

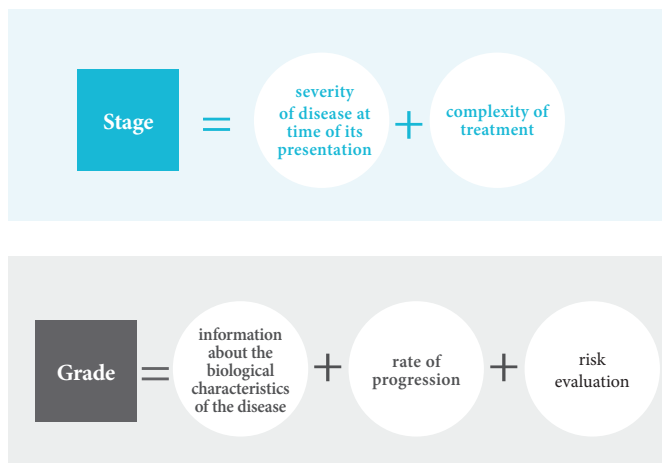
Applying the new classification of periodontitis to clinical cases

The EFP is actively encouraging clinicians to adopt the new classification of periodontal and peri-implant diseases and conditions. In April 2019, the federation published a toolkit for clinicians which includes a step-by-step “decision tree” algorithm for diagnosing cases of periodontitis. The following two clinical case studies, written by Spanish periodontists, apply the new classification to existing patient cases, showing how clinicians can apply the different steps explained in the new classification to establish the stage and the grade of periodontitis.

Generalised periodontitis, stage I, grade B

(By María Rioboo, Ignacio Sanz Martín, Ana Marcos Terán, Ion Zabalegui, and Marta Escribano)

A 28-year-old male patient, systematically healthy, who smokes five cigarettes per day, attends the clinic on the recommendation of his orthodontist. He is the bearer of a fixed orthodontic apparatus. He is an oral breather, and in the oral anamnesis a large accumulation of bacterial plaque is detected, along with gingival inflammation, bleeding, and food impaction. He does not perform correct oral hygiene and does not mention interproximal cleaning. In terms of dental history, he does not



Step 3c: To distinguish if it is stage I or II, we focus on the percentage of bone loss, which in this case is less than 15%, and on the attachment loss, which is of 1-2mm. Thus, the patient can be diagnosed as having generalised periodontitis, **stage I**.

Step 4: With no patient records available, bone loss is estimated according to age to determine the grade. The bone loss could be estimated at 8% (with a periapical x-ray of the most affected tooth) which, in a patient aged 28 years, would give a result of 0.28, which would indicate grade A. However, the grade is modified by the smoking risk factor as the patient smokes five cigarettes per day. The grade would therefore be **grade B**.

Treatment

After a systemic phase of advice on quitting smoking (the Fargeström test), the basic anti-inflammatory phase is performed, consisting of instructions in oral hygiene plus scaling and root planing in two sessions, together with the adjunctive use of chlorhexidine 0.12%, twice daily for two weeks. In addition, the wisdom teeth are extracted for orthodontic reasons.

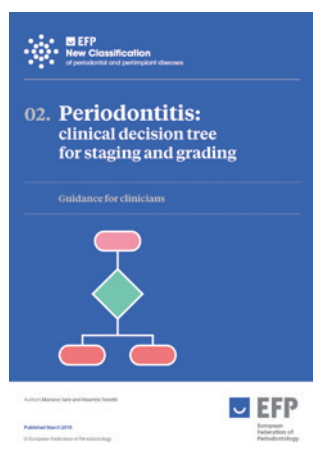


Figure 1. The EFP's toolkit for clinicians on the new classification includes a decision tree for diagnosing cases of periodontitis.

present any missing teeth, caries, or previous restorations.

The patient presents numerous malpositioned teeth, mostly located in the lower arch.

Step 1: In the first visit, marginal bone loss is detected in the bitewing x-rays and it is therefore suspected that this is a patient with periodontitis. A complete periodontal study is performed.

Step 2: On not detecting local factors and with attachment loss greater than 1mm in more than one non-adjacent tooth (the probing depths are greater than 4mm in interproximal), it is confirmed as a case of periodontitis. Step 3 is then

performed to determine the stage and the grade.

