International Journal Dental and Medical Sciences Research
Volume 4, Issue 6, Nov-Dec 2022 pp 683-689 www.ijdmsrjournal.com ISSN: 2582-6018

# An Insight In To 2017 Classification Of Periodontal And Peri-Implant Diseases And Conditions

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Submitted: 08-12-2022 Accepted: 16-12-2022

**ABSTRACT:** A classification system is necessary for clinicians to properly diagnose and treat patients.As the former 1999 classification is two decades old. An organizing committee from the American Academy of Periodontology and European Federation of Periodontolgy commissioned 19 review papers and four consensus reports covering relevant areas in periodontology and implant dentistry. This updated version was introduced and named as ‘‘New classification scheme for periodontal and peri-Implant diseases and conditions.It has four main categories as Periodontal health and gingival diseases,Periodontitis,Other conditions affecting the periodontium and Peri-Implant diseases and conditions.

**KEYWORDS:** Classification system,Staging and grading ,Periodontal abscess,Endo –perio lesion .Gingival recession ,Necrotizing periodontal diseases

## I. INTRODUCTION

Periodontitis is defined as chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the tooth-supporting apparatus.Its primary features include the loss of periodontal tissue support,manifested through clinical attachment loss (CAL) and radiographically assessed alveolar bone loss, presence of periodontal pockets and gingival bleeding. Periodontitis is a major public health problem due to its high prevalence,as well as because it may lead to tooth loss and disability, negatively affect masticatory function and aesthetics.

A classification is a division or category in a system which divides things into groups or types.It is nothing but systematic arrangement of classes or groups based on perceived common characteristics.It helps in the diagnosis, prognosis and treatment planning of the disease.It helps to communicate among clinicians,researchers, educators, students, epidemiologists and public health workers.

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.

## II .LIMITATIONS OF 1999 CLASSIFICATION:

- Understanding of periodontal disease in the 1999 classification is not complete enough to base our classification on etiology.
- The 1999 classification system depends upon assessing the rate of progression spread over multiple appointments in order to diagnose aggressive periodontitis. It is not possible for patient to repeat clinical visits just to place him/her under a specific disease entity such as aggressive or chronic periodontitis.
- In spite of rapid advancement in the field of implantology, there is no provision in the present classification for the diseases around implants, leaving a significant void .Risk factors are not considered, e.g., smoking and diabetes.

## III .NEED FOR A CLASSIFICATION SYSTEM

- A classification system should be simple, easy to understand, easy to reproduce and clinically relevant.
- To provide a foundation to study the etiology,susceptibility traits, pathogenesis, and treatment of diseases in an organized manner.
- To give clinicians a way to organize the health care needs of their patients.Assemble similar disease phenotypes in more homogeneous syndromes.

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## IV.2017 CLASSIFICATION OF PERIODONTAL AND PERI IMPLANT DISEASE AND CONDITIONS:

Given that the former classification was almost two decades old, it was truly time for a change and to recognise new knowledge along with its implications 13 .The workshop was co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) and included expert participants from all over the world.Planning for the conference, which was held in Chicago on November 9 to 11 ,2017, began in early 2015. An organizing committee from the AAP and EFP commissioned 19 review papers and four consensus reports covering relevant areas in periodontology and implant dentistry 6 .

The experts were assigned with updating the 1999 classification of periodontal diseases and conditions and developing a new classification for peri- implant diseases and conditions.The establishment of periodontal clinical case definitions and the provision of diagnostic criteria for periodontal and peri implant diseases were prioritized. This updated version was introduced and named as ‘‘New classification scheme for periodontal and peri-Implant diseases and conditions: Introduction and key changes from the 1999 classification” 7 .

