EFP
New Classification
of periodontal and peri-implant diseases

03. Systemic and other periodontal conditions

Guidance for clinicians

- Numerous systemic disorders can affect the initiation and progression of periodontitis, or can negatively impact the periodontal structures.
- The new classification of gingival recession is based on interproximal attachment loss and combines clinical parameters, including gingival phenotype, and characteristics of the exposed root surface.
- Occlusal forces can damage teeth and the periodontal attachment apparatus.
- Developmental or acquired conditions associated with teeth or prostheses may predispose to diseases of the periodontium.
- Periodontal abscesses and endo-periodontal lesions can also affect the periodontium.

Author **Søren Jepsen**

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Introduction

Human periodontal diseases encompass a wide spectrum of conditions in addition to gingival diseases and periodontitis. Some of these are related to plaque biofilm while others arise independently of biofilm accumulation and may either be modified by the biofilm or be uninfluenced by it.

It was the remit of working group 3 of the 2017 World Workshop to review and update the 1999 classification on periodontal manifestations of systemic diseases and developmental and acquired conditions, and to develop case definitions and diagnostic considerations.

Periodontal manifestations of systemic diseases and conditions

There are rare systemic disorders, such as Papillon–Lefèvre syndrome, that result in the early presentation of severe periodontitis. They have a major impact on the loss of periodontal tissues by influencing periodontal inflammation. 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).

Periodontal diseases include a wide spectrum of conditions in addition to gingival diseases and periodontitis

There are more common systemic diseases – such as diabetes mellitus – that are important modifiers of the course of periodontitis. However, diabetes-associated periodontitis should not be regarded as a distinct diagnosis – diabetes is now included in the new clinical classification of periodontitis as a descriptor in the grading process. In a similar way, smoking – now regarded as nicotine dependence and as a chronic relapsing medical disorder with major negative effects on the periodontium – is now also included as a descriptor in the grading process.

Other systemic conditions, such as neoplastic diseases, can affect the periodontal tissues independently of biofilm-induced inflammation. 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."

A case of "periodontitis" in a patient with uncontrolled diabetes mellitus. This is *not* a case of "periodontitis as a direct manifestation of systemic disease"

Periodontitis as a manifestation of systemic disease

Systemic disorders with major impact on loss of periodontal tissues by influencing periodontal inflammation:

- Genetic disorders
  - Diseases associated with immunological disorders (e.g. Papillon-Lefèvre syndrome)
  - Diseases affecting the oral mucosa and gingival tissue (e.g. epidermolysis bullosa)
  - Diseases affecting connective tissues (e.g. Ehlers-Danlos syndromes)
  - Metabolic and endocrine disorders (e.g. hypophosphatasia)
- Acquired immunodeficiency diseases (e.g. HIV infection)
- Inflammatory diseases (e.g. inflammatory bowel disease)

Other systemic disorders that influence the pathogenesis of periodontal diseases:

- Diabetes mellitus
- Obesity
- Smoking (nicotine dependence)

Systemic diseases or conditions that affect the periodontal supporting tissues

Systemic disorders that can result in loss of periodontal tissues independently of periodontitis:

- Neoplasms (e.g. oral squamous-cell carcinoma)
- Other disorders that may affect periodontal tissues (e.g. Langerhans cell histiocytosis)

The importance of the gingival phenotype is now recognised

Mucogingival conditions

The importance of the gingival phenotype – including gingival thickness and width – is now recognised and a new classification for gingival recessions has been introduced. This combines clinical parameters such as the gingival phenotype, the interproximal attachment loss, and the characteristics of the exposed root surface.