Step 3a: At this point, we establish the extent. In this case, the attachment loss affects more than 30% of the teeth (pocket depths greater than 4mm in more than 30%), so it will be treated as **generalised periodontitis**.

Step 3b: Then we must consider the severity to distinguish if the case is in stages I-II or III-IV. The patient presents detectable attachment loss of less than 5mm and radiographic bone loss in the first third of the root, type I furcation, and no missing teeth. The patient thus has stage I or II periodontitis.

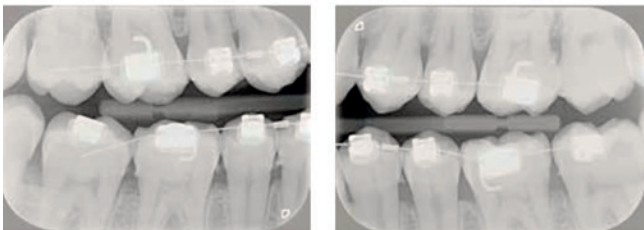
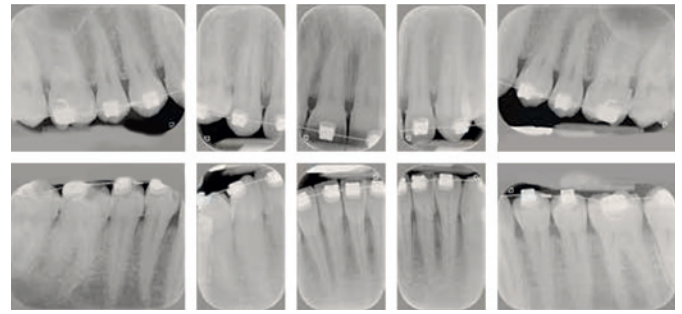
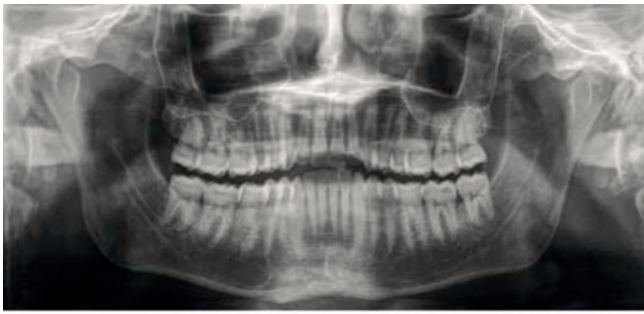


Figure 3. Panoramic x-ray and periapical x-ray series.

Figure 2. Intraoral clinical situation at maximum intercuspitation, bitewing x-rays.

Discussion

A clinical situation that is hard to diagnose is the start of periodontitis in cases where the patient presents signs of gingival inflammation while the bone loss is still not very evident, as in this case. One question in the diagnosis of this case is the extent of the disease, and it is important to establish whether there are

pseudo-pockets and to detect the cemento-enamel junction (CEJ). While the patient does present pockets greater than 4mm in more than 30% of sites, radiographic bone loss seems to be evident in fewer than 30% of sites.

In terms of the stage, the pocket depths of more than 5mm (and a few of more than 6mm) make it difficult to decide whether to classify the case as stage II or even stage III. As described in the implementation of the new classification (Tonetti & Sanz 2019), clinical judgement should be applied using pocket depth (PD) to categorise a patient as one stage or another. In this case, the pocket depths could be attributed to pseudo-pockets as the bone loss is less than 15% and the attachment loss is 1-2mm.

It should be considered that the patient's condition as an oral breather plays a role in the gingival hyperplasia that leads to the formation of pseudo-pockets, which can confuse us when diagnosing the patient.

Reference:

Tonetti MS, Sanz M. (2019). Implementation of the new classification of periodontal diseases: Decision-making algorithms for clinical practice and education. *Journal of Clinical Periodontology* 46, 398-405.

