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New Classification System for Periodontal and Peri-implant Diseases

Background

Since 1999, we have become used to the periodontal diseases classification system devised by Armitage.[1] This defined periodontal diseases (but not, at that time, peri-implant diseases) into eight categories and recognized periodontitis in two forms, chronic and aggressive. With advances in knowledge from both clinical and biological research over the last two decades there was a consensus of opinion that the time was right for the development of a new classification system based on our current understanding of the pathophysiology of both periodontal and peri-implant diseases. Early in 2015, planning commenced for a World Workshop on the Classification of Periodontal and Peri-implant Diseases, co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP). The Workshop took place in Chicago from 9 to 11 November 2017 and the proceedings of the Workshop were published in June 2018, coinciding with the Europerio 9 international conference in Amsterdam the same month. The Workshop comprised four main working groups:

1. Periodontal health, gingival diseases and conditions;
2. Periodontitis;
3. Other conditions affecting the periodontium;
4. Peri-implant diseases and conditions.

Each working group produced a consensus report which was then discussed and agreed at a plenary session. The full proceedings of the Workshop[2] can be accessed free at **https://www.onlinelibrary.wiley.com/toc/1600051x/2018/45/S20**

What are the main differences between the 1999 and 2017 systems?

For the first time, periodontal and gingival health has been defined and it has been recognized that periodontal health can exist in both an intact and reduced periodontium. The main advances on the previous classification system have been identified as:

- The definition of periodontal health;
- The replacement of chronic and aggressive periodontitis with a model based on stages and grades;
- The support given to personalized medicine;
- The inclusion of peri-implant diseases and conditions.

Table 1 provides an overview of the four working groups. While the remit of the Workshop was wide and overall the recommendations have been universally welcomed, there was one aspect of the Workshop that has raised concerns. One of the main aims of the Workshop was to create a system that could capture the severity, extent and rate of progression of a patient's periodontitis and, most importantly, that could be used in a general practice setting, where most periodontal diseases are managed. The system that was developed by the Workshop, specifically with respect to periodontitis, ceased to recognize the distinction between chronic and aggressive periodontitis, based on the lack of evidence that these were distinct conditions, and has instead described them as variations on the same spectrum of disease. The only exception was classical localized juvenile periodontitis (LJP) involving molars and incisors only where a clinical phenotype can be identified. The new system has proposed a staging and grading system (similar to that used in cancer diagnoses) where staging describes the severity of disease and grading disease susceptibility. Staging of periodontitis, as described by the World Workshop, involves an assessment of the greatest site of clinical attachment loss, an assessment of bone loss and tooth loss (due to periodontitis) and other factors, such as maximum pocket depth, pattern of bone loss, furcation involvement, ridge defects, occlusal trauma and restorative needs. Grading involves assessment of bone and attachment loss over a 5-year period, the ratio of % bone loss to age, the relationship between biofilm volume and level of destruction, levels of smoking and blood glucose status. This has created a detailed system of assessment that is well summarized in tabular form as a downloadable practice resource on the AAP website (**https://www.perio.org/2017wwdc**).

However concerns have

CLASSIFICATION OF PERIODONTAL AND PERI-IMPLANT DISEASES AND CONDITIONS 2017										
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	Necrotizing Periodonal 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 and Hard Tissue Deficiencies	

Table 1. World Workshop Classification 2017.

been raised, as discussed on the EFP website (**efp.org**), about the practicalities of implementing such a detailed and complex system in general dental practice. These concerns are being addressed by the EFP but the British Society of Periodontology (BSP) shared the same concerns and, in September 2018, the BSP Council convened an implementation group of active BSP members to devise a practice-based implementation plan. The BSP implementation group comprised academics, specialists and general practitioners and the conclusions of the group were ratified by the full BSP Council. The BSP recommendations are to be published in the *British Dental Journal* (*BDJ*) in January 2019 and readers are referred to this paper[3] for full details.

How can the new system be implemented in general practice?

It is important to recognize that classification, as described by the World Workshop, is not the same as diagnosis; classification is historical and tells you nothing about current disease status. Diagnosis includes classification but should also include current disease status, based on pocket depths (PPD) and bleeding on probing (BoP), and the risk factor profile of the patient. Patients should not be treated on the basis of classification alone but on a comprehensive diagnosis, since the latter drives appropriate treatment planning. As an example, the classification may be 'chronic periodontitis' (using the 1999 system) but an appropriate diagnosis may be 'generalized moderate chronic periodontitis with widespread pocketing of 4–6 mm and bleeding on probing and with smoking and poorly controlled diabetes as risk factors'. While a detailed diagnosis such as this is important to ensure that the correct treatment decisions are made for the patient, it is also sobering to note that about 75% of periodontal claims made to the Dental Defence Union in the period 2008–2012 were due to 'a failure to diagnose and treat'[4] and that, in the period 2013–2017, the number of periodontal claims has more than doubled. Diagnosis is therefore important for the patient but it is also important in the medico-legal context.

