

## **Biocompatible Periodontal Therapy**

*IAOMT Committee on Periodontal Therapy*

Periodontal disease is an infection --- “an invasion by pathogenic microorganisms of a bodily part in which the conditions are favorable for growth, production of toxins, and resulting injury to tissue.” (Webster’s II New Riverside University Dictionary). Pathogens of bacterial, protozoan, viral or fungal origin have been implicated as causal factors in periodontal disease. Its clinical symptoms and progression indicate the body’s defenses are being challenged, and that the immune system is unable to adequately defend against the invaders. It is also important to note that recent research has demonstrated serious cardiovascular and other health risks associated with high levels of proteolytic enzymes and endotoxins produced by the pathogens most commonly associated with active periodontal disease.

Periodontal disease is a long-term chronic degenerative disease. It is often refractory, in that it may be periodically active or dormant depending on the effect that environmental or acquired risk factors (e.g., smoking) have on host immuno-inflammatory response to the microbial challenge.

Because the understanding of periodontal disease has improved dramatically, treatment methods have been changing. Today the treatment of choice takes into account both local factors and systemic risk factors, and treats causes, not just effects. The goal is to help patients achieve optimal long-term periodontal health and maximize their resistance to periodontal infection. The treatment of choice is no longer removal of healthy or potentially healthy body parts.

<b>Phases of Biocompatible Periodontal Therapy:</b> .....	2
<b>I. Diagnosis</b> .....	2
<b>Clinical tests</b> .....	2
<b>Microbiological tests</b> .....	3
<b>Diet Pattern Analysis:</b> .....	3
<b>Medical Evaluation and Systemic Tests:</b> .....	4
<b>II. Treatment:</b> .....	4
<b>Objectives:</b> .....	4
<b>Procedures at All Appointments:</b> .....	5
<b>First Appointment:</b> .....	5
<b>Professional Sequence of Care - Alternative Treatment Philosophies:</b> .....	5
<b>Subsequent Appointments:</b> .....	5
<b>Initial Therapy End Point:</b> .....	6
<b>Surgery:</b> .....	6
<b>III. Maintenance:</b> .....	6
<b>Further Thoughts for Consideration:</b> .....	6
<b>Definition of irrigation:</b> .....	7
<b>References:</b> .....	7

## **Phases of Biocompatible Periodontal Therapy:**

Diagnosis

Treatment

Maintenance and Prevention

### **I. Diagnosis**

#### **Clinical tests**

1. Periodontal Probing: Sulcus depth by itself does not indicate disease or health. Shallow sulci are not necessarily healthy or protective. If periodontal disease results in deeper pockets, it obviously originates in shallow pockets. Absolute probing depths are not predictive of future attachment loss. Changes in attachment >2mm over time, however, are pathologic. Probing sites exceeding 3 mm should be considered to be at greater risk, but increased pocket depth, per se, does not constitute disease and many deep pockets may be free of infection.
2. Tissue Tone: Periodontal tissue should be pink and firm, or may possibly be pathologic. Edema and erythema, however, are not dependable signs of periodontal disease since they may result from other causes, including systemic medications (e.g. the diuretics used by 20% of adults), local trauma, transient hormonal effects and other syndromes.
3. Bleeding on Probing or Manipulation: Bleeding from the gingiva is not healthy any more than bleeding from any other body tissue. It is not, however, predictive of future attachment loss as it is frequently associated with and confounded by non-periodontal causes.
4. Odor or purulent discharge: A fetid odor and metallic taste are the classic symptoms of periodontal infection. Odor and pus from the gingival are signs of disease.
5. Recession or “notching” (abfraction): While not an indication of infection, this may be a sign of occlusal problems. Occlusal problems can overwhelm a periodontium that has lost supporting bone.
6. Mobility: Healthy teeth with a healthy periodontium are not mobile outside of physiologic limits. Malocclusion cannot initiate periodontal disease, but may exacerbate it.
7. Connective Tissue Destruction and Bone Loss: Radiographically, apical migration of the connective tissue attachment and alveolar bone loss are characterized by a lack of cortication of the interproximal alveolar crest and periodontal pocket formation. Although radiographic evidence may indicate that active periodontal infection was present at some time in the past, it does not indicate the presence of active infection nor is

it predictive of future attachment loss. Dense cortication of the alveolar crest and a lack of attachment loss are generally regarded as a sign of periodontal health.