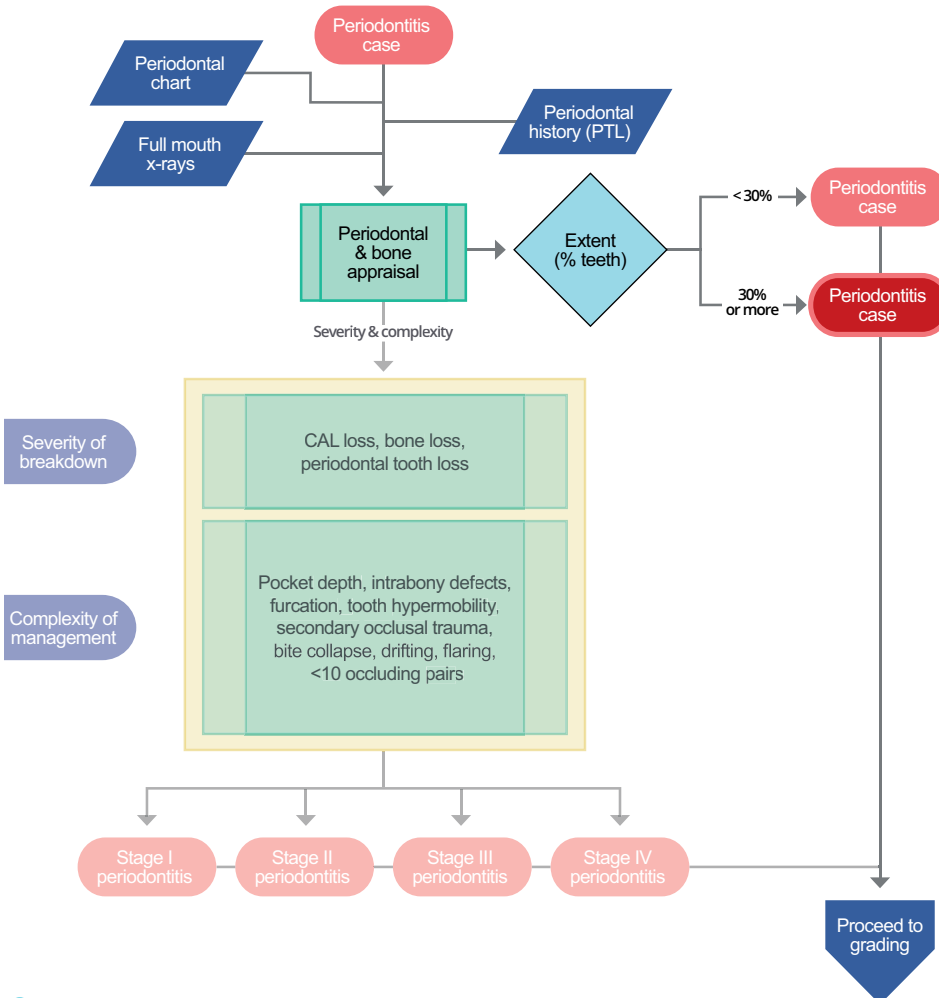


Figure 4. Periodontitis: clinical decision tree.

Generalised periodontitis, stage III, grade B

(By Ana Marcos Terán, María Rioboo, Ignacio Sanz Martín, and Ion Zabalegui)

A 45-year old woman attends the clinic, sent by her general dentist for a periodontal evaluation. The main reason for the consultation is that the patient has noticed bad breath, bleeding, and inflammation over the last four years despite having spent three years in periodontal treatment. In addition, the upper incisors have flared.

In terms of medical history, the patient presents a chronic autoimmune thyroiditis, without need for treatment. She has been an ex-smoker for five years.

The patient's dental history indicates her interest in resolving her periodontal problem, as periodontal access surgery has been performed in the mandible four weeks earlier and prophylaxis has been performed frequently over a long time. She also had orthodontic treatment nine years ago.

No noteworthy signs are found in the extraoral examination, although the intraoral examination detects a congenital diastema between the central incisors (which was treated nine years ago) and an

overbite of 6mm with occlusal trauma in protrusive (eccentric fremitus). The gingiva presents an evident increase in size, change in colour with reddened gums, inflammation – especially in sextant II – as well as loss of the scalloping and texture that is compatible with gingival health.

Original diagnosis

In 2013, the patient is diagnosed, according to Armitage's classification, with a moderate generalised chronic periodontitis, advanced

localised periodontitis, and bleeding on probing of 100%. There was also an overbite of 6mm, an overjet of 4mm, occlusal trauma and fremitus in eccentric dissolution in the anterior front, and augmented congenital interincisal diastema.

