Review Article

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The New Periodontal Disease Classification: Analysis and Review

Abstract:
Classifications are formulated based on the understanding developed regarding the etiology, pathogenesis and clinical features of a particular disease. Classification of the periodontal and peri-implant diseases is essential for diagnosis, prognosis and treatment of the disease. Though we have made great strides towards the understanding of periodontitis in general, the bitter truth is that we have not hit the bull's eye on the true nature of etiopathogenesis. Joseph Fox, in 1806 first classified gingival disease. A number of different systems have been proposed later and till recently the 1999 international workshop on periodontal disease classification has been used for periodontal diseases. This paper aims to critically review in detail the major drawbacks of 1999 classification that led to the newer periodontal classification 2017, the key changes incorporated, its strengths and also the areas requiring further clarity and research. The 2017 classification is elaborate and complex as compared to the 1999 classification and its implementation is to be determined in the course of time.

Key words: classification 1999, classification 2017, periodontal diseases.

Introduction:

Periodontal disease is defined as the infectious disease resulting in inflammation within the supporting tissues of the teeth,progressive attachment loss and bone loss.[1] Based on the updation of knowledge during different times in the past regarding the etio-pathogenesis and clinical manifestations, various schemes for classifying periodontal diseases were proposed.[2]

Classifications systematically segregate patients into groups, helping in the diagnosis, prognosis, treatment planning; communication among clinicians, researchers, etc.; and in research regarding etio-pathogenesis, and treatment strategies.[3] A New Classification was the need of the hour to cater to the substantial developments that had occurred in the understanding of periodontal diseases since 1999 classification, & also to overcome the loopholes of that classification like overlapping categories, unclear pathophysiology-based differentiation between the classes, and diagnostic inaccuracy. There was a dearth of universal consensus among researchers about the existing 1999 classification.4-7The latest classification system for periodontal and peri-implant diseases has been developed by the American Academy of Periodontology & the European Federation of Periodontology, based on current evidence, evaluation of reviews, & consensus.

What features of 1999 classification prompted for a new classification?

- It did not serve as therapeutic guide (unlike Angle's Classification of maloccusion)
- Categorizing aggressive & chronic periodontitis – cumbersome & confusing (required assessment of rate of progression spread over multiple visits & chronic

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periodontitis exacerbation phase may also show rapid progression)

- Current evidence does not support the distinction between chronic and aggressive periodontitis as separate clinical entities (similar microbiology, pathogenesis, and histopathology).
- Confusion in diagnosing a case of plaque-induced gingival inflammation on a reduced but healthy periodontium – periodontitis or gingivitis?
- Categories of gingival disease modified by medication & diabetes mellitus exist but no such periodontitis class exists.
- No mention of peri-implant diseases
- **Gingival recession was placed under multiple categories complicating the diagnosis:-**

➢ **A** treated periodontitis case with recession

✦ **Further CAL loss** – present- periodontitis; Absent - gingivitis

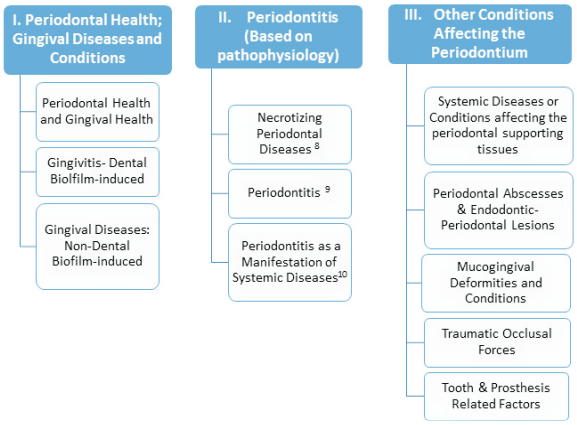
➢ Toothbrush trauma induced - non-plaque-induced traumatic lesion

➢ Due to anatomical variation-mucogingival deformities and conditions

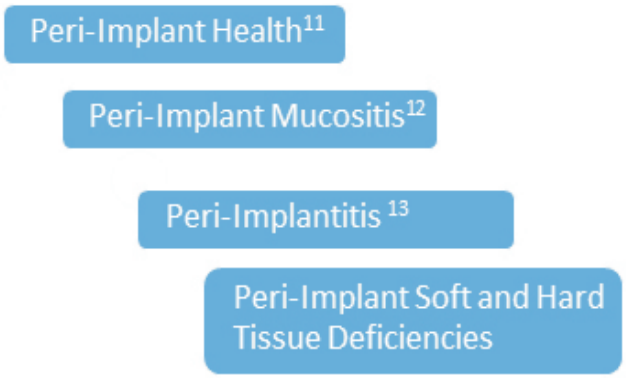
- No proper acknowledgement of risk factors (diabetes & smoking).
- Terms localized and generalized were introduced with arbitrary cut-off 30%, & gives ambiguous results. In Localised Aggressive Periodontitis, if all the incisors & 1st molars are involved (12 teeth), 12/32= 37.5%- but >30% must fall into generalised)

