

PERIO-ANALYSE



**How to prevent and cure Periodontal
disease and peri-implantitis using
PERIO-ANALYSE Testing**

Periodontal bacteria Identity and associated risks

The origin of periodontal disease is the formation of bacterial biofilm with specific pathogenic bacteria. The pathogenic bacteria are also present in the saliva of patients. The colonization of the mouth by periodontal bacteria can take place at an early age of the patient but can also take place after dental implant installation (peri-implantitis) if the patient was not being properly treated against pathogenic bacteria or having poor oral hygiene.

- ✓ The non-existence in the oral cavity of a certain pathogenic bacteria strain will guarantee the absence of periodontal disease or peri-implantitis
- ✓ The presence of certain pathogenic bacteria strains and fungus at a certain level will increase the risk of periodontal disease or peri-implantitis.

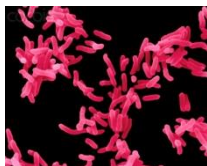
List of pathogenic bacteria strains and fungus associated with risk of periodontal disease or peri-implantitis is:

- *Aggregatibacter actinomycetemcomitans*
- *Porphyromonas gingivalis*
- *Tannerella forsythensis*
- *Treponema denticola*
- *Prevotella intermedia*
- *Peptostreptococcus micros*
- *Fusobacterium nucleatum*
- *Campylobacter rectus*
- *Eikenella corrodens*
- *Candida albicans*

- a) A great number of periodontal disease cases can be treated and maintained under control for many years by dental hygienists according to the traditional process of surgical mechanical actions, such as radicular surfacing and under-gingival de-scaling associated with hygiene protocol and some local antibiotics in case of need. The choice of the therapy depends on the composition of the sub-gingival microflora.
- b) However, with presence of aggressive, anaerobic pathogenic bacteria, these methods are not enough to eliminate them from the sulcus. Consequently, some bacterial strains are responsible for a fast decomposition of the alveolar bone. In that situation, a personalized **antibiotic therapy** can be prescribed after bacterial identification by Perio-Analyse in combination with a meticulous cleaning of the pockets by surgery. Certain aggressive, anaerobic pathogenic bacteria are inside the soft tissue (intracellular) and require **surgical procedure** to eliminate contaminated soft and hard tissue, associated with specific antibiotic (pills). In this situation, it could be recommended to the hygienist to refer the patient to a dentist specialized in treatment of periodontal disease and surgery.

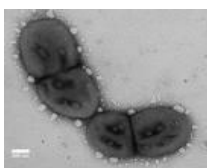
The list of pathogenic bacteria strains to be at high risk for rapid bone destruction and need specific treatment by a specialized dentist is:

- *Aggregatibacter actinomycetemcomitans*



A.a is sensitive to New Quinolone, Penicillin and Tetracycline, but is practically insensitive to Metronidazol. There is a strong relation with the youthful periodontitis (very high). Bone lost could be more than **3 mm in 2 months with only 10^5 bacteria** into the pocket (Haffajee 1994). Antibiotics are always necessary and gingioplasty could be recommended in some cases to eliminate soft tissue. A.a. is transmissible in particular between parents and children.

- *Porphyromonas gingivalis* (if present at a certain quantity)



Porphyromonas is sensitive to Tetracycline and Penicillin. Bone lost could be more than **2mm in 2 months with only 10^5 bacteria** into the pocket (Haffajee 1994). Pg is transmissible between parents and children and between partners.

Periodontal disease antibiotic therapy has to be prescribed with a microbiological analysis (1, 2) to identify and quantify the exact bacteria present in the sulcus and decide the efficient antibiotic, reduce antibiotic resistance and treatment failure.

The success of the long-term treatment is assured only if the patient practices good oral hygiene and follows a monitoring program organized by hygienist with regular Perio-Analyse controls.

Hygienist also have to be involved in good oral hygiene of patients who require dental implant. During the last decades, dental implants became an alternative treatment to removable prostheses. However, patient suffering from periodontal disease are at risk of new bacterial infection around the dental implant (called peri-implantitis) reducing life cycle (3). Peri-implantitis (osseous loss is higher or equal to 1.8 mm after one year and associated with a bleeding and/or a suppuration) increase at 16% of the patients and around 6.6% of the implants (4, 5).

The microbial colonization associated with peri-implantitis is similar to bacteria identified during periodontal disease (6, 7, 8, 9, 10, 11) however high level of some bacteria seems more associated with peri-implantitis (11, 12).

Periodontal disease bacterial translocation could be highlighted as the source of peri-implantitis. Indeed, gingivo-dental pockets of the adjacent teeth, as well as surrounding soft tissue, such as the back of the tongue, mucous membranes are bacterial tanks able to provide bacteria sources and finally the colonization of the dental implant.