Anti-inflammatory periodontal treatment is carried out, consisting of instructions in oral hygiene and scaling and root planing in 24 hours (Full-Mouth Disinfection, Apatzidou & Kinane 2004). After four weeks, full periodontal records are taken to evaluate the response.



Figure 5. Initial clinical appearance with alteration of all the gingival morphological aspects: colour, size, form, and texture.

Later, advanced regenerative periodontal treatment is performed in sextant II with the elimination of the irritants, polishing of the development furrow on the root surface of #11 mesio-palatine, and the application of enamel-derived proteins (Emdogain, Straumann), as well as metronidazole 500mg every eight hours for seven days.

Applying the new classification

To classify this case under the 2017 classification from the World Workshop on Periodontal and Peri-implant Diseases and Conditions ("the World Workshop"), we turn to the decision-making algorithm.

Step 1: Suspecting periodontitis, the patient is offered a complete radiographic examination. The patient brought a panoramic

x-ray and, given the situation with her thyroid, it is decided not to perform a complete periapical series. Two periapical x-rays of the anterior-superior sextant – the most-affected area by attachment loss and marginal-bone loss – are performed.

Step 2: Periodontal probing to record the interproximal attachment loss, which does not involve only local factors, and a complete periodontogram (Florida Probe System) is performed. The patient is a periodontitis case, because interproximal attachment loss, is greater than 4mm at various sites.

Step 3a: A full clinical examination is also performed. The results show periodontal pockets \geq 6mm in 70% of sites, a bleeding

index of 100%, and a plaque index of 48%. She also presents mobility of grade I in the superior incisors. To evaluate the extent of the disease, we analyse whether

the CAL or the bone loss (BL) affects more than 30% of sites. In this case, the 30% figure is surpassed, so it will be classified as **generalised periodontitis**.



Figure 6. Initial panoramic x-ray.

Steps 3b/3c: To establish the stage of periodontitis, we assess the severity (through the CAL, BL and teeth lost because of periodontitis), and the complexity (evaluating the probing depth, PD) of the periodontitis. With this patient, we have a generalised periodontitis, **stage III** (pockets in more than 30% of sites, vertical defect at #11).

Step 4: Complementary diagnostic tests are carried out: volatile sulphurous compounds are measured

(Oral Chroma) and qualitative microbiological analysis is performed using a DNA probe (Sunstar, Guidor). The results reveal the presence of *Porphyromonas gingivalis*, *Tannerella forshytia*, and *Treponema denticola*, all of which belong to the "red" microbial complex (World Workshop 1996), as well as others belonging to the "orange" microbial complex (*Prevotella intermedia*, *Parvimonas micra*, and *Fusobacterium nucleatum*).

Finally, to obtain the grade we evaluate the bone loss/age ratio: the patient presents a bone loss of 75% and an age of 45 years, for which the ratio is greater than 1, with no additional risk factor. The case is thus classified as generalised periodontitis, stage III, **grade B**.

Fortunately, we have information about the development of this case five years later. Periodontal stability is observed both in the clinical images and in the

periodontal and radiographic records, and there is even some clinical attachment gain as well as the partial correction of the diastema.

