnosis with clinical periodontal screening/assessment, which arguably enhances its utility in practice. **Tables 2** and **3** provide an outline of the key aspects of the World Workshop proceedings with regard to staging and grading, respectively, and for comparison the BSP interpretation plan, which was designed to simplify the introduction of the 2017 classification in general practice. A current series in this *Journal* demonstrates the practical application of this tool in establishing periodontitis diagnoses.¹²

Basic premises

Practitioners should understand some basic premises when using the 2017 system:

- ▶ **Worst affected tooth:** Diagnosis of disease stage and grade relates to the tooth most severely affected by periodontitis.
- ▶ **No need to sub-classify:** Information on the extent/distribution of periodontitis is used to further qualify stage and grade. A single diagnosis of stage and grade suffices – clinicians do not have to outline different levels of disease severity within the same mouth.
- ▶ **Assessment of current stability:** For the first time, the new system incorporates classification of periodontal health in both untreated and treated patients.¹³ Current clinical measurements are utilised to assess stability. In treated cases, it is recognised that a patient who has been treated for periodontitis remains a periodontitis patient for life; while clinical stability may be achieved following treatment, this patient remains at risk of disease progression in the future if risk factors cannot be successfully controlled. These patients require long-term maintenance.
- ▶ **No regression to a lower stage following treatment:** Despite the improvement in clinical measurements associated with successful treatment outcomes, a patient does not regress to a lower stage of disease, i.e., if initially classified as Stage III, the patient will remain Stage III even after treatment. (One exception to this may be where regenerative surgery modifies calculation of radiographic bone loss at the most severely affected tooth.)

- ▶ **Clinical judgment still applies:** It is likely that borderline cases will continue to present and clinical judgment may still be required in specific circumstances, for example:
 - differentiation of early signs of slight disease (Stage I) from gingivitis; and,
 - differentiation of severe cases (on the borderline between Stage III and IV).
- ▶ **Value and limitations of screening:** The BSP tool aligns classification with periodontal (e.g., basic periodontal examination (BPE)) screening. This acknowledges the value of performing periodontal screening in every new patient and at recall visits for existing patients. In those patients formerly treated for periodontitis or demonstrating obvious clinical attachment/bone loss, it must be recognised that screening is inadequate and comprehensive periodontal examination is indicated.

British Society of Periodontology tool

The BSP implementation tool exhibits several subtle differences from the more detailed classification grids outlined in the 2017 classification paperwork. The rationale behind these changes has been discussed in detail,¹⁴ but can be summarised as follows:

- ▶ **Staging with radiographs only:** Recognising that clinical attachment loss (CAL) measurements are not routinely collected in dental practice, staging is based on radiographic assessment of bone loss only.
- ▶ **Differentiating Stages III and IV is simpler:** The BSP tool simplifies the



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Table 4: Assessment of disease status in periodontitis patients.

Disease status	BoP	PPD	Descriptor
Currently stable	<10%	≤4mm	No BoP at 4mm sites
Currently in remission	≥10%	≤4mm	No BoP at 4mm sites
Currently unstable	See descriptor	≥5mm or ≥4mm with BoP	Any site present with PPD ≥5mm or PPD ≥4mm with BoP

criteria for differentiating between Stage III and IV cases. Whereas the classification differentiated these stages based on complexity factors such as presence of ridge defects, bite collapse and number of teeth lost to periodontitis, the BSP tool acknowledges the challenges of making these inferences. Instead, Stages III and IV are differentiated by radiographic features alone: Stage III describes bone loss extending to the middle third of the root, whereas Stage IV involves apical third bone loss.

- ▶ **Thresholds for determining grade are simpler:** Grade is determined by measuring percentage bone loss at the most severely affected tooth, and dividing by patient age (% bone loss/age). The resulting ratio allows characterisation of each case as Grade A, B or C, respectively, with Grade B considered the likely ‘default’ (average rate of disease progression). The BSP tool simplifies the thresholds used for calculating these ratios.
- ▶ **Incorporates current disease status into diagnosis:** The BSP tool utilises clinical findings to include a formal statement of disease stability (e.g., “currently stable”) in the diagnosis (Table 4). This will allow clinicians to relate diagnosis more closely to individual treatment needs and recall strategy.
- ▶ **Incorporates statement on risk factors:** The classification denoted smoking and diabetes as formal “modifiers”, which can elevate the assigned disease grade. The BSP tool instead lists risk factors, where present, in the formal statement of diagnosis. This should flag the presence of risk factors more easily in case notes, in communication between clinicians and with the patient.

Implementation in practice

Diagnosis of a periodontitis case using BSP tool

Conduct patient assessment:

- ▶ periodontal screening (BPE) to assess treatment needs; and,
- ▶ if obvious clinical evidence of periodontitis/history of periodontitis diagnosis or periodontitis treatment exists, proceed straight to comprehensive examination.

Diagnostic threshold for a periodontitis case:

- ▶ presence of ≥2mm of interproximal clinical attachment loss at ≥2 non-adjacent teeth, not accounted for by other reasons (e.g., crown lengthening) – assessment of radiographic bone loss may serve as an effective proxy for clinical attachment loss measurements.

For periodontitis cases, utilise available radiographs to follow the implementation flowchart:

- ▶ determine the tooth that is most severely affected by proportional bone loss;
- ▶ quantify the percentage bone loss at this tooth → apply relevant stage;

- ▶ calculate percentage bone loss/patient age → apply grade;
- ▶ extent/distribution: evaluate the proportion of teeth affected by periodontal bone loss (<30% teeth affected = localised; ≥30% teeth = generalised – cases formerly diagnosed as localised aggressive periodontitis are described as “molar-incisor distribution”);
- ▶ use summary clinical findings to list current disease status;
- ▶ statement of risk factors – note the presence of smoking or diabetes; and,
- ▶ list the diagnosis statement: extent – condition – stage – grade – stability – risk factors (e.g., generalised periodontitis Stage II Grade B, currently unstable. Risk: smoker, 10 cigarettes/day).

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