### **Microbiological tests**

#### 1. Microscopic Examination:

- a. Phase contrast microscopy is the quickest and most cost-effective clinical method of evaluating microbiological risk factors at individual periodontal sites.
- b. Phase contrast microscopy is the only chairside method of determining the relative immune status of patients at individual periodontal sites by analysis of local WBC counts.
- c. Phase contrast microscopy is also the only practical chairside method of determining the presence of a wide range of putative periodontal pathogens, including: protozoans (amoebae & trichomonads); treponemes (spirochetes); fungi and yeasts. A number of other risk factors can be identified through microscopy, including: motile microorganisms; colonial patterns; and the relative numbers and proportions of bacterial morphotypes. Approximately 5% of refractory periodontal infections cannot be diagnosed through microscopy. Such infections are often the result of incomplete or inadequate therapy, which eliminates the natural antagonists of otherwise innocuous oral microorganisms. The resultant superinfection may have no microscopically obvious morphological distinguishing characteristics.

#### 2. Culture & Antibiotic Specificity Testing:

Cultures for laboratory analysis should be taken in the following circumstances:

- a. Whenever the use of systemic antibiotics is contemplated. Many periodontal pathogens are resistant to traditional antibiotics. Culture labs automatically test positive microorganisms for specific antibiotic susceptibility.
- b. When phase contrast microscopy is negative, and there are obvious clinical signs or symptoms of periodontal disease and its progression.

### **Diet Pattern Analysis:**

If the balance of host immune response can be tipped by the chronic deficiency of a single essential micro-nutrient (e.g., scurvy and lack of vitamin C), and the microbial challenge can be intensified by a diet high in simple sugars, then some basic form of dietary adjustment is in order with the possibility of supplement addition to the diet. Trying to satisfy the body's basic vitamin and mineral needs through the diet is almost impossible without supplementation.

Hair Analysis: Helpful many times, particularly with class III & IV periodontitis. This provides a measure of general nutrition status. Hair analysis is of questionable value to patients who use strong bleaching or coloring agents.

Micronutrient Analysis: When diet pattern analysis fails to reveal potential excesses or deficiencies, then a micronutrient analysis by a registered dietitian or nutritionist may be recommended.

### **Medical Evaluation and Systemic Tests:**

Systemic health problems (e.g., diabetes) can cause a deterioration of nerves and blood vessels and can dramatically affect host immuno-competency and resistance to periodontal infection. When local etiological factors and diet patterns cannot explain an impaired or exaggerated soft tissue response to common oral microorganisms, then a medical evaluation may be recommended.

Blood Tests: A complete blood count (CBC) measures the amount of hemoglobin, the hematocrit (percentage of red blood cells), the number and kinds of white blood cells and the number of platelets. This test can indicate a wide variety of systemic conditions that may have an important impact on periodontal health. A blood glucose test can also be used to diagnose Type II diabetes (NIDDM), which may negatively affect oral immune-inflammatory response without having any other outward symptoms. Blood testing may also indicate certain nutritional deficiencies.

Urine Tests: Tests for diabetes and other systemic problems, which may impact the oral immune-inflammatory response.

## **II. Treatment:**

### **Objectives:**

- a. To disinfect the mouth and eliminate periodontopathic microorganisms.
- b. To remove as little healthy tissue (including cementum) as possible. Once the infection has been controlled and the body given a chance to heal itself, re-evaluate the need to excise any residual diseased or necrotic tissue
- c. To remove calculus deposits, which obstruct access to the base of the pocket or defect.
- d. To ensure that the patient has good nutritional function and no other lifestyle risk factors such as smoking.

### **Procedures at All Appointments:**

- a. Disinfection of the periodontium and oral cavity.
- b. Nutritional Status Assessment: Patient must be assessed and supplemented when appropriate. Periodontal disease is not simply microbial but also the result of immunosuppression.