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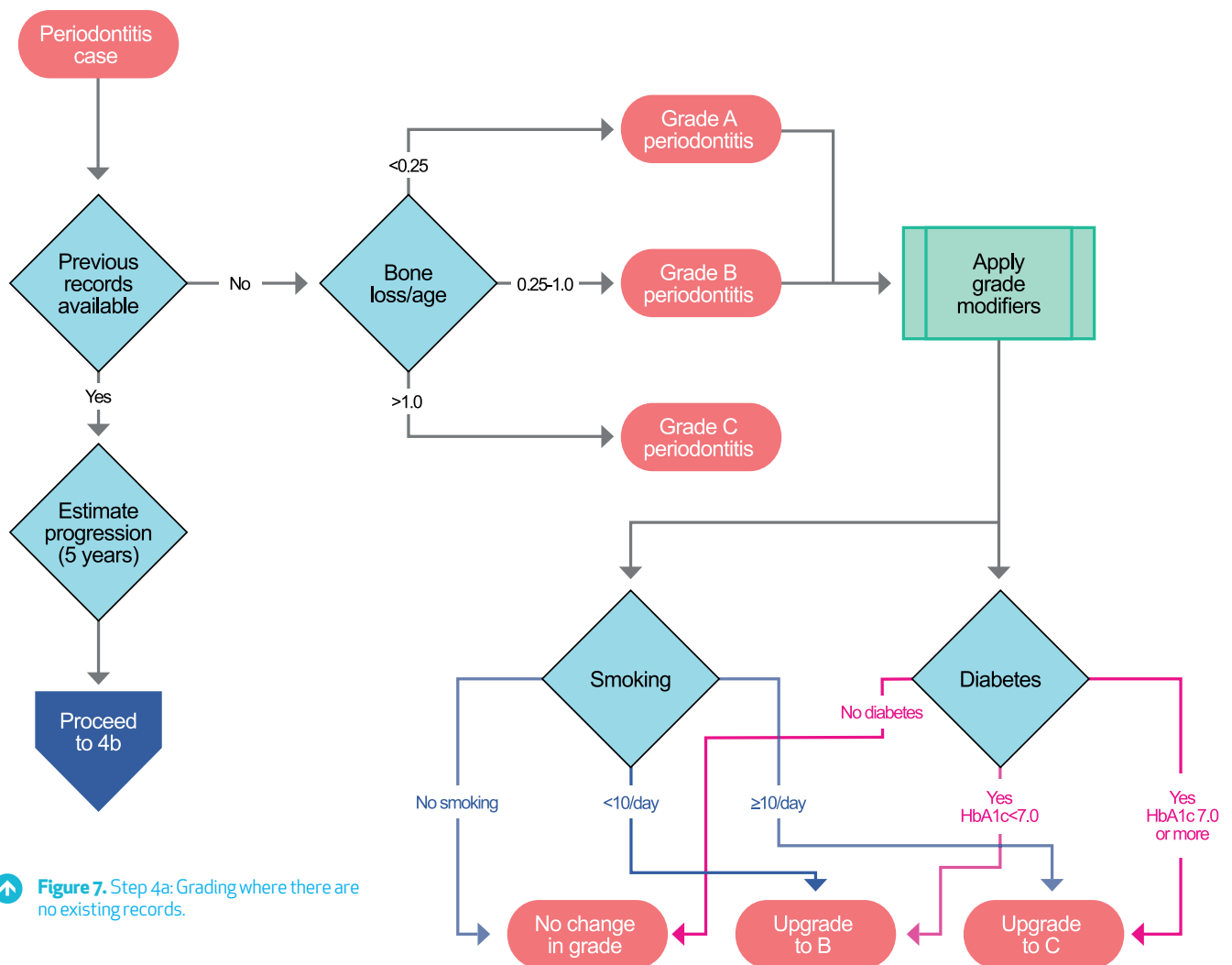


Figure 7. Step 4a: Grading where there are no existing records.

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Perio Master Clinic 2020: New approaches to combined periodontal regeneration and vertical augmentation

The EFP's Perio Master Clinic 2020, which takes place in Dublin, Ireland, on March 6 and 7, puts the spotlight on challenges related to soft- and hard-tissue aesthetic reconstructions around teeth and dental implants. In the session on "Novel concepts: outlook for the future", Péter Windisch will explore new approaches to combined periodontal regeneration and vertical augmentation. Here, he gives a preview of his presentation.

Although periodontal regenerative therapy has become a successful treatment modality for single intrabony defects, non-favourable or confluent defect morphologies that involve multiple teeth still require resective treatment for either root or tooth.

At the epicentre of large periodontal defects, there is often a hopeless tooth with advanced periodontal bone loss extending to the proximal surface of neighbouring teeth, compromising their periodontal status and prognosis. Implant placement for these sites is challenging because of the following four factors, which influence and can compromise the outcome:

- the existing extensive bone loss – missing buccal bone around hopeless teeth;
- further bone loss following tooth extraction;
- the involvement of the interdental proximal bone;
- the distorted mucogingival conditions.

In these cases, complex rehabilitation is required with a step-by-step surgical protocol.

