01. Periodontal health and gingivitis

Guidance for clinicians

- The 1999 classification system was the first to recognise the need to classify gingival diseases and conditions, but there were many flaws in its approach.
- It did not define “health” and the description of gingivitis was unnecessarily complex.
- The New Classification from the 2017 World Workshop provides a clear definition of periodontal health, both histologically and clinically.
- It also simplifies the definition of gingivitis into two categories: gingivitis induced by plaque biofilm and gingival diseases not induced by plaque biofilm.
- Clinical gingival health is defined both on an intact and a reduced periodontium, while health/stability is defined for a successfully treated periodontitis patient.
Introduction

Human periodontal diseases encompass a wide spectrum of conditions. Some of these are related to plaque biofilm while others arise independently of biofilm accumulation and may either be modified by the biofilm or be uninfluenced by it.

The 1999 classification system was the first to recognise a need to classify gingival diseases. But it had many flaws. Included in its classification of gingival conditions are some oddities, such as “diabetes mellitus-associated gingivitis” and “ascorbic acid-deficiency gingivitis” which are misleading (“ascorbic acid-deficiency gingivitis”, for example, does not exist – it is really “scurvy” or gingival ulceration caused by ascorbate deficiency).

There was no attempt in this system to define “health”, which is clearly a critical factor when trying to establish case definitions for disease. And the description of gingivitis was unnecessarily complex, as it embedded both predisposing and modifying factors in the diagnosis.

It was in the context of these limitations of the 1999 classification that working group 1 of the 2017 World Workshop decided to create a clear definition of periodontal health, both histologically and clinically. It also adopted a reductionist methodology to enable the definition of gingivitis according to only two principal categories: (1) gingivitis induced by the dental-plaque biofilm and (2) gingival diseases not induced by the plaque biofilm.

Defining periodontal health

A critical factor in defining health was the recognition that periodontal health can exist at a site level and at a whole-mouth level, and on an intact or a reduced periodontium. An intact periodontium is one without clinical attachment loss (CAL) or bone loss, whereas a reduced periodontium may arise in two separate situations: either in a non-periodontitis patient (e.g. patients with some forms of gingival recession or following crown-lengthening surgery) or in a patient with a history of periodontitis. Therefore, case definitions of health and gingivitis were established for all three scenarios, as described below.

Another fundamental decision concerns the concept of “pristine” versus “clinical” health. Given that in medicine normality is defined by 95% of the population fitting that definition, and that 95% of adults have one or more bleeding points in their mouths, then “health” needs to accept some localised sites of mild inflammation. It was evident from the literature that histological changes in the gingival microvasculature arise almost immediately following tooth eruption and that an inflammatory infiltrate is evident as part of normal immune surveillance. So too are subtle clinical signs of inflammation at isolated sites as part of “clinical health”. Pristine health can therefore be considered exceptional and largely limited to textbooks (<5% of the population).

A case of clinical gingival health was defined, in the case of both an intact and a reduced periodontium in a non-periodontitis patient, as less than 10% sites of
bleeding on probing and probing depths ≤3mm. The intact periodontium had no attachment loss, whereas the reduced periodontium did have evident attachment loss.

In the reduced periodontium in a successfully treated periodontitis patient, the definition of health allowed probing depths of up to 4mm (embracing the concept of the “closed pocket”). But there must be no bleeding on probing (BoP) at any 4mm site, as this would represent the likelihood of recurrent periodontitis and indicate a need for remedial intervention.

Defining gingivitis

Defining plaque-induced gingivitis on a reduced periodontium was the most challenging concept on which to achieve consensus. This is because it is recognised that the consequences of periodontitis are irreversible and that a patient who develops periodontitis remains at high risk of recurrent periodontitis. This risk remains regardless of whether a patient:

• is currently healthy as the result of successful treatment;
• has individual sites of gingival inflammation defined by BoP at shallow sites (≤3mm);
• has 4mm non-bleeding “closed pockets”.

It was therefore agreed that, once periodontitis has been diagnosed, a patient remains a periodontitis patient for life, whose status at any given moment following successful therapy can be categorised in one of three ways:

• Controlled: healthy/stable;
• Remission: gingival inflammation;
• Uncontrolled: recurrent periodontitis/unstable.

Gingivitis versus “gingival inflammation”:
In the context of the periodontitis patient, the term “gingival inflammation” is used rather than “gingivitis”. Although these two terms mean the same thing from a technical point of view, it was decided that one could not have a patient who
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was defined as a “case” of periodontitis as well as a “case” of gingivitis. Nonetheless, a periodontitis patient may have sites of gingival inflammation at probing depths of ≤3mm following treatment, but such patients may not need root-surface debridement for recurrent periodontitis, but rather oral-hygiene reinforcement and plaque removal to manage the localised gingival inflammation.