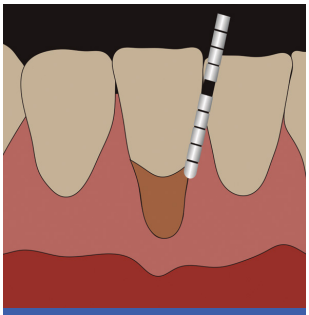
Classification of mucogingival conditions (gingival phenotype) and gingival recessions

	Gingival site			Tooth site	
	Recession depth	Gingiva thickness	Width of keratinised gingiva	CEJ (A/B)	Step (+/-)
No recession					
RT1					
RT2					
RT3					

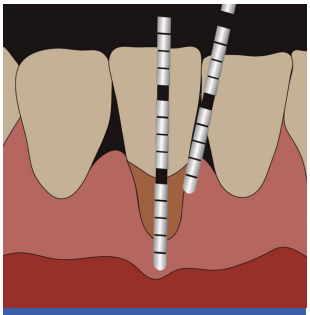
RT = recession type (*Cairo et al. 2011*)

CEJ = cemento-enamel junction
(Class A = detectable CEJ,
Class B = undetectable CEJ)

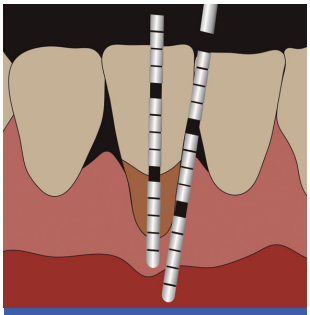
Step = root-surface concavity
(Class + = presence of a cervical step > 0.5mm.
Class – = absence of a cervical step > 0.5mm)
(*Pini Prato et al. 2010*)



RT1
- REC with no loss of interproximal CAL
- Interproximal CEJ is not visible



RT2
- REC with loss of interproximal CAL
- Interproximal loss of CAL is less than or equal to buccal CAL loss



RT3
- REC with loss of interproximal CAL
- Interproximal loss of CAL is greater than loss of buccal CAL

Mucogingival conditions are classified according to gingival phenotype, interproximal attachment loss, and the characteristics of the exposed root surface

A patient with multiple gingival recession defects of various recession types, gingival phenotypes and root-surface conditions. Individual case assessments (tooth by tooth) are required to facilitate adequate treatment planning. (Photo: K. Jepsen).

Graphics RT1, RT2, RT3 courtesy H. Dommisch.

Occlusal trauma and traumatic occlusal forces

Traumatic occlusal force, which replaces the term “excessive occlusal force” of the previous (1999) classification, is any occlusal force that results in injury to teeth (such as excessive wear or fracture) and/or to the periodontal attachment apparatus.

Occlusal trauma is a histological term to describe the injury of the periodontal attachment apparatus.

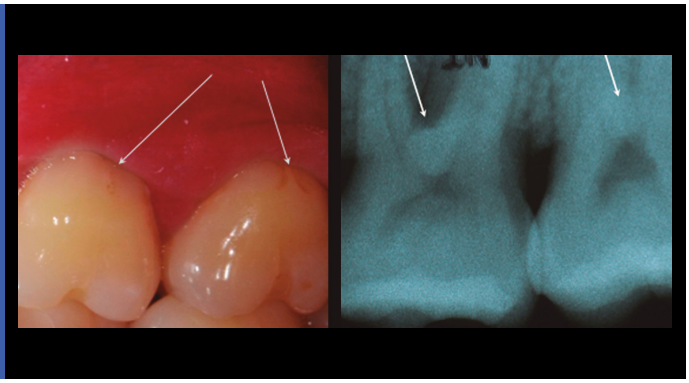
The presence of traumatic occlusal forces and occlusal trauma may be indicated by one or more of the following: (a) fremitus (adaptive tooth mobility), (b) progressive tooth mobility, (c) thermal sensitivity, (d) excessive occlusal wear, (e) tooth migration, (f) discomfort/pain on chewing, (g) fractured teeth, (h) radiographically widened periodontal ligament space, (i) root resportion, (j) hypercementosis.

It should be noted that some of the signs and symptoms of traumatic occlusal forces and occlusal trauma may also be associated with other conditions. Therefore, an appropriate differential analysis must be performed to rule out alternative aetiological factors.Traumatic occlusal forces lead to adaptive mobility in teeth with

normal support (primary occlusal trauma) and to progressive mobility in teeth with reduced support (secondary occlusal trauma), usually requiring splinting.

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.

Cervical enamel projections are an example of tooth-related factors that can predispose to loss of periodontal supporting tissues – in this case severe buccal furcation involvement of the first molar.
(Photo: K. & S. Jepsen).