Tooth extractions and remaining alveolar-ridge characteristics are the focus of implant therapy. The timing of implant placement is mainly determined by the healing characteristics of post-extraction soft and hard tissue, and the aim is to achieve or maintain a natural tooth-like appearance of implant-borne restorations. Severe (horizontal-vertical; vertical) alveolar-ridge deficiencies that are left for spontaneous healing require extensive surgical procedures to regain the desired function and aesthetics of any compromised site before implants can be placed (Urban et al. 2009).

In dehiscence-type extraction defects – EDS: Extraction Defect Sounding: Class I and Class II (Caplanis et al. 2005) – an immediate or early implant placement with a single-stage guided bone regeneration (GBR) and contour augmentation (Buser et al. 2008) can be carried out.

Proper post-extraction defect management could reduce the amount of tissue loss and therefore the invasiveness of late-treatment therapy.

However, this protocol cannot be implemented if the remaining bone does not allow the proper implant placement or if neighbouring proximal bone is also destroyed. The presence of a maintained proximal bony peak is vital for the functional and aesthetic outcome of the case. Furthermore, the proximal bony peak marks the most coronal extent of vertical augmentation procedures. Conventional surgical protocols describe successful treatment at either end of the spectrum – but there are cases in between, where a different approach can have a beneficial effect.

In order to reduce the amount of further bone loss and improve interproximal hard-tissue dimensions, an alveolar ridge preservation procedure – Extraction Site Development, XSD (Molnár & Windisch 2019) – may be performed immediately after tooth extraction.

With this technique, a two-layer tunnel-like flap with a modified GBR approach is applied. As a result, the often-missing buccal bone wall (EDS: Extraction Defect Sounding: Class III and Class IV) can be re-established by increasing the space below the membrane to allow an enlarged blood-clot formation. Instead of introducing non-resorbable graft particles into the extraction socket, this technique enhances the regenerative capabilities of the body – to a certain extent – where not only does the extraction defect show bone fill, but the proximal bony peak is also improved. XSD reduces the need for further vertical augmentation.

This step-by-step approach can reduce patient morbidity and the invasiveness of surgical interventions, with an attempt to maintain or re-establish the lost tissues by enhancing the natural healing process with only minor augmentation necessary.

Péter Windisch is professor of the Department of Periodontology at Semmelweis University in Budapest, Hungary.

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Hard- and soft-tissue aesthetic reconstructions
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EFP Postgraduate Symposium highlighted clinical cases on wide range of periodontal conditions

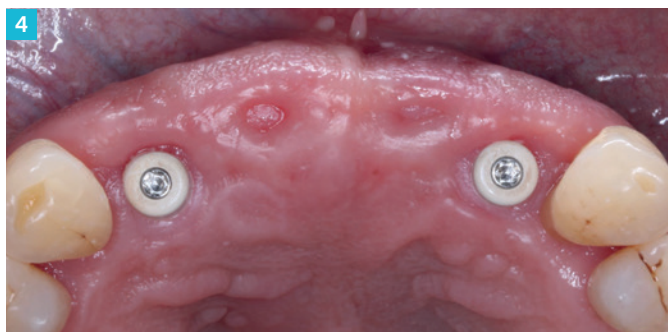
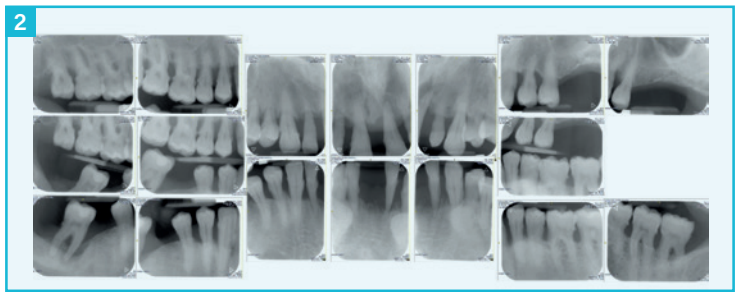
The 8th EFP Postgraduate Symposium, held in September 2019 in Gothenburg, Sweden, was a showcase for the excellence of the university departments that teach the EFP-accredited postgraduate programme in periodontology. The previous issue of *Perio Insight* provided summaries of the research presentations made by students, and here we offer two of the clinical cases presented, with more to come in future issues.

