Newer Classification of Periodontal And Peri-Implant Diseases And Conditions – An Update

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ABSTRACT

Periodontal disease is an infectious disease of the supporting structures of the teeth, which includes gingiva, periodontal ligament and alveolar bone. A classification system for periodontal and peri-implant diseases and conditions is necessary for clinicians to properly diagnose and treat patients as well as for scientists to investigate etiology, pathogenesis, natural history and treatment of the diseases and conditions. The first classification system for periodontal disease was recorded by Joseph Fox in 1806, to classify ‘gingival disease.’ Since then, a number of different systems have been proposed and presently we are using the 1999 international workshop on periodontal disease classification. This paper will be discussing in detail about the major drawbacks and strengths in order to assess the usefulness of the article in the newer
periodontal classification 2018. Due to many number of changes from 1999 classification the ease of transition in implementing this new classification is yet to be determined to classify periodontal diseases. The classification is very extensive and more complicated than 1999 classification, its helpfulness to the general dentist and Periodontitis to choose optimal treatment plan to the patient will be decided in the course of time.

**Key words:** classification 1999, classification 2018, periodontal diseases.

**Introduction**
Periodontal diseases is defined as the infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss and bone loss”.[1].Periodontitis is a complex disease of the tooth-supporting structures that has no geographic, ethnic or age barriers. [2] Periodontal diseases have been recognized and treated since 3000 AD.[3]

Classification is nothing but systematic arrangement of classes or groups based on perceived common characteristics [4]. Classifying periodontal diseases is essential to provide a framework to scientifically study the etiology, pathogenesis, and treatment of disease in an orderly fashion (Armitage, 1999). [2] In the scientific setting, the new classification stimulates future research to address appropriate solutions for clinical concerns and enables researchers to make an accurate case selection, which will ensure the quality of research outcomes and the newer classification is mostly clinically useful and it is patient centered.[5]

**Requisites for an ideal classification system:**
The ideal way to classify any disease is to use the name of the etiological agent. For example, tuberculosis is so called because it is a mono infection, in this case with the organism mycobacterium tuberculosis. However, periodontal diseases cannot be classified according to their etiology because they are complex diseases that are polymicrobial and polyimmuno inflammatory in nature. Thus, periodontal disease is the outcome of complex, and often unpredictable, interactions between microbial complexes and the host’s inflammatory/Immune response.[6]
**Historic Prespective Of The Periodontal Disease Classification System:**

The first classification system for periodontal disease was recorded in 1806, when Joseph Fox attempted to classify ‘gum disease.’ Since then, a number of different systems have been described. However, The first classification scheme to be accepted by the American Academy of Periodontology (AAP) was that of Orban in 1942. A further workshop was convened by the AAP in 1989, amending the classification.[6] In 1999 a world workshop was conducted for formulating the classification system. Later a newer classification was proposed by AAP and EFP in 2018. This journal deals with the key changes in newer classification compared to that of 1999 classification.

**CLASSIFICATION OF PERIODONTAL AND PERI-IMPLANT DISEASES AND CONDITIONS (WORLD WORKSHOP 2018)**

Newer classification was proposed based on ICD (International classification of Diseases). [4]

1. Periodontal health, gingival diseases and conditions.
2. Periodontitis
3. Other conditions affecting the periodontium
II) PERI-IMPLANT DISEASES AND CONDITIONS

1. PERIODONTAL HEALTH, GINGIVAL DISEASES AND CONDITIONS

A) Periodontal health and gingival health
B) Gingivitis: dental biofilm induced
C) Gingival diseases: non-dental biofilm-induced

