EFP
New Classification
of periodontal and peri-implant diseases
Periodontal health and gingivitis

Iain Chapple
Periodontal health, gingival diseases and conditions

Chairs: Iain Chapple
Brian Mealey
Four expert position papers

Periodontal health
Niklaus P. Lang and P. Mark Bartold

Dental plaque-induced gingival conditions
Shinya Murakami, Iain Chapple, Brian Mealey, and Angelo Mariotti

Non-plaque-induced gingival diseases
Palle Holmstrup, Jacqueline Plemons, and Joerg Meyle

Plaque-induced gingivitis: Case definition and diagnostic considerations
Leonardo Trombelli, Roberto Farina, Cléverson Silva, and Dimitris Tatakis
Is there a holistic definition of periodontal health?

Does “pristine periodontal health” exist?

If pristine health exists, is that “normality” (95% population)?

Is there a biological level of inflammation consistent with clinical gingival health & homeostasis? Clinical vs pristine health.

Can periodontitis enter into “remission”?
What can we use for perio?

- A biological phenotype exists in gingivitis.

- The biological phenotype can be mapped to clinical changes.

- Such a biological phenotype has not yet been defined for periodontitis.
Biological model for stages from health to gingivitis

Plaque
- Plaque levels associated with clinical health
- Early plaque accumulation
- Heavy plaque accumulation

Progression of gingivitis
- Health
  - Neuropeptide release
  - Epithelial cell activation and neutrophil infiltrate
- Gingivitis
  - Acute-phase response

Biomarkers
- Substance P
- IL-1β
- Cathepsin G
- Elastase
- α-1 antitrypsin

We cannot do this yet for periodontitis. It is too complex: there is no single cause.
Gingival transcriptome data for CP versus AgP

Adjusted model-based clustering of transcriptomic data using finite mixtures generated two distinct clusters of patients that did not align with the current classification of chronic and aggressive periodontitis.
Health-promoting biofilm = Symbiosis

Low biomass

Proportionate host response

Incipient dysbiosis (quorum-sensing bacteria)

Proportionate host response

Frank dysbiosis (pathogenic biofilm)

Disproportionate host response (hyper-inflammatory)

Connective tissue & bone damage

Complement

PMNs

Antigens

Bact’l DNA

fMLP

Resolving inflammation

Virulence Factors

LPS

Non-resolving inflammation

Failed resolution of inflammation

Chronic non-resolving inflammation

Antibody

PMNs ++

T & B cells

Antigens

Gingipains

LPS

Periodontitis

Clinical Health

Gingivitis

Behavioural risk factors present

Environmental risk factors absent

Environmental risk factors present

Genetic risk factors absent

Epigenetic effects not evident

Genetic risk factors present

Epigenetic effects evident
WHO definition of health

“Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity.”

WHO 1948: 19456 No 2:1

Thus, periodontal health should be defined as a state free from inflammatory periodontal disease that allows an individual to function normally and avoid physical or mental consequences due to current or past disease.

This is a complex definition: how do we create an objective set of measures for this?
Pristine health: Does it exist? Is it natural?

FREE GINGIVAE

Gingival margin
Sulcular epithelium (SE)
Gingival crevice/sulcus
Junctional epithelium (JE)
Alveolar bone
Neuro-vascular bundle
Periodontal ligament (PDL)

Gingivae
Periodontal ligament
Alveolar bone
Cementum
AB  Alveolar bone
AGF  Alveologingival fibres
CE  Cementum
CF  Circular fibres
DGF  Dentogingival fibres
EN  Enamel
EOE  External oral epithelium
GCT  Gingival connective tissue
GS  Gingival sulcus
JE  Junctional epithelium
SE  Sulcular epithelium
RR  Rete ridges
PL  Principal fibres of periodontal ligament
What are the clinical features of Pristine Health?

- Gingival groove
- Stippling
- Triangular papilla
- Muco-gingival junction
- Attached gingiva
- Free gingiva

[Image of a dental area with annotations for each feature mentioned.]
Changes in histology arise after only four days of plaque exposure
What does clinical health look like?

Case *versus* site

Is clinical inflammation compatible with health?

Can there be a *site* of inflammation that is also a case of clinical health?
Periodontal health is defined as: “An absence of clinically detectable inflammation.”

“There is a biological level of immune surveillance consistent with clinical gingival health & homeostasis.”

“Clinical health can be restored following treatment of gingivitis and periodontitis.”

“A case of clinical health represents a different situation to a ‘site’ of clinical health.”
Clinical gingival health on an intact periodontium.

(An intact periodontium refers to an absence of detectable attachment and/or bone loss).