Diabetes patient seeks second opinion on treatment plan

(Emma Busom, International University of Catalonia, Barcelona, Spain)

A 52-year-old male patient was referred to the department of periodontology asking for a second opinion on his treatment plan, after his previous dentist had offered him a treatment based on extractions and full-arch prosthesis over implants in both arches. **Figure 1:** The patient presented great amounts of plaque and calculus. **Figure 2:** He was diagnosed with generalised periodontitis, stage IV, grade C. **Figure 3:** Orthodontic treatment (12 months) was performed from canines to first molars to position teeth correctly to reduce occlusal trauma and close the

open contacts. **Figure 4:** Two bone-level implants were placed in the position of the lateral incisors, sockets were grafted with a xenograft to preserve the volume, and a connective tissue graft was placed in 2.1 to avoid the collapse of soft tissues. **Figure 5:** In the lower arch, two bone-level implants were placed in the position of the lateral incisors. **Figure 6:** After eight weeks, Poly(methyl methacrylate) (PMMA) milled provisionals were placed. **Figure 7:** At the final re-evaluation, the patient presented no PPD ≥ 6 mm and BoP was 4.7%.



Aesthetic problems with the lower teeth, orthodontics, and the restoration of the patient's entire dentition

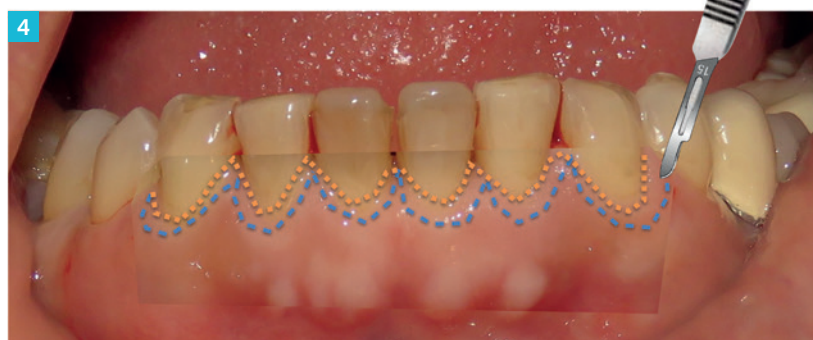
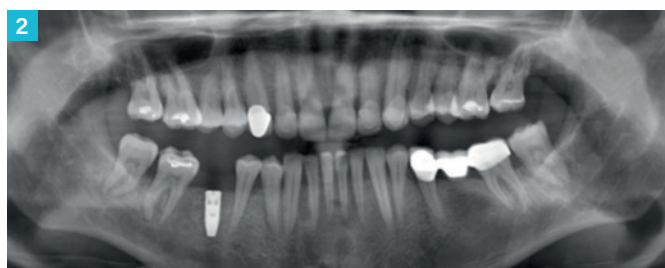
(Deniz Findik, Yeditepe University, Istanbul, Turkey)

A 50-year-old female patient was referred to a training and research hospital from a private practice because of her main complaint - that her lower teeth were not visible.

She was first referred to the prosthodontic and orthodontic departments. She was diagnosed with myofascial pain/muscle spasms and a stabilisation splint was made. After orthodontic evaluation, it was concluded that she needed a complex orthodontic treatment, but she refused the optimal orthodontic treatment plan. Her lower anterior teeth were aligned and intruded,

an implant was placed, and the patient was then referred to the periodontology department.

Figure 1: The lower anterior teeth were aligned and intruded. **Figure 2:** Radiographic examination, at the time of periodontal referral. **Figure 3:** Intraoral photograph of frontal view, mouth slightly open. **Figure 4:** Line of incision. **Figure 5:** Soft-tissue recontouring and levelling of the upper anterior area. **Figure 6:** Third recall session, one year after cementation.



Latest research

Journal of Clinical Periodontology

Periodontitis and cardiovascular diseases: Consensus report

There is strong epidemiological evidence that periodontitis increases the risk of future atherosclerotic cardiovascular disease, according to the consensus report from the Perio-Cardio Workshop, an expert meeting organised by the European Federation of Periodontology (EFP) and the World Heart Federation (WHF).