### **First Appointment:**

- a. Pre-scaling rinse with an antimicrobial agent to reduce contaminated aerosols & general microbial loads.
- b. Gross scaling with an ultrasonic scaler to remove bulk debris. Use an antimicrobial agent in lieu of water as coolant to further reduce microbial loads.
- c. Subgingival irrigation to deliver antimicrobial agents to the apical depth of periodontal pockets.
- d. Patient as Co-therapist: Patient is thoroughly instructed in appropriate oral hygiene techniques, including oral irrigation and brushing. Patient must be willing to follow a meticulous regimen of home care and proper nutrition to support professional treatment.

### **Professional Sequence of Care - Alternative Treatment Philosophies:**

Conservative Option: Mechanical debridement and local antimicrobial agents used. Systemic antibiotics used only if local measures fail to eliminate the infection.

Aggressive Option: Systemic antibiotics prescribed ASAP in advanced disease for early and optimal elimination of pathogens.

Home Care and Nutritional Option: Professional care instituted only after patients nutritional needs have been addressed and the patient has instituted proper oral hygiene techniques.

### **Subsequent Appointments:**

- a. Pre-scaling rinse with an antimicrobial agent to reduce contaminated aerosols & general microbial loads.
- b. Definitive quadrant scaling. Ultrasonic scalers may substitute for traditional manual scaling. Antimicrobial agents should be used in lieu of coolant.
- c. Subgingival irrigation with antimicrobial agents of all quadrants during each quadrant appointment.

- d. Re-evaluation of the effectiveness and compliance with home care measures via phase microscopy.

**Initial Therapy End Point:**

- a. Absence of microbiological risk factors.
- b. Clinical signs and symptoms consistent with health.
- c. Attaining an abstract and idealized pocket depth is not a goal of biocompatible periodontal therapy.

**Surgery:**

Indicated as a limited therapy of last resort if areas do not respond to the above therapy  
When surgery performed in limited areas, it will be to determine what is preventing healing

**III. Maintenance:**

Frequency: Individually determined as demonstrated by clinical and microbial parameters.

Best way to determine frequency: Phase Contrast Microscope.

- a. Negative microbiological risk: 1 year or four consecutive preventive appointments – 3 month interval.
- b. Most patients with class 3 or 4 periodontitis should be seen on a 3 month preventive basis.
- c. Continued microbiological risk: 2 month interval is indicated.

(Irrigant use: Same as above.)

**Further Thoughts for Consideration:**

Pre-medication: for patients with mitral valve prolapse or other valvular problems with regurgitation

Irrigation: Any one needing pre-medication according to the published guidelines should be irrigated with antiseptic solution before any therapy that may lead to bleeding (Included in this is Rheumatic Heart Disease, Mitral Valve Prolapse, Prosthetic Heart Valves, Prosthetic Joint Replacement or Reconstruction, Atherosclerosis and Congenital Heart Disease).

Irrigants: Use the most non-toxic substances available, which will do the job, and which are appropriate for the patient.

**No More Root Planing!** The practice of root planning, as taught in the dental schools throughout the world, is outdated and unnecessary. The concept of removal of healthy root structure in the name of curing disease is outdated and unnecessary. Since this is a disease caused by microbes, the excision of healthy tissue is to be condemned. *The goal of Biocompatible Periodontal Therapy is the elimination of the infections, not the elimination of tooth structure.*

### **Definition of irrigation:**

Irrigation is the process of using an oral irrigator (e.g., the Water-Pik, Viajet, or Hydrofloss) to introduce water (with or without an antiseptic solution) into the sulcus and interproximal areas to flush away microbial plaque.

Supragingival irrigation may be used under high pressure when directed 90° to the long axis of the tooth facially & lingually. This neutralizes the proteolytic enzymes and endotoxins generated by the microorganisms in the plaque by both direct flushing or, when held for 3-4 seconds, by setting up a suction through hydrodynamic forces which disrupt the intercellular plaque matrix. It also reduces interproximal stagnation by increasing healthy gingival circulation interdentially.