## V .PERIODONTAL AND PERI-IMPLANT DISEASES AND CONDITIONS:

1.Periodontal health and gingival diseases :
I. Periodontal and gingival health
II. Gingivitis caused by biofilm
III.Gingivitis not caused by biofilm

2. Periodontitis
I. Necrotizing diseases
II. Periodontitis as a manifestation of systemic disease

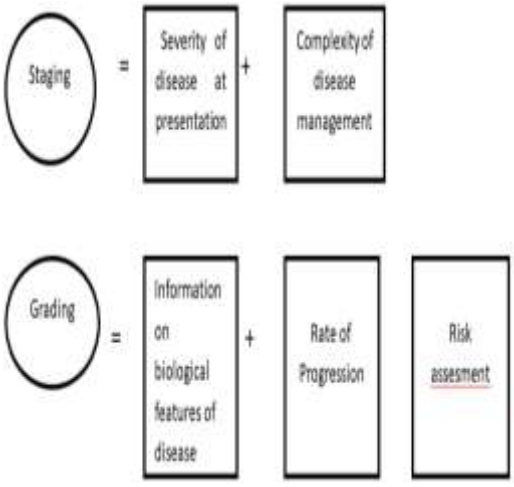
III.Periodontitis
3. Other conditions affecting the periodontium
I. Systemic diseases affecting the periodontium
II.Periodontal abscess or periodontal/endodontic lesions
III.Mucogingival deformities and conditions
IV.Traumatic occlusal forces
V. Tooth- and prosthesis-related factors

4.Peri-implant diseases and conditions
I. Peri-implant health
II. Peri-implant mucositis
III. Peri-implantitis
IV. Peri-implant soft- and hard-tissue deficiencies .

## VI .FRAMEWORK FOR DEVELOPING A PERIODONTITIS STAGING AND GRADING SYSTEM:

Staging, an approach used for many years in oncology, has been recently discussed relative to periodontal disease and affords an opportunity to move beyond the one dimensional approach of using past destruction alone and furnishes a platform on which a multidimensional diagnostic classification can be built. Staging relies on the standard dimensions of severity and extent of periodontitis at presentation but introduces the dimension of complexity of managing the individual patient. As it is recognized that individuals presenting with different severity/extent and resulting complexity of management may present different rates of progression of the disease and/or risk factors, the information derived from the staging of periodontitis should be supplemented by information on the inherent biological grade of the disease. This relies on three sets of parameters: 1) Rate of periodontitis progression 2) Recognized risk factors for periodontitis progression and 3) Risk of an individual's case affecting the systemic health of the subject.

## VII .PRIMARY GOALS IN STAGING AND GRADING A PATIENT WITHPERIODONTITIS:



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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 dentition 1 .

B.Extent and distribution: Localized;Generalized; Molar-Incisor distribution.

C. Grades: Evidence or risk of rapid progression, anticipated treatment response

- Grade A :Slow rate of progression
- Grade B :Moderate rate of progression
- Grade C :Rapid rate of progression.

**Table 1: Classification of periodontitis based on stages defined by severity (according to the level of interdental clinical attachment loss, radiographic bone loss and tooth loss), complexity and extent and distribution [8].**

| Periodontitis Stage | | Stage I | Stage II | Stage III | Stage IV |
|---|---|---|---|---|---|
| Severity | Interdental CAL at the site of greatest loss | 1 to 2 mm | 3 to 4 mm | ≥5mm | ≥5 mm |
| | Radiographic bone loss | Coronal third (~15%) | Coronal third (15% to 33% | Extending to middle or apical third of the root | Extending to middle or apical third of the root |
| | Tooth loss | No tooth loss due to periodontitis | No tooth loss due to periodontitis | Tooth loss due to periodontitis ≤4tooth | Tooth loss due to periodontitis ≥5tooth |
| Complexity | Local | Maximum probing depth ≤4mm Mostly horizontal bone loss | Maximum probing depth ≤5mm Mostly horizontal bone loss | In addition to stage 2 complexity Probing depth ≥6mm Vertical bone loss ≥3mm Furcation involvement class II or III Moderate ridge defect | In addition to stage III complexity Need for complex rehabilitation due to: Masticatory dysfunction secondary occlusal trauma (tooth mobility degree ≥2mm) Severe ridge defect Bite collapse , drifting, flaring Less than 20 remaining teeth (10 opposing pairs) |
| Extent and distribution | Add to stage as descriptor | For each stage , describe extend as localized (<30% of teeth involved) , generalized , or molar/incisor pattern | | | |