Variations in definition for research and clinical care:
A further complication arose from trying to balance two competing needs: for epidemiological studies to capture periodontitis prevalence and for clinical management protocols to avoid over-treatment in successfully managed periodontitis patients. The threshold for defining health on a reduced periodontium in a treated periodontitis patient was set at ≤3mm for epidemiological surveys, where it is important to capture all cases of periodontitis, but at ≤4mm (but with no BoP) for clinical care, where over-treatment of non-bleeding 4mm pockets is to be avoided.

Gingivitis and risk factors:
Gingivitis was simply categorised as gingivitis on an intact or a reduced periodontium. The predisposing factors (local risk factors) that lead to
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In the periodontitis patient, the term ‘gingival inflammation’ is used rather than ‘gingivitis’

Predisposing factors (local risk factors), e.g. plaque retention factors

- plaque-retention factors (e.g. ledges on restorations or sub-gingival crown margins);
- oral dryness.

Modifying factors (systemic risk factors) that alter the immune-inflammatory response to plaque were also defined:

- smoking;
- hyperglycaemia (in patients with diabetes);
- low antioxidant micronutrient intake (e.g. Vitamin C);
- Drugs, especially immune-modulating drugs;
- Elevated levels of sex steroids;
- Haematological disorders (e.g. neutropenia).

Gingivitis induced by the dental-plaque biofilm is broken down into three categories:

- Associated with dental biofilm alone;
- Mediated by systemic or local risk factors;
- Drug-influenced gingival enlargement.
Non-biofilm-induced gingival conditions and lesions were stratified into eight groups differentiating them from non-plaque-induced periodontal conditions:

a. Genetic/developmental disorders;
b. Specific infections;
c. Inflammatory and immune conditions;
d. Reactive processes;
e. Neoplasms;
f. Endocrine, nutritional, and metabolic diseases;
g. Traumatic lesions;
h. Gingival pigmentation.

Need for standard probe

Working group 1 also recognised that there was a need to develop an ISO-standard, constant-force periodontal probe, as probing depths vary with probing pressure: without this, case definitions based on probing differences of just 1mm are futile.

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<th>Classification of periodontal health and gingival diseases/conditions</th>
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* Predisposing factors (local risk factors)

1. Plaque-retention factors (e.g. sub-gingival crown margins, orthodontic appliances);
2. Oral dryness.

* Modifying factors (systemic risk factors)

1. Smoking;
2. Hyperglycaemia (in people with diabetes);
3. Low antioxidant micronutrient intake (e.g. Vitamin C);
4. Drugs – especially immune-modulating drugs;
5. Sex steroids – elevated levels;
6. Haematological disorders (e.g. neutropenia).
Health and dental-biofilm-induced gingivitis on an intact and a reduced periodontium: from classification to diagnosis

Patient classification/categorisation

- Patient with periodontal health
- Gingivitis patient
- Periodontitis patient stage & grade

Periodontal therapy

Diagnosis: case of
- Periodontal health
- Gingivitis
- Periodontitis patient - controlled (case of current health)
- Periodontitis patient - remission (case with some gingival inflammation)
- Periodontitis patient - uncontrolled (unstable case of recurrent periodontitis)
**Further reading**

*Proceedings of the World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions,*
co-edited by Kenneth S. Kornman and Maurizio S. Tonetti.

Proceedings include:

- Lang MP, Bartold PM. *Periodontal Health,* S9-S16.
- Murakami S, Mealey BL, Mariotti A, Chapple ILC. *Dental plaque-induced gingival conditions,* S17-S27.

Chapple ILC, Hamburger J. *Periodontal Medicine – A Window on the Body.*

**Author**

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Iain Chapple is professor of periodontology and head of the School of Dentistry at the University of Birmingham (UK). He is a former scientific editor of the *British Dental Journal*, former associate editor of the *Journal of Periodontal Research*, and currently associate editor of the *Journal of Clinical Periodontology*. He has written eight textbooks and more than 20 book chapters. At the European Federation of Periodontology (EFP), Prof Chapple was treasurer (2007-2013), co-organiser of Perio Workshops, chair of the scientific advisory committee and editor of *JCP Digest* (2014-2016), and secretary general (2016-2019). In 2012 he was awarded the Tomes medal of the Royal College of Surgeons of England and in 2018 won the IADR Distinguished Scientist Award in Periodontal Research.
New Classification of periodontal and peri-implant diseases and conditions

The New Classification is the product of the World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions, held in Chicago in November 2017. The World Workshop was organised jointly by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) to create a consensus knowledge base for a new classification to be promoted globally. The New Classification updates the previous classification made in 1999. The research papers and consensus reports of the World Workshop were published simultaneously in June 2018 in the EFP’s Journal of Clinical Periodontology and the AAP’s Journal of Periodontology. The new classification was presented formally by the two organisations at the EuroPerio9 congress in Amsterdam in June 2018.

About the EFP

The European Federation of Periodontology (EFP) is an umbrella organisation of 35 national scientific societies devoted to promoting research, education, and awareness of periodontal science and practice. It represents more than 14,000 periodontists and gum-health professionals in Europe alone. In addition to 31 European members, the EFP has recently welcomed four international associate members from Asia, the Middle East, and Latin America.

www.efp.org
www.efp.org/newclassification

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