Following the publication of the World Workshop Proceedings, it was also speculated that there would be no place for the Basic Periodontal Examination (BPE) once the new system was adopted. BPE has been ingrained in clinical dental practice in the UK (and many other countries across Europe in some form) since 1986 and the BSP implementation group felt strongly that BPE should be retained as an important means of periodontal screening for all dental patients in UK practice. Once the BPE examination has identified a patient with a periodontal condition, a detailed history and examination (clinical and radiographic) should then take place to assess and diagnose the condition. BPE is not in itself diagnostic. A detailed infographic has been produced showing how BPE should be used within the conte xt of the new classification system; this infographic is included in the BDJ paper[3] and it will be available via the BSP website (**bsperio.org.uk**) in both pdf and hard copy format.

The main concern with the new system identified by the BSP implementation group was the complexity of staging and grading of periodontitis; while the World Workshop proposal was suitable in the academic and research (and possibly specialist) environment, it was not suitable for general dental practice. Accepting the four stages of severity (mild, moderate, severe, very severe) and three grades of rate of progression (slow, moderate, rapid), the BSP implementation group sought to devise a simpler system

	Stage I (early/mild)	Stage II (moderate)	Stage III (severe)	Stage IV (very severe)
Maximum % interproximal bone loss	<15% or <2 mm**	Coronal third	Mid third	Apical third
Extent	Describe as: • localized (up to 30% of teeth) • generalized (more than 30% of teeth) • molar/incisor pattern			

Table 2. Staging of periodontitis (BSP modification). ** measurement from CEJ if only bitewing radiograph available or ID recession if no radiographs clinically justified.

	Grade A (slow)	Grade B (moderate)	Grade C (rapid)
Maximum % bone loss/age	<0.5	0.5–1.0	>1.0

Table 3. Grading of periodontitis (BSP modification).

that would allow practitioners to determine stage and grade quickly and accurately. The group realized that most clinicians already assessed severity by means of pocket depths (not attachment levels which few clinicians use in practice) and bone levels and that the bone level was probably the most useful (and indeed objective) determinant for severity. The group therefore established the bone level as the only determinant for stage, depending on whether the bone loss was less than 15% or within the coronal, middle or apical third of the root (Table 2). This method of stage assessment depends on the availability of a radiograph but staging and grading will only be carried out on BPE code 3 or 4 sextants and the BSP's BPE Guidelines 2016[5] already require the examination of radiographs for all such sextants. In addition, within the proposed staging system, the extent of periodontitis severity can be assessed as localized, generalized or molar/incisor pattern, as proposed by the World Workshop.

In addressing the complex grading system for the assessment of the rate of progression of disease in an individual patient, as proposed by the World Workshop, again the group realized that the main determinant was the radiograph, specifically the extent of the bone loss in relation to the age of the patient; something that most clinicians would already be doing instinctively. In other words, 20% bone loss in an 80-year-old patient would not cause any alarm, but 20% loss in a 20-year-old patient certainly would. The BSP group has therefore recommended that the ratio % bone loss/age is used to determine the grade, or rate of progression of bone loss, and nothing else (Table 3). However, the group was unhappy with the ratios selected by the World Workshop for grading and these have been changed slightly. This is explained in detail in the BDJ paper[3] and readers are referred to the full paper for a detailed explanation of the reasons for this departure from the ratios proposed by the World Workshop. Happily, the change in ratios has also meant that a calculator is not required when determining grade (as it would be if the World Workshop range of ratios was adopted) since the following criteria apply:

- **Grade A** If max % bone loss is < half patient's age in years eg <30% in 60-year-old, <40% in 80-year-old
- **Grade B** All other situations
- **Grade C** If max % bone loss is > patient's age in years eg >30% in 28-year-old, >50% in 49-year-old

In terms of the current status of the patient, the World Workshop described three types of periodontal patient – the stable patient, the unstable patient and the patient with residual inflammation. The BSP implementation group have developed this further and proposed an approach which also draws on the principles of cancer diagnosis: stable, unstable and in remission. The group has defined what each of these states display, relying on the recording of a 6-point PPD chart and BoP measurements. Clinical attachment levels are not taken into account. There is a detailed infographic in the BDJ paper[3] to explain this but the criteria are as follows:

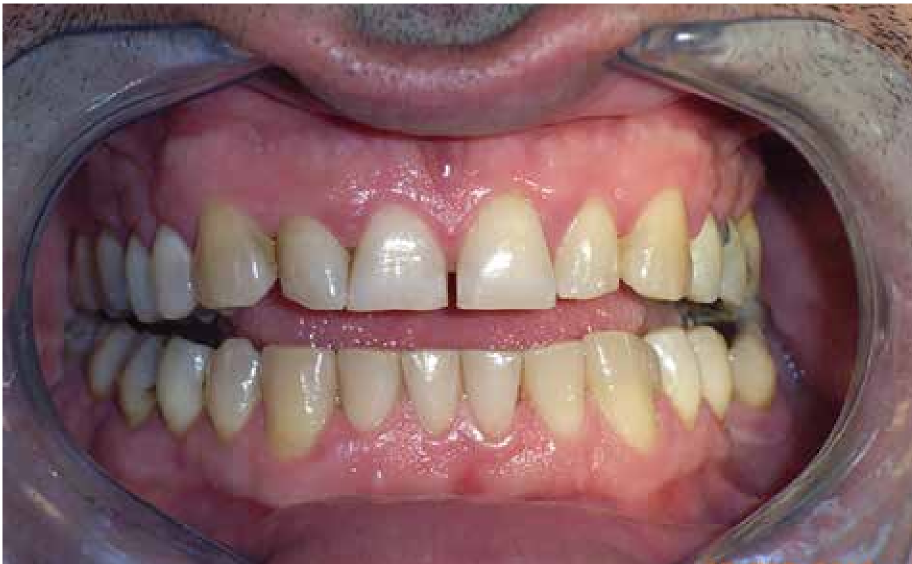
- Currently stable: BoP <10%, PPD ≤4 mm, no BoP at 4 mm sites;
- Currently in remission: BoP ≥10%, PPD ≤4 mm, no BoP at 4 mm sites;
- Currently unstable: PPD ≥5 mm or PPD ≥4 mm with BoP.

However, it is also recognized that, in many patients who are are in long-term supportive care, the presence of 5 or 6 mm pockets in the absence of bleeding may not necessarily represent active disease, and such patients may well be considered stable, so clinical discretion in making this decision about stability is advised.

Finally, it proposed that the diagnosis should include a comment on the risk factor profile of the patient in terms of smoking and diabetic status, although other putative risk factors such as diet, genetics, obesity or stress should also be noted in the history.

What's in a good diagnosis?

Following the detailed history-



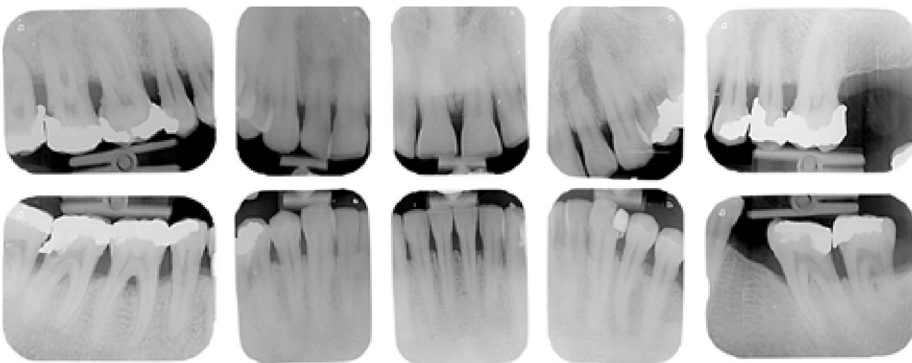


Figure 1. Male patient, aged 42, former heavy smoker but no other risk factors, widespread pockets of 4–6 mm, most of which display bleeding on probing.

taking, clinical assessment, which will include 6-point pocket charts, and bleeding on probing measurements, and appropriate radiographic assessment, the elements of a detailed periodontal diagnosis should include:

- Distribution – generalized, localized or molar/incisor pattern;
- Classification – stage/grade;
- Current status – stable, in remission or unstable;
- Risk factor profile

An example of a diagnosis might therefore be: generalized periodontitis III/B, currently unstable, RF: smoking, poor diabetic control.

The BDJ paper will also contain some clinical examples which will allow readers to practice the new system of classification and diagnosis on some real cases.[3] It is planned to publish several more cases for this purpose in the BDJ over the subsequent months following publication. An example of a case that requires a diagnosis is in Figure 1 (solution at the end of this paper).

Summary

The new World Workshop Classification 2017 has proposed a revision of our labelling of periodontal and peri-implant diseases, based on an extensive research base. The majority of the proposed changes have garnered near-universal acceptance but there are aspects of the reclassification of periodontitis that have raised concerns, particularly with respect to the practicality of staging and grading of this condition in the general practice setting. The BSP have modified the new system to allow clinicians to use it on a daily basis and all clinicians are strongly advised to study the details of the BSP proposals in the BDJ[3] and to download the relevant infographics from the BSP website. Finally, it is important to note that these changes are not, and should not, change the way we treat our periodontal patients; we will be giving their diseases slightly different names in the future but their treatments will remain the same, based on a detailed diagnosis. The most positive aspect of the new system is that it should encourage clinicians to consider periodontal diagnoses in more detail, perhaps take more radiographs, and our patients should benefit from more appropriate treatment as a result.

References

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Figure 1. Solution: most teeth have some bone loss so the condition is generalized. The worst affected site is UR7 distal where there is about 50% bone loss in the middle third of the root. There is pocketing over 4 mm with bleeding and the patient is a former smoker. The diagnosis is: generalized periodontitis III/C, currently unstable, RF: past smoking.