2. PERIODONTITIS

1. Necrotizing periodontal diseases
2. Periodontitis (Staging and grading)

3. PERIODONTITIS AS A MANIFESTATION OF SYSTEMIC DISEASE AND DEVELOPMENTAL AND ACQUIRED

i) Systemic diseases or conditions affecting the periodontal supporting tissues
   ii) Other periodontal conditions
   iii) Mucogingival deformities and conditions around teeth
   iv) Traumatic occlusal forces
   v) Prosthesis and tooth-related factors that modify or predispose to plaque-induced diseases/periodontitis
1. PERIODONTAL HEALTH, GINGIVAL DISEASES AND CONDITIONS
   A) PERIODONTAL HEALTH AND GINGIVAL HEALTH
      a. Clinical gingival health on an intact periodontium
      b. Clinical gingival health on a reduced periodontium
         i) Stable periodontitis patient
         ii) Non-periodontitis patient
   B) GINGIVITIS: DENTAL BIOFILM INDUCED
      a. Associated with dental biofilm alone
      b. Mediated by systemic or local risk factors
      c. Drug-induced gingival enlargement
   C) GINGIVAL DISEASES: NON-DENTAL BIOFILM-INDUCED
      a) Genetic/developmental disorders
      b) Specific infections
      c) Inflammatory and immune conditions
      d) Reactive processes
      e) Neoplasms
      f) Endocrine, nutritional & metabolic diseases
      g) Traumatic lesions
      h) Gingival pigmentation

2. PERIODONTITIS
   A) Necrotizing periodontal diseases
      a) Necrotizing gingivitis
      b) Necrotizing periodontitis
      c) Necrotizing stomatitis
   B) Periodontitis
      a) Stages: based on severity and complexity of management
         Stage i: initial periodontitis
         Stage ii: moderate periodontitis
         Stage iii: severe periodontitis with potential for additional tooth loss
         Stage iv : severe periodontitis with potential for loss of the dentition
      b) EXTENT AND DISTRIBUTION:
         i) Localized
         ii) Generalized
         iii) Molar -Incisor distribution
      c) GRADES: Evidence or risk of rapid progression grades, anticipated treatment response
         i) GRADE A: Slow rate of progression
         ii) GRADE B: Moderate rate of progression
         iii) GRADE C: Rapid rate of progression
   C) PERIODONTITIS AS MANIFESTATION OF SYSTEMIC DISEASES:

3. PERIODONTITIS AS A MANIFESTATION OF SYSTEMIC DISEASE AND DEVELOPMENTAL AND ACQUIRED CONDITIONS.
   i) Systemic diseases or conditions affecting the periodontal supporting tissues
ii) Other periodontal conditions
   a) Periodontal abscesses
   b) Endodontic-periodontal lesions

iii) MUCOGINGIVAL DEFORMITIES AND CONDITIONS AROUND TEETH
   a) Gingival phenotype
   b) Gingival/soft tissue recession
   c) Lack of keratinized gingiva
   d) Decreased vestibular depth
   e) Aberrant frenum /muscle position
   f) Gingival excess
   g) Abnormal color
   h) Condition of the exposed root surface

iv) Traumatic occlusal forces
   a) Primary occlusal trauma
   b) Secondary occlusal trauma
   c) Orthodontic forces

v) Prosthesis and tooth-related factors that modify or predispose to plaque-induced diseases/periodontitis
   a) Localized tooth-related factors
   b) Localized dental prosthesis-related factors

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**Key Changes In 2018 Classification:**

- THE DEFINITION OF PERIODONTAL HEALTH IS GIVEN IN THE NEW CLASSIFICATION.

Periodontal health is defined as absence of clinically detectable inflammation.[7] It is proposed that there are 4 levels of periodontal health, depending upon whether the periodontium has normal attachment and bone level or reduced support, as well as the ability to control modifying factors and relative treatment outcomes.

1) pristine periodontal health, 2) clinical periodontal health, 3) periodontal disease stability in a reduced periodontium. 4) periodontal disease remission/control in a reduced periodontium.

- DENTAL PLAQUE BIOFILM INDUCED GINGIVAL LESION [8]

  A) Associated with dental biofilm alone
B) Mediated by systemic or local factors
C) Drug induced gingival enlargement

The term plaque induced is now replaced by dental biofilm induced. Smoking and oral contraceptives are added as systemic risk factors. The following are clubbed to gather to form a new sub category called sex steroid hormones, namely puberty, menstrual cycle, pregnancy, oral contraceptives. Blood related Dyscrasias and leukemia is now clubbed together and classified under hematological conditions. The systemic risk factors newly added are smoking, hyperglycemia, nutritional factors, pharmacological agents, sex steroid hormones, hematological condition.[8]

➢ NON INDUCED GINGIVAL LESIONS:

The non–plaque-induced gingival lesions are often manifestations of systemic conditions, but they may also represent pathologic changes limited to gingival tissues. This classification is proposed, based on the etiology of the lesions.