Classification of Periodontal &Peri-implant diseases and conditions 2017

A) Periodontal Diseases and Conditions



B) Peri- Implant diseases and conditions



Periodontitis Stage		Stage I	Stage II	Stage III	Stage IV
Severity	Interdental CAL at site of greatest loss	1-2 mm	3-4 mm	≥5mm	≥5mm
	Radiographic bone loss	Coronal 3rd (<15%)	Coronal 3rd (15%-33%)	Extending to mid-3rd of root or beyond	Extending to mid-3rd of root or beyond
	Tooth loss	No tooth loss due to periodontitis		Tooth loss due to periodontitis of ≤ 4 teeth	Tooth loss due to periodontitis of ≥5 teeth
Complexity	Local	Maximum probing depth ≥4 mm Mostly horizontal bone loss	Maximum probing depth ≥5 mm Mostly horizontal bone loss	In addition to stage II complexity: Probing depth ≥6 mm, Vertical bone loss =3 mm 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 ≥2), Severe ridge defect, Bite collapse, drifting, Flaring. <20 remaining teeth (10 opposing pairs)
Extent & distribution	Add to stage as descriptor	For each stage, describe extent as localized (<30% of teeth involved), generalized, or molar/incisor pattern			

Periodontitis Grade			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	≥2 mm over 5 years
	Indirect evidence of Progression	% Bone loss/age	<0.25	0.25 to 1.0	>1.0
		Case Phenotype	Heavy biofilm deposits 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- smoker	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

Salient Features :

1. Periodontitis characterization based on a multi dimensional staging and grading system, which maximizes the significance of diagnostic processes in comprehensive case management.[14] This classification system considers not only the principal disease (staging) but also the systemic influences both to and from the diseased periodontium (grading). It avoids the misconception that disease severity can be reduced by extraction of the compromised teeth.
2. The definition & specific criteria of Gingival health & Periodontal health for cases with intact and reduced periodontium have been established.
3. It resolved the discrepancies of previous classification by clarifying the definition of a gingivitis case (differentiates from gingival inflammation at ≥1 sites).
4. Rearrangement of the non- dental-biofilm induced gingival diseases and conditions is based on the etiology of the lesions.
5. The classification laid down the case definition for periodontitis & excluded CAL observed due to non-periodontitis causes.
6. This classification has stated a single term and no chronic/aggressive periodontitis terms remain.
7. Periodontitis as manifestation of systemic diseases has been grouped according to primary systemic disease based on international classification of diseases (ICD).
8. All abscesses of periodontal tissues are now termed as periodontal abscess, which are classified based on the etiology and patient's periodontitis history.
9. Mucogingival conditions have been described by the periodontal phenotype i.e. gingival thickness, keratinized tissue width, bone morphotype. The new classification & case definitions related to treatment of gingival recession are based on gingival phenotype,15 interproximal loss of clinical attachment, assessment of exposed root and cemento-enamel junction.[16]

Changes in Terminologies:

1999	2017
Excessive occlusal force	Traumatic occlusal force
Biologic Width	Supracrestal Attached Tissues[15]
Periodontal Biotype	Periodontal Phenotype
Plaque Induced Gingivitis	Dental Biofilm Induced Gingivitis
Acute Necrotizing Ulcerative gingivitis	Necrotizing gingivitis
Necrotizing Ulcerative Periodontitis	Necrotizing periodontitis
Chronic/Aggressive periodontitis	Periodontitis
----	Incipient gingivitis (Clinical term for Lower levels of BOP (< 10%))

New Classes	Removed Classes
Periodontal & Gingival Health	Gingival abscess
Reduced & Intact Periodontium	Pericoronal abscess
No & Stable Periodontitis	Chronic Periodontitis
Necrotising Stomatitis	Aggresssive Periodontitis
Stages & Grades of Periodontitis	Menstrual cycle associated Gingivitis
Prostheses-related factors	
Periodontal phenotype in mucogingival deformities & condition	
Peri-implant Diseases & Conditions- peri-implant health, mucositis, peri-implantitis, hard & soft tissue deficiency	

