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Mini Review

Short Review on New Classification of Periodontal and Peri-implant Diseases

Pavan Kumar A*

Senior Lecturer, Department of Periodontics, Kamineni Institute of Dental Sciences, India

***Corresponding Author:** Pavan Kumar A, Senior Lecturer, Department of Periodontics, Kamineni Institute of Dental Sciences, India.

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Abstract

Classification of the disease helps to the diagnosis, prognosis and treatment of particular disease. 1999 classification of periodontal disease was accepted among the periodontology community, although it had disadvantages. All these disadvantages led to rethink and modify and redevelopment of newer classification of periodontal disease which was co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP). This review summarized the newer classification, advantages/modification and disadvantages of the newer classification.

Keywords: *Classification; Diagnosis; Gingiva; Periodontum; Occlusion; Peri-Implant Disease*

Introduction

Classification 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 understand the etiology, pathology of disease. Most importantly, it helps to communicate among clinicians, researchers, educators, students, epidemiologists and public health workers. Unfortunately, 1999 classification [1] of periodontal disease and conditions had some drawbacks regards overlapping nature of criteria of disease, also created some confusion among clinicians to diagnosis the case properly. Another drawback, it did not elaborate the effect of risk factors (e.g. Smoking, Diabetes etc.). Peri-implant health/Conditions were not included in the 1999 classification as Periodontal disease and Peri implant diseases shared almost same microbial profile. The classification did not give clue regards correct treatment plan as it depended on correct diagnosis of the disease. All these difficulties led to improvement of 1999 classification which was co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP). An organizing committee from AAP and EFP published 19 review papers and 4 Conesus reports which covered relevant areas in periodontology and Implantology, including the untouched areas of 1999 classification of periodontal disease.

New classification of periodontal and peri-implant diseases and conditions (World workshop 2017) [2]:

1. Periodontal diseases and conditions
2. Peri-Implant diseases and conditions

Periodontal diseases and conditions

1. Periodontal health, gingival diseases and conditions
2. Periodontitis
3. Other conditions affecting the periodontium

Periodontal health, gingival diseases and conditions

1. 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

2. Gingivitis: Dental Biofilm Induced
    a. Associated with dental biofilm alone
    b. Mediated by Systemic or local risk factors
    c. Drug-influenced gingival enlargement

3. Gingival Diseases: Non-Dental Biofim-Induced
    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

Periodontitis

1. Necrotizing periodontal diseases
    a. Necrotizing Gingivitis
    b. Necrotizing Periodontitis
    c. Necrotizing Stomatitis

2. Periodontitis
    a. Stages: Based on Severity and Complexity of Management
        i. Stage I: Initial Periodontitis
        ii. Stage II: Moderate Periodontitis
        iii. Stage III: Severe Periodontitis with potential for additional tooth loss
        iv. Stage IV: Severe Periodontitis with potential for loss of the dentition
    b. Extent and distribution: Localized, generalized, molar-incisor distribution
    c. Grades: Evidence or risk of rapid progression, anticipated treatment response
        i. Grade A: Slow rate of progression
        ii. Grade B: Moderate rate of progression
        iii. Grade C: Rapid rate of progression

3. 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.

Systemic and other periodontal conditions

1. Systemic diseases or conditions affecting the periodontal supporting tissues
2. Other Periodontal Conditions
    a. Periodontal Abscesses
    b. Endodontic-Periodontal Lesions
3. Mucogingival Deformities and Conditions around teeth
    a. Gingival phenotype
    b. Gingival/soft tissue recession
    c. Lack of keratinised gingiva
    d. Decreased vestibular depth
    e. Aberrant frenum/muscle position
    f. Gingival excess
    g. Abnormal color
    h. Condition of the exposed root surface
4. Traumatic Occlusal Forces
    a. Primary occlusal trauma
    b. Secondary occlusal trauma
    c. Orthodontic forces
5. 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
6. Peri-implant diseases and conditions
    a. Peri-implant health
    b. Peri-implant mucositis
    c. Periimplantitis
    d. Peri-implant soft and hard tissue deficiencies

Critical appraisal

The 1999 classification failed to classify the gingival diseases and conditions without flaws [3]. It did not provide definition for gingival health. The newer classification divided the gingivitis based on association with plaque i.e. biofilm induced gingivitis and non-biofilm induced gingivitis [2]. The term periodontal health introduced and divided into intact and reduced periodontal health. The intact periodontal health defined as the patient did not show clinical attachment loss or radiographic assessment of bone loss. The reduced periodontium had two different entities like reduced periodontium due to non-periodontitis conditions like patient had gingival recession or underwent crown lengthening procedures [3].

An intact periodontium patient showed less than 10% sites bleeding on probing and probing pocket depth ≤3mm considered as clinical gingival health and it is also applicable to the patient with reduced periodontium due to non- periodontal conditions [3].

In the reduced periodontium in successful treated periodontitis patient, probing pocket depth up to 4 mm and no bleeding on probing at 4 mm site considered as clinical gingival health. A diagnosed periodontitis patient is always considered as periodontitis patient in life long and categorised based on the response to periodontal therapy and divided into controlled (healthy/stable), remission (associated with gingival inflammation) and an uncontrolled (recurrent periodontitis/un stable periodontitis) [3].