Clinical gingival health on a reduced periodontium:

- Stable periodontitis patient (successful treatment);
- Non-periodontitis patient (e.g. recession, crown-lengthening surgery).
Critical questions:

- Define plaque-induced gingivitis on an intact & a reduced periodontium.
- Define a reduced periodontium (previous periodontitis vs non-periodontitis patient).
- What are the predisposing factors – local risk factors?
- What are the modifying factors – systemic risk factors?
- Can we reduce the number of categories?
Plaque-induced gingival conditions

Is this a case of clinical health (with sites of gingival inflammation)?

Or is it a case of gingivitis?
Predisposing and modifying factors

Local risk factors (*predisposing factors*)

- Dental plaque-biofilm retention factors:
  - Tooth anatomy
  - Restoration margins, etc.

- Oral dryness:
  - ↓ saliva flow
  - ↓ saliva quality

- e.g. Sjögren’s, medications, mouth-breathing
Predisposing and modifying factors

Systemic risk factors (modifying factors)

- Smoking
- Metabolic factors (hyperglycemia)
- Nutritional factors (Vitamin C)
- Pharmacological agents
- ↑ sex steroids (puberty, pregnancy)
- Haematological conditions
1. Genetic/developmental disorders.
2. Specific infections.
3. Inflammatory and immune conditions.
4. Reactive processes (epulides).
5. Neoplasms.
6. Endocrine, nutritional, and metabolic disorders.
7. Traumatic lesions.
8. Gingival pigmentation.
1. Genetic/developmental disorders

- HGF
- Juvenile hyaline fibromatosis
- Sebaceous naevus of Jadassohn
2. Specific infections

- Gingival herpes simplex I
- Molluscum contagiosum
- Histoplasma capsulatum
3. Inflammatory and immune conditions

- Disseminated pyogenic granuloma
- Plasma cell gingivitis
- C1-esterase inhibitor dysfunction
- Erosive lichen planus
- Erythema multiforme
- Systemic lupus erythematosus
4. Reactive processes (epulides)

- Fibrous epulis
- Vascular epulis
- Pregnancy epulis
- Peripheral giant cell granuloma
5. Neoplasms

- Non-Hodgkin's Lymphoma
- Chondrosarcoma
- Squamous cell carcinoma
- Proliferative verrucous leukoplakia
6. Endocrine, nutritional, and metabolic disorders
7. Traumatic lesions

Cocaine-induced necrosis

Gingivitis artefacta
8. Gingival pigmentation

- **AZT pigmentation**
- **Smoker’s melanosis**
Plaque-induced gingivitis: Case definition and diagnostic considerations


date

Leonardo Trombelli1 | Roberto Farini2 | Clavéson G. Shiu2 | Dimitri N. Tatakis*

BoP = only objective measure
We cannot measure severity
So limited to extent (<10%, 30% rule)
Periodontal probes:
There is a critical need for a new ISO standard

What is needed is a probe that provides “constant force” and goes to 15mm
Health and gingivitis on an intact periodontium and on a reduced periodontium: underpinning principles

**Classification**

- **Patient with periodontal health**
- **Gingivitis patient**
- **Periodontitis patient**

**Diagnosis**

- **Periodontal health**
- **Gingivitis**
- **Periodontitis patient**

**Periodontitis patient**
- **Stable:** BoP <10%, PPD ≤ 4mm, No BoP at 4mm sites
- **Remission:** BoP ≥ 10%, PPD ≤ 4mm, No BoP at 4mm sites
- **Unstable:** PPD ≥ 5mm or PPD ≥ 4mm & BoP

**Periodontal therapy**
Once a periodontitis patient, always a periodontitis patient. But such a patient can be a case of health.
The 4mm non-bleeding site (closed pocket) represents health in a treated patient.
## 2017 case definitions of health and gingivitis

<table>
<thead>
<tr>
<th></th>
<th>Health</th>
<th>Gingivitis</th>
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<tbody>
<tr>
<td><strong>Intact periodontium</strong></td>
<td></td>
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<tr>
<td>Probing attachment loss</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Probing pocket depths</td>
<td>≤ 3mm</td>
<td>≤ 3mm</td>
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<tr>
<td>(assuming no pseudo pockets)</td>
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</tr>
<tr>
<td>Bleeding on probing</td>
<td>&lt;10%</td>
<td>Yes</td>
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<tr>
<td>Radiological bone loss</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Reduced periodontium in a</td>
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<tr>
<td>non-periodontitis patient</td>
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<tr>
<td>Probing attachment loss</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Bleeding on probing</td>
<td>&lt;10%</td>
<td>Yes</td>
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<tr>
<td>Radiological bone loss</td>
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<td>Possible</td>
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<tr>
<td>Successfully treated and stable</td>
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<tr>
<td>periodontitis patient</td>
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<td>≤ 4mm</td>
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<td>(all sites &amp; assuming no pseudo pockets)</td>
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<td>Yes (≥ 10%)</td>
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<td>Radiological bone loss</td>
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