Additions in classes		Substractions from classes
In systemic risk factors (Dental-biofilm induced gingivitis) – smoking, hyperglycemia, nutritional factors, pharmacological agents, sex steroid hormones(puberty, pregnancy, **Oral Contraceptives, Menstrual cycle**) &hematological condition(Blood Dyscrasias, leukemia)[17]		Oral Contraceptives associated gingivitis from medication modified gingivitis
Drug-influenced Gingival enlargements in dental-biofilm induced Gingivitis		Drug-influenced Gingival enlargements from medication modified gingivitis
Neoplasms, Gingival pigmentation(Drug-induced pigmentation, Amalgam tattoo), **Reactive process**(epulis, pyogenic granuloma) in Non Dental-Biofilm induced Gingival lesions		
Severity/classification of recession, gingival thickness & width; presence of cervical caries & hypersensitivity; patient esthetic concern in Gingival/soft tissue recession		
Orthodontic forces in Traumatic occlusal forces		
Altered passive eruption as tooth-related factor		
Specific Infections	Bacterial - Mycobacterium tuberculosis, Necrotizing periodontal diseases of bacterial origin	
	Viral –Coxsackie virus, MolluscumContagiosum, Human Papilloma virus	
	Fungal - Candidosis	Linear gingival Erythema

Advantages of New Classification:

1. It is evidence-based and clinically relevant classification system.
2. It encourages research, helps in accurate case selection (less overlap & ambiguity amongst classes), and is likely to improve research results.
3. The difficulty to differentiate aggressive and chronic periodontitis previously is overcome by clarity within stages of periodontitis.
4. Grading of periodontal disease introduces biomarkers (C-reactive protein), though research is required for their standardization.
5. It addresses most of the limitations identified in the 1999 classification.
6. 1999 classification classes showed only limited differences with regards to disease risk and complexity factors but has been taken care of by the new classification.
7. New classification was able to reflect on tooth loss while the 1999 classification showed only limited association with tooth loss.
8. Generalised or localised - The 1999 classification used the percentage of sites, while the new one used percentage of teeth (more clinically practical).
9. It assesses the progression of periodontal destruction (bone loss/age) in the patient's past, which is associated with future tooth loss, & may support treatment planning in periodontitis patients.
10. New classification assesses the multiple dimensions of the disease and its risk factors, & may assist towards antibiotics prescription.
11. The diagnosis of periodontitis based on CAL was error-prone due to CEJ misinterpretation, but in new classification radiographic bone loss & factors including microbiological, host, and environmental determinants increase accuracy.
12. Periodontal & gingival health have been defined.
13. Endo-Perio lesion- classification based on clinical findings in contrast to primary lesion as in the past (limited by similarities in the microbial profile and challenges associated with identifying the primary lesion.)

Disadvantages of New classification:

1. The classification is very extensive and more complicated than 1999 classification and its understanding & implementation by practitioners is bound to take time.
2. Some degree of overlap exists between the following categories-
   · Periodontitis as a Manifestation of Systemic Conditions
   · Systemic Diseases/Conditions Affecting the Periodontal Supporting Tissues
   · Systemic diseases, such as uncontrolled diabetes mellitus, grade modifiers in periodontitis.
3. Due to large number of changes from 1999 classification, the effort in the incorporation of this classification in periodontal disease diagnosis is yet to be determined.
4. Necrotizing gingivitis is included in the periodontitis category, despite it being confined to the interproximal soft tissues, and no bone loss.
5. Periodontal abscess is a clinical manifestation and not a disease yet is considered as a diagnosis (reason behind it maybe different treatment regime).
6. Evidence for a distinct pathophysiology between an endo-periodontal and a periodontal lesion have not been established, still it is classified separately.
7. Gingival diseases modified by medications have been included in “dental biofilm induced gingival diseases”, but they cause gingival features independent of biofilm.
8. There is no distinction between periodontal and gingival abscesses.

Areas requiring future research:

1. Develop improved methodologies for accurate assessment of soft and hard tissue changes associated with periodontitis progression longitudinally.
2. Identify genetic, microbial, and host response-associated markers to enable differentiation between periodontitis subtypes, or which can determine the initiation and progression of periodontitis.

3. Expansion of the existing epidemiological databases & integration of clinical, radiographic data to facilitate the study of periodontal and peri-implant diseases and conditions.
4. With regard to the effect of periodontitis on systemic diseases, this classification can help guide future research and lead to prevention of co-morbid effects.
5. Research into the aetiology and natural history of the periodontal diseases is taking giant leaps and will empower us with the knowledge about the mechanisms underlying the etio-pathogenesis of periodontal diseases, generating a need for modifications in the classification schemes.

Conclusion:

There is a continuous pursuit towards an ideal and clinically relevant classification of periodontal diseases. With the present knowledge, the new classification has aimed to classify periodontal disease in an unambiguous and elaborate format, covering the conditions not included in the previous classifications. But due to many key changes from 1999 classification, the acceptance and ease of transition in implementing this new classification will be determined in the course of time. Concluding, that in the common pursuit towards building a better periodontal disease classification "Coming Together is a Beginning, keeping together is progress and working together is success"…

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