<table>
<thead>
<tr>
<th>NON–PLAQUE-INDUCED GINGIVAL DISEASES AND CONDITIONS</th>
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<tbody>
<tr>
<td>1. Genetic/developmental disorders</td>
</tr>
<tr>
<td>● Hereditary gingival fibromatosis (HGF)</td>
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<tr>
<td>2. Specific infections</td>
</tr>
<tr>
<td>● Bacterial origin</td>
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<tr>
<td>Necrotizing periodontal diseases (Treponema spp., Selenomonas spp., Fusobacterium spp., Prevotella intermedia, and others)</td>
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<tr>
<td>Neisseria gonorrhoeae (gonorrhea)</td>
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<tr>
<td>Treponema pallidum (syphilis)</td>
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<tr>
<td>Mycobacterium tuberculosis (tuberculosis)</td>
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<tr>
<td>Streptococcal gingivitis (strains of streptococcus)</td>
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<td>● Viral origin</td>
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<tr>
<td>Coxsackie virus (hand-foot-and-mouth disease)</td>
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<td>Herpes simplex 1/2 (primary or recurrent)</td>
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<td>Varicella-zoster virus (chicken pox or shingles affecting V nerve)</td>
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<td>Molluscum contagiosum virus</td>
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<tr>
<td>Human papilloma virus (squamous cell papilloma, condyloma acuminatum, verruca vulgaris, and focal epithelial hyperplasia)</td>
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<tr>
<td>● Fungal</td>
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</table>
### Candidosis
Other mycoses (e.g., histoplasmosis, aspergillosis)

### 3. Inflammatory and immune conditions and lesions
- **Hypersensitivity reactions**
- **Contact allergy**
- Plasma cell gingivitis
- Erythema multiforme
  - Autoimmune diseases of skin and mucous membranes
- Pemphigus vulgaris
- Pemphigoid
- Lichen planus
- Lupus erythematosus
  - Granulomatous inflammatory conditions (orofacial granulomatosis)
- Crohn's disease
- Sarcoidosis

### 4. Reactive processes
- **Epulides**
- Fibrous epulis
- Calcifying fibroblastic granuloma
- Pyogenic granuloma (vascular epulis)
- Peripheral giant cell granuloma (or central)

### 5. Neoplasms
- Premalignant
- Leukoplakia
- Erythroplakia
  - Malignant
- Squamous cell carcinoma
- Leukemia
- Lymphoma

### 6. Endocrine, nutritional, and metabolic diseases
- **Vitamin deficiencies**
- Vitamin C deficiency (scurvy)

### 7. Traumatic lesions
- **Physical/mechanical insults**
- Frictional keratosis
- Toothbrushing-induced gingival ulceration
- Factitious injury (self-harm)
  - Chemical (toxic) insults

### Etching
- Chlorhexidine
- Acetylsalicylic acid
- Cocaine
- Hydrogen peroxide
- Dentifrice detergents
Paraformaldehyde or calcium hydroxide
- Thermal insults
Burns of mucosa
8. Gingival pigmentation
Gingival pigmentation/melanoplakia
Smoker's melanosis
Drug-induced pigmentation (antimalarials; minocycline)
Amalgam tattoo

Mycobacterium tuberculosis added to specific infection of bacterial origin.

Specific infection of viral origin is discussed in detail, in which the Coxsackie virus (hand foot mouth disease), Molluscum Contagiosum, Human papilloma virus were newly added.

Candidosis is added to specific infection of fungal origin.

Linear gingival Ertheyma is removed from fungal diseases.

Neoplasmas and gingival pigmentation category is newly added.

The reactive process is been added newly which refers to the presence of epulis which is further classified as Fibrous epulis, Calcifying fibroblastic granuloma, Pyogenic granuloma (vascular epulis) and Peripheral giant cell granuloma (or central).

Gingival pigmentation is newly added which includes Melanoplakia, Smoker's melanosis
Drug-induced pigmentation, & Amalgam tattoo.