'Traumatic occlusal force' replaces the previous term 'excessive occlusal force'

Prosthesis-related and tooth-related factors

Classification of factors related to teeth and to dental prostheses that can affect the periodontium
A. Localised tooth-related factors that modify or predispose to biofilm-induced gingival diseases/periodontitis
1. Tooth anatomical factors
2. Root fractures
3. Cervical root resorption, cemental tears
4. Root proximity
5. Altered passive eruption
B. Localised dental-prosthesis-related factors
1. Restoration margins placed within the supracrestal attached tissues
2. Clinical procedures related to the fabrication of indirect restorations
3. Hypersensitivity/toxicity reactions to dental materials

This section is expanded in the new classification. It comprises all factors that modify or predispose to biofilm-induced gingival diseases/periodontitis.

- The term "biologic width" is replaced by "supracrestal tissue attachment", consisting of junctional-epithelium and supracrestal connective tissue.
- An infringement of restorative margins within the supracrestal connective-tissue attachment is associated with inflammation and loss of periodontal supporting tissue.

- The design, fabrication, delivery, and materials used for tooth-supported/retained restorations and fixed dental prosthetic procedures can be associated with plaque retention, gingival recession, and loss of periodontal supporting tissue.
- Tooth anatomical factors (i.e. cervical enamel projections, enamel pearls, developmental grooves), root proximity, abnormalities and fractures, and tooth relationships in the dental arch are related to gingival inflammation induced by dental-plaque biofilm and loss of periodontal supporting tissues.

Periodontal abscesses

Case definition: A periodontal abscess is a localised accumulation of pus located within the gingival wall of the periodontal pocket/sulcus, resulting in a significant tissue breakdown. The primary detectable signs or symptoms associated with a periodontal abscess may involve ovoid elevation in the gingiva, along the lateral part of the root, and bleeding on probing. Other signs and symptoms include pain, suppuration on probing, deep periodontal pockets, and increased tooth mobility.

A periodontal abscess may develop in a pre-existing periodontal pocket – for example, in patients with untreated periodontitis, under supportive therapy, after scaling and root planing, or after systemic antimicrobial therapy. A periodontal abscess occurring at a site that was previously periodontally healthy is commonly associated with a history of impaction or harmful habits.

Periodontal abscesses can cause rapid tissue destruction and may compromise tooth prognosis

Classification of periodontal abscesses based on the aetiological factors involved			
Periodontal abscess in periodontitis patients (in a pre-existing periodontal pocket)	Acute exacerbation	Untreated periodontitis	
		Non-responsive to periodontitis therapy	
		Supportive periodontal therapy	
	After treatment	Post-scaling	
		Post-surgery	
		Post-medication	Systemic antimicrobials
			Other drugs: nifedipine
Periodontal abscess in non periodontitis patients (not mandatory to have a a pre-existing periodontal pocket)	Impaction		Dental floss, orthodontic elastic, toothpick, rubber dam or popcorn hulls
	Harmful habits		Wire or nail biting and clenching
	Orthodontic factors		Orthodontic forces or a cross-bite
	Gingival overgrowth		
	Alteration of root surface	Severe anatomic alterations	Invaginated tooth, *dens evaginatus*, or odontodysplasia
		Minor anatomic alterations	Cemental tears, enamel pearls, or development grooves
		Iatrogenic conditions	Perforations
		Severe root damage	Fissure or fracture, cracked-tooth syndrome
		Post-surgery	

Endo-periodontal lesions

Endo-periodontal lesions should be classified according to signs and symptoms that have direct impact on their prognosis and treatment (such as the presence or absence of fractures and perforations, and the presence or absence of periodontitis).

Case definition: An endo-periodontal lesion is a pathological communication between the pulpal and periodontal tissues at a given tooth that may occur in an acute or a chronic form. The primary signs associated with this lesion are deep periodontal pockets extending to the root apex and/or a negative/altered response to pulp-vitality tests.

Other signs/symptoms may include: (a) radiographic evidence of bone loss in the apical or furcation region, (b) spontaneous pain or pain on palpation/percussion, (c) purulent exudate/suppuration, (d) tooth mobility, (e) sinus tract/fistula, (f) crown and/or gingival colour alterations.