Subgingival irrigation is also effective when used as a delivery system to introduce antimicrobial agents directly into the gingival sulcus (0-3 mm depth) or periodontal pocket (> 3 mm depth) under the irrigator's lowest pressure. In the office, delivery of antimicrobial agents to the bottom of the sulcus or pocket is done by a trained professional with a side-port cannula. At home, the patient who has been trained by this dental professional aims a special tip directly into the sulcus or pocket.

“Rinsing” is not irrigation. Rinsing or flushing the mouth cannot get fluids into the sulcus or pocket to disrupt the plaque or neutralize pathogenic endotoxins.

Irrigation, while absolutely necessary for the biologically compatible control of periodontal infection, does not take the place of sulcular brushing, gum massage, and general cleaning of the mouth with a soft nylon brush, proxabrushes, end-tuft brushes, etc. All of these oral hygiene methods contribute to elimination of the infection and are encouraged.

### **References:**

1. S. Renvert, et. al., “Treatment of Periodontal Disease Based On Microbiological Diagnosis, Relation Between Microbiological and Clinical Parameters During Five Years”; Journal of Periodontology: 1996: 67: 562-571

2. E. Corbet, et. al., "The Periodontally Involved Root Surface"; *Journal of Clinical Periodontology*. 1993: 10: 402-410.
3. P. Baehun, et. al., "Effects of Ultrasonic and Sonic Scalers on Dental Plaque Microflora in Vitro and in Vivo"; *Journal of Clinical Periodontology*. 1992: 19: 455-459.
4. G. Rosling, et. al., "Topical Antimicrobial Therapy and Diagnosis of Subgingival Bacteria in the Management of Inflammatory Periodontal Disease"; *Journal of Clinical Periodontology*. 1986: 13: 975-981.
5. S. Asikainen, et. al., "Can One Acquire Periodontal Bacteria and Periodontitis From a Family Member?"; *JADA*. Vol. 128, September, 1997: 1263-1271.
6. H. Slavkin, et. al., "Does the Mouth Put the Heart at Risk?"; *JADA*. Vol. 130, January, 1999: 109-113.
7. Offenbacher, et. al., "Potential Pathogenic Mechanisms of Periodontitis Associated Pregnancy Complications"; *Ann Periodontics*. 1998: 3 (1): 233-250.
8. M. Navazesh, et. al., "Systemic Dissemination As a Result of Oral Infection in Individuals 50 Years of Age and Older"; *Special Care in Dentistry*. Vol. 15, No. 1, 1995.
9. U. R. Dahle, et. al., "Spirochaetes In Oral Infections". *Endodontic Dental Traumatology*. 1993: June; 9 (3): 87-94.
10. W. Loesche, "Association of the Oral Flora with Important Medical Diseases". *Current Opinion in Periodontology*. 1997: 4: 21-28.
11. J. Abrahams, "Dental Disease: A Frequent Unrecognized Cause of Maxillary Sinus Abnormalities?"; *American Journal of Radiology*. 1996: 166: 1219-1223.
12. F. A. Scannapieco, et. al., "Periodontal Disease as a Potential Risk Factor for Systemic Diseases". *Journal of Periodontology*. 1998: 69: 841-850.
13. W. Loesche, et. al. "Periodontal Disease as a Risk Factor for Heart Disease". *Compendium of Continuing Education in Dentistry*. 1994: 15 (8): 976-991.
14. D. H. Fine, et. al., "Assessing pre-procedural Subgingival Irrigation and Rinsing with an Antiseptic Mouthrinse to Reduce Bacteremia". *JADA*, Volume 127, May, 1996: 641-646.
15. A. C. Fonder. The Dental Physician; Medical-Dental Arts, 1985.
16. Newman and Kornman. Antibiotic /Antimicrobial Use in Dental Practice; Quintessence Publishing Co., Inc., 1990.
17. Cheraskin and Ringsdorf. The Vitamin C Connection; Harper and Row, 1983.
18. Kennedy. How To Save Your Teeth; Health Action Press, 1993.