Linear gingival erythema is added to HIV manifestations rather than non plaque induced lesions as clinical case reports were minimal.
PERIODONTITIS:

- The necrotizing periodontal diseases have been classified into following three categories: Necrotizing gingivitis, necrotizing periodontitis and necrotizing stomatitis. The older terms like ANUG and ANUP are replaced with the above newer terms.
- The term Chronic and aggressive periodontitis is removed. The replacement of chronic/aggressive periodontitis with a model based on stages and grades. Multi dimensional staging and grading added for periodontitis.
- Staging I to IV of periodontitis is defined based on severity (primarily periodontal breakdown with reference to root length and periodontitis-associated tooth loss), complexity of management (pocket depth, infrabony defects, furcation involvement, tooth hypermobility, masticatory dysfunction) and additionally described as extent (localized or generalized).
- Grading of periodontitis is estimated with direct or indirect evidence of rate in three categories: slow, moderate and rapid progression as Grade A, B & C respectively. Risk factor analysis is used as grade modifier. [9] The proposed staging and grading is designed to avoid the paradox of improvement of disease severity observed after loss/ extraction of the more compromised teeth.
- Periodontitis as manifestation of systemic diseases - Classification of these conditions should be based on the primary systemic disease according to the international statistical classification of diseases and related health problems (ICD) codes.

PERIODONTITIS AS A MANIFESTATION OF SYSTEMIC DISEASE AND DEVELOPMENTAL AND ACQUIRED CONDITIONS.

- A variety of systemic diseases and conditions can affect the course of periodontitis or have a negative impact on the periodontal attachment apparatus.
- The term gingival abscess is removed and any abscess of periodontium is described as periodontal abscess.
• Endo-perio lesions are categorized under this as there are determined with their etiology as in other acute lesion.

• Gingival biotype is replaced with gingival phenotype as it is considered relevant for outcome assessment of therapy in several dental disciplines, including periodontal and implant therapy, prosthodontics, and orthodontics.

• Gingival recessions are highly prevalent and often associated with hypersensitivity, the development of caries and non-carious cervical lesions on the exposed root surface and impaired esthetics. It is therefore important to define anatomic/morphologic characteristics of mucogingival lesions and other predisposing conditions or treatments that are likely to be associated with occurrence of gingival recession.

• Occlusal trauma is renamed as traumatic occlusal forces. *Traumatic occlusal force* is defined as any occlusal force resulting in injury of the teeth and/or the periodontal attachment apparatus.

• The prostheses and tooth related factors modifies plaque induced gingival diseases and periodontitis by local tooth related factors such as Tooth anatomic factors, Root fractures, Cervical root resorption, cemental tears, Root proximity, Altered passive eruption and local dental prostheses related factors such as Restoration margins placed within the supra crestal attached tissues, Clinical procedures related to the fabrication of indirect restorations, Hypersensitivity/toxicity reactions to dental materials.

➢ **PERI IMPLANT DISEASE AND CONDITIONS:**

The term peri implant disease is newly added to this classification. Peri-implant tissues are those that occur around osseointegrated dental implants [10], the new classification, addresses about its health and disease such as mucositis, periimplantitis and deficiencies of hard and soft tissues.
Benefits Of New Classification:

The new system for grading periodontal disease introduces biomarkers, these have still to be standardised, so “research is strongly encouraged to identify critical biomarkers and then develop personalised predictive models.”\[5\]

In the previous classification It was difficult to differentiate between aggressive and chronic periodontitis – whereas in this new classification a stage 2 and 3 periodontitis is clearly defined to differentiate them,” (kristin kolltveit, norway).

Drawbacks of The New 2018 Classification System:

No classification system is perfect, all will change as knowledge increases. [11] the new classification systems has many critics, but it had tried to accommodate a Number of important areas that was lacking in 1999 system.[4] the clinicians have raised concern about practicalities of implementing the new classification in everyday practice.[11]

Future Plan Of The New Classification System:[11]

It will take time for the new classification to sink in, but it gives us new avenues in periodontal research and will give us more information on retaining of extracting ‘hopeless’ teeth,” (darko božić, croatia). The AAP and the EFP is settling down to work on a wide range of events and projects to implement its strategic vision of “periodontal life for a better health”. The future looks extremely bright for the field of periodontology but we need to manage it carefully that our superb periodontology profession is not, over – burdened and protect our perio assests by planning carefully and taking one step at a time. [11]

Conclusion:

This overview introduces an updated classification of periodontal diseases and conditions and a New Classification of Peri-Implant Diseases and Conditions. The 2018 consensus workshop is a
major step forward not only for periodontology but also for periodontology as a whole. [11].

Time will decide how the new classification will be helpful to the general dentist and periodontist to choose optimal treatment plan to the patient. Due to many number of changes from 1999 classification the ease of transition in implementing this new classification is yet to be determined however, as nothing is guaranteed, the systems of the future are also likely to be controversial, stimulate much debate, and require further modification. [11][4]

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