The Periodontitis and cardiovascular disease: Consensus report – published simultaneously in the EFP's *Journal of Clinical Periodontology* and the WHF's *Global Heart* – explains the latest evidence on the associations between the two diseases and provides recommendations for dentists, doctors, and patients.

Both cardiovascular disease and periodontitis are chronic non-communicable diseases. Periodontitis has an overall global prevalence of 45-50% and its severe form affects 11.2% of the world's population, making it the sixth most common human disease.

Cardiovascular disease is responsible for 17.9 million deaths per year worldwide (one third of all deaths), including 3.9 million in Europe (45% of all deaths), with ischaemic heart disease, stroke, and hypertension leading to heart failure the main causes. Although mortality rates are falling, the absolute numbers have increased over the last 25 years because of an increasingly ageing population.

The percentage of deaths from cardiovascular disease is higher in Europe not only because of an ageing population but also because of risk factors associated with a "Western" lifestyle, such as poor diet (high in saturated fats, salt, and refined sugar), obesity, smoking, and lack of exercise. Some of these are also lifestyle risk factors for periodontal disease. The report also highlights the shared genetic risk factors for the two diseases.

'Independent and significant associations'

The report states that severe periodontitis is independently and significantly associated with cardiovascular disease from all causes and with cardiovascular mortality in various populations. Proposed mechanisms to explain this association include bacteraemia and the associated systemic inflammatory sequelae, including elevations in C-reactive protein and oxidative stress.

Exploring the question of whether periodontitis treatment can prevent or delay atherosclerotic cardiovascular disease (ACVD) events, the report says that in terms of primary prevention, progression of ACVD may be influenced by successful periodontal treatment independently of traditional CVD risk-factor management. However, in terms of secondary prevention, there is insufficient evidence to support or refute the potential benefit of the treatment of periodontitis in preventing or delaying ACVD events.

The Perio-Cardio Workshop produced a series of recommendations for oral-health professionals to use in the dental practice with people with cardiovascular disease, for physicians and other medics to use in cardiology practice, and for patients with cardiovascular disease.

For instance, patients with periodontitis should be advised that they have a higher risk of suffering cardiovascular diseases – including myocardial infarction and stroke – and that they should actively manage risk factors (such as smoking, lack of exercise, excess weight, blood pressure, and a diet high in saturated fats and refined sugars). Patients who have both periodontitis and cardiovascular disease should be informed that they may be at higher risk of suffering subsequent cardiovascular complications and that they should therefore stick to recommended dental regimes of prevention, treatment, and maintenance.

Risks and complications

The workshop also reviewed the potential risk and complications of periodontal therapy in patients who are on anti-thrombotic medication and the report provides detailed recommendations in this area. Doctors are advised to liaise closely with dental surgeons in the periodontitis management of CVD patients on anticoagulant or antiplatelet therapy before any oral intervention or periodontal surgery, as it is very important to avoid excess bleeding or the risk of ischaemic events.

The consensus report was based on four technical papers that systematically reviewed the evidence for epidemiological associations between periodontitis and incident CVD, mechanisms of biological plausibility relating to periodontal bacteria and systemic inflammation (two reviews), and periodontal intervention studies.

The Perio-Cardio Workshop, held in Madrid (Spain) in February 2019, brought together more than 20 experts from the EFP and the WHF to consider the latest evidence on the associations between periodontal and cardiovascular diseases and to update the pioneering work of the IX European Workshop on Periodontology, a joint workshop of the EFP and the American Academy of Periodontology held in 2012, which explored the links between periodontitis and systemic conditions including cardiovascular diseases.






Authors: Mariano Sanz, Alvaro Marco del Castillo, Søren Jepsen, Jose R. Gonzalez-Juanatey, Francesco D'Aiuto, Philippe Bouchard, Iain Chapple, Thomas Dietrich, Israel Gotsman, Filippo Graziani, David Herrera, Bruno Loos, Phoebus Madianos, Jean-Baptiste Michel, Pablo Perel, Burkert Pieske, Lior Shapira, Michael Shechter, Maurizio Tonetti, Charalambos Vlachopoulos, Gernot Wimmer.

Full article: <https://doi.org/10.1111/jcpe.13189>







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