**Table 2 :Classification of periodontitis based on grades that reflect biologic features of the disease including evidence of, or risk for, rapid progression, anticipated treatment response, and effects on systemic health[8].**

| Progression | | | Grade -A : Slow rate of progression | Grade -B : Moderate rate of progression | Grade – C : Rapid rate of progression |
|---|---|---|---|---|---|
| **Primary criteria** | Direct evidence of progression | Longitudinal data (radiographic bone loss or CAL) | Evidence of no loss over 5 years | <2 mm over 5 years | ≥2mm over 5 years |
| | | % bone loss | <0.25 | 0.25 to 1.0 | >1.0 |
| | Indirect evidence of progression | Case phenotype…… | Heavy biofilm deposit with low levels of destruction | Destruction commensurate with biofilm deposits | Destruction exceeds expectation given biofilm deposits : specific clinical patterns suggestive of periods of rapid progression and / or early onset disease (e.g.,molar/incisor pattern ; lack of expected response to standard bacterial control therapies ) |
| **Grade modifiers** | Risk factors | Smoking | Non – smokers | Smoker < 10 cigarettes/ day | Smoker ≥ 10 cigarettes/day |
| | | Diabetes | Normoglycemic / no diagnosis of diabetes | HbA1c <7.0% in patients with diabetes | HbA1c ≥7.0% in patients with Diabetes |
| **Risk of systemic impacts of periodontitis** | Inflammatory burden | High sensitivity CRP (hsCRP) | <1 mg/L | 1 to 3 mg/L | >3 mg/L |
| **Biomarkers** | Indicators of CAL/bone loss | Saliva,gingival crevicular fluid, serum | ? | ? | ? |

According to the American Academy of Periodontology[71], acute periodontaldiseases are rapid- onset clinical conditions that involve the periodontium or associatedstructures and may be characterized by pain or discomfort, tissue destruction, andinfection. Among these conditions, the following diseases have been listed: gingivalabscess, periodontal abscess, necrotizing periodontal diseases, herpeticgingivostomatitis, pericoronal abscess, or pericoronitis, and combined periodontal- endodontic lesions[9].

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**Table 3: Classification of periodontal abscesses based on the etiologic factors involved[1]**

| | | | |
|---|---|---|---|
| Periodontal Abscess in periodontitis patients (In a pre – existing periodontal pocket) | Acute exacerbation | Untreated periodontitis | |
| | | Non- responsive to therapy periodontitis | |
| | | Supportive periodontal therapy | |
| | After treatment | Post- scaling | |
| | | Post - surgery | |
| | | Post - medication | Systemic antimicrobials |
| | | | Other drugs : Nifedipine |
| Periodontal abscess in non- periodontitis patient ( not mandatory to have a pre – existing periodontal pocket) | Impaction | | Dental floss, orthodontic elastic, tooth prick, rubber dam or popcorn hulls |
| | Harmful habits | | Wire or nail biting and clenching |
| | Orthodontic factors | | Orthodontic force or a cross bite |
| | Gingival overgrowth | | |
| | Alteration of root surface | Severe anatomic alterations | Invaginated teeth, dens evaginatus or odontodysplasia |
| | | Minor anatomic alterations | Cemental tears, enamel pearls or developmental grooves |
| | | Iatrogenic condition | Perforations |
| | | Severe root damage | Fissure or fracture, cracked tooth syndrome |
| | | External root resorption | |

Clinical presentation In the 1999 classification, necrotizing ulcerative gingivitis (NUG) and necrotizing ulcerative periodontitis (NUP) were included among Necrotizing dental periodontitis .Studies have suggested that they may represent different stages of the same disease, because they have similar etiology, clinical characteristics, and treatment, and may even progress to more severe forms such as necrotizing stomatitis (NS) and NOMA. The terminology "ulcerative" was later eliminated, because ulceration was considered to be secondary to the necrosis.