Gingival inflammation is most appropriate term rather than using term "gingivitis" in periodontitis patient as patient cannot defined as a case of periodontitis as well as a case of gingivitis [3].

There is no clear cut demarcation between chronic and aggressive periodontitis. Three forms of periodontitis were included in the newer classification 1. Periodontitis 2. Necrotising periodontitis 3. Periodontitis as manifestation of systemic diseases [2]. Necrotizing Stomatitis is added in new classification, which characterized by necrosis that extends beyond Mucogingival junction. The term 'ulcerative ïs no longer used as ulceration is considered to be secondary to necrosis[2-4].

Periodontitis was characterized based on stage and grade of the disease. Stage provide the information regarding severity and the extent of the disease whereas grading describes the rate of progression of disease [4].

A patient is a periodontitis case when [4,5]:

i. Interdental CAL is detectable at ≥ 2 non-adjacent teeth, or
ii. Buccal/oral CAL of ≥ 3 mm with pocketing of > 3 mm is detectable at ≥ 2 teeth.

We exclude the CAL that occurred in non –periodontal conditions like as gingival recession due to traumatic origin, Caries extending into cervical area of teeth, the distal aspect of 2nd molar associated with malposition or extracted third molar, draining endo lesion through marginal periodontium to state a case as periodontitis [4,5].

Severity of disease depends on attachment loss or radiographic measurement of bone loss and tooth loss due to Periodontitis [4].

In Periodontitis as direct of manifestation of disease, clinician follow the International Statistical Classification of Diseases and Related Health Problems (ICD) codes for classification of primary disease [4].

Staging of periodontal disease depend on severity and complexity. Severity of disease based on attachment loss or radiographic measurement of bone loss. Tooth loss due to periodontitis also decide the severity of disease. Complexity based on complexity of the disease which depends on probing pocket depths, vertical defects, involvement of furcation, mobility of teeth etc [4,5].

Grading provides the information regarding future risk of the disease and response to periodontal treatment [4,5]:

1. When a newer patient came to your clinic. You should ask whether patient had full mouth radiographs of good quality. If the patient said yes, the clinician should asses the bone loss from the radiographs. If the patient had bone loss, there was higher chances of susceptible periodontitis patient. The next step is to assess interdental CAL. If the patient had interdental CAL, patient can be categorized to susceptible periodontitis patient. If interdental CAL was not detected, clinician to assess the buccal recessions with probing pocket depth greater than 3 mm. If it is present, patient can be categorized to susceptible periodontitis patient. The next step is to assess full mouth bleeding on probing (FM Bop). If FM Bop, more than 10% sites, the patient is categorized as gingivitis patient. If it is lesser than 10% sites, the patient is categorized as the patient is categorized as periodontal health.

2. When interdental CAL is examined during oral examination, then patient categorized into susceptible periodontitis patient. As earlier mentioned, CAL occurred to non-periodontal conditions. So, the clinician should aware of whether CAL was occurred to periodontal or non- periodontal conditions. If CAL is present to non- adjacent teeth, we can consider this patient as periodontitis patient. Then, we should evaluate full mouth pocket charting for PPD 4mm or more to confirm that patient has periodontitis. Based on the CAL/BL, we assess the extent of the disease (If the CAL/BL less than 30% sites then considered as localized, 30% or morthen

considered as generalized). If patient does not have PPD 4 mm or more, the next step is to evaluate full mouth bleeding on probing (FM Bop). If FM Bop, more than 10% sites, the patient is categorized as gingival inflammation in periodontitis patient.

If CAL is present more than 5 mm or Bone loss at middle third of root or beyond in more than two adjacent teeth, the periodontitis case categorized into either stage III or stage IV. If CAL is 5 mm or less in fewer than two adjacent teeth, we should evaluate for furcation like grade II or III. If furcation present, then the periodontitis case categorized into either stage III or stage IV. If furcation involvement was not there, then look for PPD. If PPD is present more than 5 mm in more than two adjacent teeth, the periodontitis case categorized into either stage III or stage IV. If PPD 3 - 5 mm, we should assess Periodontal tooth loss (PTL). If it is present, then case categorized into either stage III or stage IV. If absent, then case categorized into either stage I or stage II [4,5].

Stages I and II are based on the level of CAL and BL. The diagnosis is Stage I if: (a) BL is less than 15% and (b) CAL is between 1 - 2 mm. The diagnosis is Stage II if: (a) BL is between 15% and 33% and (b) CAL is between 3 - 4 mm. The diagnosis is Stage III if: (a) BL affects the middle third of the root or beyond, (b) CAL is 5 mm or more, (c) PTL is four teeth or fewer, (d) 10 or more occluding pairs are present, and (e) in the absence of bite collapse, drifting, flaring, or a severe ridge defect. The diagnosis is Stage IV if: (a) BL affects the middle third of the root or beyond, (b) CAL is 5mm or more, (c) PTL is more than four teeth, (d) there are fewer than 10 occluding pairs, or (e) when there is bite collapse, drifting, flaring, or a severe ridge defect [4,5].