Signs observed in endo-periodontal lesions associated with traumatic and/or iatrogenic factors may include root perforation, fracture/cracking, or external root resorption. These conditions drastically impair the prognosis of the involved tooth.

Endo-periodontal lesions occur in acute and chronic forms

Classification of endo-periodontal lesions		
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 one tooth surface
		Grade 2 - wide deep periodontal pocket in one tooth surface
		Grade 3 - deep periodontal pocket in more than one tooth surface
	Endo-periodontal lesion in non-periodontitis patients	*Grade 1* - narrow deep periodontal pocket in one tooth surface
		Grade 2 - wide deep periodontal pocket in one tooth surface
		Grade 3 - deep periodontal pocket in more than one tooth surface

Endo-periodontal lesion (Grade 3) in a periodontitis patient (Photo: H. Dommisch)

Further reading

Proceedings of the World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions,
co-edited by Kenneth S. Kornman and Maurizio S. Tonetti.
Journal of Clinical Periodontology, Volume 45, Issue S20, June 2018.

Proceedings include:

- Jepsen S, Caton JG, et al. Periodontal manifestations of systemic diseases and developmental and acquired conditions: Consensus report of workgroup 3 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions: S219-S229.
- Albandar JM, Susin C, Hughes FJ. Manifestations of systemic diseases and conditions that affect the periodontal attachment apparatus: case definitions and diagnostic considerations: S171-S189.
- Cortellini P, Bissada NF. Mucogingival conditions in the natural dentition: narrative review, case definitions and diagnostic considerations: S190-S198.
- Fan J, Caton JG. Occlusal trauma and excessive occlusal forces: narrative review, case definitions, and diagnostic considerations: S199-S206.
- Ercoli C, Caton JG. Dental prostheses and tooth-related factors: S207-S218.
- Herrera D, Retamal-Valdes B, Alonso B, Feres M. Acute periodontal lesions (periodontal abscesses and necrotising periodontal diseases) and endo-periodontal lesions: S78-S94.
- Papapanou PN, Sanz M, et al. Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions, S162-S170.

Cairo F, Nieri M, Cincinelli S, Mervelt J, Pagliaro U. The interproximal clinical attachment level to classify gingival recessions and predict root coverage outcomes: an explorative and reliability study. *J Clin Periodontol*. 2011; **38**: 661-666.

Pini-Prato G, Franceschi D, Cairo F, Nieri M, Rotundo R. Classification of dental surface defects in areas of gingival recession. *J Periodontol*. 2010; **81**: 885-890.

Author

Søren Jepsen

Søren Jepsen is professor and chair of the Department of Periodontology, Operative and Preventive Dentistry at the University of Bonn, Germany. He has served on the executive committee of the European Federation of Periodontology (EFP) as chair of its research committee (2004-2010), as a board member (2012-2017), and as president (2015-2016). He was also co-chair of the organising committee for the AAP/EFP World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions (2017), and scientific chair of EuroPerio9 (2018). Prof Jepsen has lectured and published extensively, has received numerous awards, and is associate editor of the *Journal of Clinical Periodontology* and an editorial-board member of *Clinical Oral Implants Research*, the *European Journal of Oral Implantology*, and the *Chinese Journal of Dental Research*.

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New Classification
of periodontal and peri-implant diseases

New Classification of periodontal and peri-implant diseases and conditions

The New Classification is the product of the World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions, held in Chicago in November 2017. The World Workshop was organised jointly by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) to create a consensus knowledge base for a new classification to be promoted globally. The New Classification updates the previous classification made in 1999. The research papers and consensus reports of the World Workshop were published simultaneously in June 2018 in the EFP's *Journal of Clinical Periodontology* and the AAP's *Journal of Periodontology*. The new classification was presented formally by the two organisations at the EuroPerio9 congress in Amsterdam in June 2018.

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About the EFP

The European Federation of Periodontology (EFP) is an umbrella organisation of 35 national scientific societies devoted to promoting research, education, and awareness of periodontal science and practice. It represents more than 14,000 periodontists and gum-health professionals in Europe alone. In addition to 31 European members, the EFP has recently welcomed four international associate members from Asia, the Middle East, and Latin America.

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European Federation of Periodontology
Avenida Doctor Arce, 14. Office 38
28002 Madrid
Spain