**Table 4 : Proposal of classification for necrotizing periodontal diseases (NPD)[1]**

| Category | Patients | Predisposing conditions | Clinical condition |
|---|---|---|---|
| Necrotizing periodontal disease in chronically , severly compromised patients | In adults | HIV +/AIDS with CD4 counts <200 and detectable viral load | NG, NP, NS, Noma. Possible progression |
| | In children | Other severe systemic conditions (Immunosuppression) | |
| | | Severe malnourishment | |
| | | Extreme living conditions | |
| | | Severe (viral) infections | |
| Necrotizing periodontal disease in temporarily and / or moderately compromised patients | In gingivitis patients | Uncontrolled factors: stress, nutrition, smoking, habits<br>Previous NPD : residual craters | Generalized NG possible progression to NP |
| | In periodontitis patients | Local factors : root proximity, tooth malposition | Localized NG possible progression to NP |
| | | Common predisposing factors for NPD | NG infrequent |
| | | | NP, infrequent progression |

Classification of endodontic –periodontic lesions was given initially by Simon, Glick and frank in 1972, and it was modified in 2017 classification of periodontal and peri –implant diseases and conditions.

**Table 5 :Classification of endo –periodontal lesions [1]**

| | | |
|---|---|---|
| **Endo- periodontal lesion with root damage** | Root fracture or cracking | |
| | Root canal or pulp chamber perforation | |
| | External root resorption | |
| **Endo- periodontal lesion without root damage** | Endo- periodontal lesion in periodontitis patients | Grade 1- narrow deep periodontal pocket in 1 tooth surface |
| | | Grade 2 -wide deep periodontal pocket in 1 tooth surface |
| | | Grade 3- deep periodontal pocket in more than 1 tooth surface |
| | Endo- periodontal lesion in non periodontitis patients | Grade 1- narrow deep periodontal pocket in 1 tooth surface |
| | | Grade 2 -wide deep periodontal pocket in 1 tooth surface |
| | | Grade 3- deep periodontal pocket in more than 1 tooth surface |

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The adoption of the definition "periodontal phenotype" to describe the combination of gingival phenotype (three-dimensional gingival volume) and the thickness of the buccal bone plate (bone morphotype).

**Classification of Gingival Phenotypes:**

- Thin scalloped
- Thick scalloped
- Thick flat[12].

Gingival recession is defined as the apical shift of the gingival margin with respect to the cemento-enamel junction (CEJ). Proposed clinical elements for a treatment-oriented recession classification are as follows. It includes recession depth ,gingival thickness and interdental clinical attachment level 13 .

**Table 6 :Ciaroclassificationofgingivalrescession**[14]

| | Gingival site | | | Tooth site | |
|---|---|---|---|---|---|
| | REC Depth | GT | KTW | CEJ (A/B) | Step (+/-) |
| No Recession | | | | | |
| RT1 | | | | | |
| RT2 | | | | | |
| RT3 | | | | | |

**MERITS OF 2017 CLASSIFICATION:**

- The definition of periodontal health is stated in the newer classification.
- Introduction of the term ''gingival pigmentation" and "neoplasms" are added.
- Candidasis is added and linear gingival erythema removed in specific infection of fungal origin.
- Viral diseases described broadly in newer classification. Coxsackie virus (hand foot mouth disease), Human papilloma virus, Molluscum Contagiosum were newly joined under the category of specific infection of viral origin.
- Granulomatous inflammatory lesion, hypersensitive reaction and Reactive process category in which refers to the presence of epulis were added.
- Identifying smoking and diabetes as the major potential risk factors that can alter the staging of periodontal disease.
- Mucocutaneous disorders replaced by auto-immune disease of the skin and mucous membrane.
- Recognition of ''periodontitis as a manifestation of systemic disease" such as Papillon Lefevre Syndrome.
- Systemic conditions affecting the periodontium when not related to dental plaque will be considered as ''Systemic Diseases or Conditions Affecting the Periodontal Supporting Tissues".
- The older terms like Necrotizing ulcerative gingivitis (NUG) and Necrotizing ulcerative periodontitis (NUP) are replaced with Necrotizing gingivitis and Necrotizing periodontitis. The terminology "ulcerative" was eliminated. Necrotizing Stomatitis term is added.
- The terms staging and grading were introduced. Staging levels indicate the severity of the disease and the complexity of disease management and is determined after considering several variables including clinical attachment loss, amount and percentage of bone loss, probing depth, presence and extent of angular bony defects and furcation involvement, tooth mobility and tooth loss due to periodontitis.
- Grading structure considers supplemental biologic characteristics of the patient in estimating the rate and likelihood of periodontitis progression.
- Any abscess of periodontium is described as a periodontal abscess. The terms gingival abscess and pericoronal abscess are eliminated.
- Classification of Endo-Perio Lesion should be established based on the clinical features available at the time of lesion is identified.
- The term periodontal phenotype replaced the periodontal biotype and supracrestal attachment is the new term replacing the biological width.
- Introduction of the term traumatic occlusal force.
- Peri-implant diseases and conditions which address about characteristics of soft and hard tissue deficiency related to implant are added in current classification 15 .