Antecedents of periodontal diseases must be regarded as a risk factor (11, 13, 14, 15, 16) and patients presenting an untreated or refractory periodontal disease present an increasing risk of complications.

Moreover, some fungus, like *Candida albicans*, have been recovered from periodontal pockets in 7,1 to 19,6% of patients with chronic periodontal disease (17) and are a cause of resistance to treatment. *Candida albicans* has also been isolated from periodontal pockets in HIV-positive and diabetic patients. *Candida albicans* can also be associated with peri-implantitis infections (18, 19). *Candida albicans* yeast is a regular inhabitant of the human mucosal surfaces and a part of its microbiota. Oral mucosal surfaces are the primary oral reservoirs of these yeasts, followed by both supra and subgingival biofilm. Antibiotics are not efficient against fungus and local treatment needs to be proposed. Antifungal treatment could be Nystatin, Amphotericin, Miconazol or fluconazole, having local effects.

Taking into account the difficulties of decontamination related even to the design of the implants which aims to optimize bone-integration, a preventive attitude must be the rule, associated with specific brushes and strict maintenance protocols.

Mucosity systematically makes the bed of periodontal infection whereas the passage of the gingivitis to periodontal disease is not in all clinical cases.

Patients having periodontal disease treatment history and smokers appear more likely to develop peri-implantitis.

Dental surgeons must be conscious of the risks of contamination pre-operative and post-operative, and should be able to anticipate the late infectious risk in order to limit the risk of implant infection and failure.

It is important in daily clinical practice to evaluate the biological risk before placing the implants, and supervising the patients after treatment to detect early signs of peri-implantitis infection. The early detection of signs of bacterial risk, the reinforcement of measurements of oral hygiene and the treatments will be able to reduce the bacterial loads and prevent peri-implantitis.

Technical recommendations and objectives

For hygienists, it is advised to carry out an analysis in the following situations:

- first visit
- patient with periodontal disease risk or gingivitis
- patients who smoke
- diabetic patient
- periodontal disease with depth of the pockets > 4mm (in spite of a very good oral hygiene)
- aggressive or progressive periodontal disease
- refractory periodontal disease resistant to the therapy
- periodontal disease evolving/moving quickly
- peri-implantitis risk patient
- 3 months after periodontal treatment starting date
- every 6 months for patients with high risk
- every year for all patients

The objectives of the analysis:

- choice of a suitable antibiotic and treatment in relation with bacterial strain identity
- follow-up of treatment and evaluation of success or failure

- early detection of the secondary infection
- motivation of patient to maintain their treatment and their oral hygiene in the long run

Pathogenic Threshold

Periodontal pathogens are presented schematically within microbiological complexes (Socransky et al., 1998) with different colors.

Complex of Socransky	Bacteria strains	Abbreviation	Threshold of pathogenicity requiring the use of a antibiotic adapted in addition to one mechanical action
Aa	<i>Aggregatibacter actinomycetemcomitans</i>	Aa	$>10^3$ CFU
Red complex	<i>Porphyromonas gingivalis</i> <i>Tannerella forsythensis</i> <i>Treponema denticola</i>	Pg Tf Td	$>10^5$ CFU $>10^5$ CFU $>10^5$ CFU
Orange complex	<i>Prevotella intermedia</i> <i>Peptostreptococcus micro</i>	Pi Pm	$>10^5$ CFU $>10^6$ CFU
Complex Orange Associated	<i>Campylobacter rectus</i>	Cr	$>10^6$ CFU

The PCR microbiological analysis gives a value of quantification (equivalent CFU by sample) of each periodontopathogen as well as the percentage of each bacterial type compared to the total flora.

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Perio-Analyse support

The possible situations are presented schematically within microbiological complexes presence or absence into saliva or pocket

<i>matrices</i>	<i>results</i>	<i>recommendations</i>
<i>saliva</i>	<i>presence of pathogenic bacteria without Aa and/or Pg</i>	<i>control all dental pocket depth radicular surfacing sub-gingival descaling hygiene protocol</i>
<i>saliva</i>	<i>presence of Aa and/or Pg</i>	<i>control all dental pocket depth and use Perio-Analyse for each dental pocket with more than 4 mm radicular surfacing sub-gingival descaling hygiene protocol</i>
<i>dental pocket</i>	<i>presence of pathogenic bacteria over the threshold without Aa and/or Pg</i>	<i>radicular surfacing sub-gingival descaling hygiene protocol tetracycline could be recommended if bacterial amount over the threshold</i>
<i>dental pocket</i>	<i>presence of Aa and/or Pg over the threshold</i>	<i>recommend your patient to a dentist specialized follow Perio-Analyse support</i>