Grading depends on previous periodontal records. If they are not available, the bone loss/age (BL/A) ratio should be calculated from the full-mouth radiographs. If BL/A is between 0.25 and 1.0, the diagnosis is Grade B periodontitis. If less than 0.25, the diagnosis is Grade A periodontitis: if higher than 1.0, the diagnosis is Grade C periodontitis. Grades A and B can be modified if the patient smokes or is diabetic. A patient who smokes 10 or more cigarettes per day will be changed to Grade C, while one who smokes fewer than 10 cigarettes will be upgraded to B. Similarly, a diabetic patient with HbA1c below 7.0 will be upgraded to B and one with HbA1c of 7.0 or more upgraded to C [4,5].

When the patient's periodontal records are available, the rate of periodontitis progression over the previous five years should be calculated. If progression is less than 2 mm, the diagnosis is Grade B periodontitis. If there has been no progression in five years, the diagnosis is Grade A periodontitis. When the progression has been 2 mm or more, the diagnosis is Grade C periodontitis. Grades A and B can be upgraded to a higher grade if the patient smokes or is diabetic. A patient who smokes 10 or more cigarettes per day will be changed to Grade C, while one who smokes fewer than 10 cigarettes will be upgraded to B. Similarly, a diabetic patient with HbA1c below 7.0 will be upgraded to B and one with HbA1c of 7.0 or more upgraded to C [4,5].

Some of systemic disorders like Papillon-Lefèvre syndrome showed early presentation of severe periodontitis. Such conditions are grouped together as "periodontitis as a manifestation of systemic disease" and classification is based on the primary systemic disease (using ICD-10 codes). Diabetes and smoking modify the course of periodontitis. But they are not included in Periodontitis manifestation of systemic disease as they are included in grading of the periodontal disease. Other systemic conditions, such as neoplastic diseases, can affect the periodontal tissues independently of biofilm-induced inflammation [6,7]. They are also classified based on the primary systemic disease (using ICD-10 codes) and are now grouped together as "systemic diseases or conditions that affect the periodontal supporting tissues" [6,7]. In the newer classification , The former distinction between gingival and Periodontal abscesses is not followed, The periocornal abscess is also eliminated as it was considered non -relevant although it is acute condition[2].

Gingival phenotype – including gingival thickness and width – is now recognised and a new classification for gingival recessions has been introduced [8].

Recession Type (RT) was used to grade the gingival recession. The distance between the height of the free gingival margin to the cemento-enamel junction (CEJ) was termed recession (REC) [9].

RT 1- REC with no loss interproximal CAL, Interproximal CEJ is not visible.

RT 2- REC with loss of interproximal CAL, interproximal loss of CAL is less than or equal to buccal CAL loss.

RT 3- REC with loss of interproximal CAL, interproximal loss of CAL is greater than buccal CAL loss.

Traumatic occlusal force, which replaces the term "excessive occlusal force" of the previous (1999) classification. There is no evidence from human studies that traumatic occlusal forces accelerate the progression of periodontitis or that they can cause non-carious cervical lesions or gingival recessions [10].

Prosthesis related factors and tooth related factors were expanded in the newer classification. The term biologic width was replaced by supracrestal tissue attachment [11]. Altered passive eruption, a condition that was absent from the 1999 classification, is also included as a tooth-related factor.

Peri implant diseases and conditions were addressed in the newer classification [12]. Bop helps to differentiate between healthy and inflamed peri-implant mucosa. Whereas bone loss helps to differentiate between peri-implant mucositis and peri-implantitis [12].

Peri-implant health is characterised by the absence of clinical signs of inflammation, such as swelling, redness, and BoP [13]. Peri-implant mucositis is characterised by an inflammatory lesion in the soft tissues surrounding an implant in the absence of loss of supporting bone [14]. Peri-implantitis [15] is characterised by inflammation in the peri-implant mucosa and loss of supporting bone. Bone levels ≥ 3mm apical of the most coronal portion of the intra-osseous part of the implant, together with bleeding and/or suppuration on probing, are consistent with the diagnosis of Periimplantitis. There is increased risk of peri implantitis higher in patients who has history of periodontitis [15].

Conclusion

The classification tried to clear the flaws of 1999 periodontal classification. Implant dentistry is part of daily clinical practice, and the introduction of case definitions for Peri-implant diseases and conditions was much needed. The staging and grading of periodontitis is descriptive of not only the extent and severity of the disease, it is also provide complexity of treating the case, disease progression and the patient's systemtic status, which helps to assess the prognosis and also risk assessment of the patient. The prognosis represents a dynamic process that is continuously reassessed as new information is collected at each subsequent visit. By comparison, diagnosis typically precedes prognosis and is established during the initial visits. But the limitation are application of this classification for epidemiological surveys due to the extensive nature of the classification and also implementation into dental practice as most of the clinicians were general dentists.

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