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**DEMERITS OF 2017 CLASSIFICATION:**

- The new classification is definitely more extensive than the previous one and time will decide how the clinicians and academicians apply it practically to diagnose and treat the periodontal diseases.
- A classification system based only on disease severity fails to capture important dimensions of an individual disease ,including the complexity that influenzes approach to therapy ,the risk factors that influence likely outcomes and level of knowledge and training required for managing the individual case.
- Concerns have been raised about practical application of new classification in day to day practices 16 .

## CONCLUSION:

The 2017 classification of Periodontal and Peri –Implant diseases and conditions is simple, easy to understand, easy to reproduce and clinically relevant. It provide a foundation to study the etiology, susceptibility traits, pathogenesis and treatment of diseases in an organized manner. To give clinicians a way to organize the health care needs of their patients. And perhaps most importantly, the new classification guides a clinician to recognize factors that indicate that the patient's disease trajectory is more complex and should be managed accordingly. The new guidelines using Bleeding on probing, probing depths and bone loss together with clinical attachment level rather than clinical attachment level alone simplify the diagnostic criteria used for a periodontal diagnosis. The guidelines also introduce definitions such as healthy but reduced periodontium and gingivitis on reduced periodontium and therefore will reduce over diagnosis of periodontitis. New classification systems appear complex and too comprehensive at a glance. However, some of the former classifications which looked much straightforward were frequently unsuitable and confusing to use. The new classification of periodontal diseases has made application in practice possible. This Classification addresses the flaws of 1999 classification. Time will decide how the new classification will help periodontists and general dentists to understand the etiology of disease in a better way and choose an optimal treatment plan for periodontal disease. The look for a perfect classification of periodontal diseases may be a add progress and therefore the finished product still looks like a mirage. The entire idea of the proposed classification is to simplify the existing classification system and eliminate unnecessary confusion. As we are yet to unravel the complete etiopathogenesis of periodontal disease, any new classification is sure to raise certain questions and controversies, which are inevitable now. With this knowledge we have aimed to classify periodontal disease in a simpler format, which is beneficial to the periodontal fraternity, general dental practitioners and therefore the patient.

**FUTURE DIRECTIONS AND ITS IMPLICATIONS:**

i)Development and validation of non-invasive diagnostic tools (e.g., saliva-based diagnostics), especially as they relate to detection of gingival inflammation.

ii)Identification of the characteristics (e.g., genetic factors) that distinguish persons who are resistant to the development of dental plaque biofilm-induced or non-dental plaque biofilm–induced gingival diseases from those who are susceptible.

iii)Expansion of our limited knowledge of the determinants that affect the reliability of currently available diagnostic tools (e.g., effects of probe design on bleeding on probing responses).

iv)Characterization of the possible differences (e.g., molecular determinants) between gingivitis on an intact periodontium and other forms of gingival inflammatory disease.

v)Develop improved methodologies to assess more accurately the longitudinal soft and hard tissue changes associated with periodontitis progression.

vi)Integrate multi-dimensional data platforms (clinical, radiographicomics) to facilitate systems biology approaches to the study of periodontal and peri- implant diseases and conditions.

Vii )Use existing databases/ develop new databases that will facilitate the implementation, validation and continuous refinement of the newly introduced periodontitis classification system 1 , 17 .

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