

# Upsetting the Underworld of Biofilms With Subgingival Air Polishing

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**Guided Biofilm Therapy – the intentional removal of supra and subgingival biofilm with Air Flow technology and low-abrasive powder *prior to power and/or hand instrumentation* for the benefits of efficiency, comfort, accessibility, preservation of tooth surfaces, restorative materials and periodontal tissues.**

## PATHOGENIC BIOFILM IS THE ENEMY!

- Health exists in homeostasis / Dysbiosis = Disease in Susceptible Hosts
- Keystone Pathogen Hypothesis / Polymicrobial Synergy & Dysbiosis
- Microbiota of pathogens, commensal bacteria, viruses in balance during homeostasis
- Microbiota begin to interact synergistically with distinct but defined roles
- Keystone Pathogens (*P. gingivalis*) evades the host response & orchestrates a shift from balanced environment to imbalanced
- *P. gingivalis*, *T. denticola* & *T. forsythia* are virulent pathogens & are “inflammophilic”
- “Periodontal biofilm’ fosters growth of pathogenic bacteria & pro-inflammatory cytokines released
- Nutrients from inflammatory tissue breakdown sustain dysbiotic microbiota
- Dysbiosis & inflammation reinforce each other in biofilm
- The imbalance of periodontal pathogens and accessory microorganisms activates an innate immune response (first-responders) and adaptive immune response (second responders) creating an abundance of proinflammatory cytokines
- What begins, as a rescue to put out a campfire, can become a forest fire depending upon the host, which is influenced by behavioral, environmental and genetic factors
- Inadequate resolution of the inflammatory condition and failure to return tissue to homeostasis results in neutrophil-mediated destruction and chronic inflammation
- Increase in cytokines essentially becomes “metastatic inflammation”
- Intervention to remove disease-promoting biofilm is required to drive down inflammation
- Altering the host response to reduce inflammation can alter the outcome

## **Oral Pathogens and Cancer:**

- OSCC – P. gingivalis & F. nucleatum
- Pancreatic cancer – P. gingivalis & A. actinomycetemcomitans
- Colorectal cancer – F. nucleatum
- Esophageal cancer – P. gingivalis

“Oral Bacteria & Cancer” PLOS Pathogens 2014

Infectious Agents & Cancer 2016

“Periodontal disease increases risk of total cancer among older women (54 – 86), irrespective of smoking and certain anatomic sites appear to be vulnerable.” (Breast, lung, esophageal, gallbladder and melanoma skin cancers)

Cancer Epidemiology, Biomarkers & Prevention 2017

## **Opportunities to alter the host response:**

### **Reduction of systemic inflammation**

- Diet modification – anti-inflammatory (low sugar, low refined carbs, healthy oils, increase plant-based choices)
- Increase Omega 3 fatty acids – dampen inflammation (900mg EPA+DHA/day)
- Stress management & exercise – strengthen immune response

### **Botanicals/Antioxidants to reduce oral inflammation**

- Periosciences topical antioxidants – Gel, mouth rinse and toothpaste. Synergistic effect of antioxidants and essential oils. Anti-inflammatory, anti-bacterial, reduces oxidative stress [www.periosciences.com](http://www.periosciences.com)

### **Adjunctive Agents to alter the host response & reduce oral inflammation**

- Arginine – increases the pH (Basic Bites®)
- Xylitol / Erythritol – inhibits bacterial growth, alters the pH (Spry®, Epic®)
- Rx: Low Dose Doxycycline – reduces collagenase, MMPs & collagen degradation
- Low dose hydrogen peroxide – antimicrobial, anti-inflammatory (Perio Protect®)

For Additional Information - [PubMed](#)

*Molecular Aspects of the Pathogenesis of Periodontitis 2015*

*Polymicrobial Synergy and Dysbiosis in Inflammatory Disease 2015*

*Host-Response Mechanisms in Periodontal Diseases 2015*

*Environmental Stimuli Shape Biofilm Formation and the Virulence of Periodontal Pathogens 2015*

*Periodontal Disease and Bone Pathogenesis: The Crosstalk Between Cytokines and *Prophyromonas Gingivalis* 2015*

*Porphyromonas Gingivalis: An Overview of Periodontopathic Pathogen Below the Gumline 2016*

*Prophyromonas Gingivalis Disturbs Host-commensal Homeostasis by Changing Complement Function 2017*

### **Dismantle & destroy the biofilm!**

- Eradicate as much biofilm as possible
- Do so as comfortably as possible
- Do so as efficiently as possible
- Use the least abrasive method possible

### **Daily Biofilm Management is preventive and therapeutic**

Sonicare Flexcare Platinum Connectivity

Oral B Genius

Sonicare AirFloss Pro

Waterpik Water Flosser

TePe Interdental Brushes – Healthy Smiles 21

### **Moh's Hardness Scale: 1 to 6 with 1 being the softest**

Talc 1

Glycine Powder 2 (25 Microns)

Erythritol PLUS Powder 2 – 2.5 (14 Microns)

#### **Dentin 2 – 2.5**

Sodium Bicarbonate Powder 2.5-3 (65-74 Microns / HFEMS Classic Comfort 40 Microns)

Calcium Carbonate Powder 3

Aluminum Trihydroxide Powder 4

#### **Enamel 4-5**

Calcium Sodium Phosphosilicate Powder 6 (Sylc)

**Glycine had the potential to revolutionize the current dental hygiene recall, as we know it.**  
**[Journal of Dental Hygiene 2013](#)**

**A Paradigm Shift In Mechanical Biofilm Management? Subgingival Air Polishing: A New Way to Improve Mechanical Biofilm Management in the Dental Practice**

**Quintessence International 2013**

*Summary: More efficient, more comfortable, safe!*

SPT favors minimally invasive and patient-friendly procedures for biofilm management. The patient perception was the primary outcome parameter in this review. The data from four studies are consistent and report a low experience of discomfort and a minor potential for harm for air polishing devices using glycine powder.

International Journal of Dental Hygiene 2016

Air Flow® PLUS powder cleaned more deeply without any damage to the enamel compared to polishing pastes which were found to abrade the enamel surface, flatten enamel rods and deposit debris in the microstructures.

Journal of Clinical Dentistry 2016

Sodium bicarbonate powders should not be used in periodontally affected dentitions because of their considerable potential for harm to cementum, dentin and gingiva.

International Journal of Dental Hygiene 2016

For exposed roots, cleaning with sodium bicarbonate powder cannot be recommended. Less abrasive glycine powder however, demonstrated non-critical substance loss of the tooth surface.

Journal of Periodontology 2014

Treatment of peri-Implantitis using air-polishing technology with low-abrasive erythritol + chlorhexidine powder had significantly higher reductions on BOP than mechanical debridement.

Journal of Clinical Periodontology 2011

Superior results, with less than 4% of the biofilm remaining on titanium disks, were obtained with oscillating PEEK plastic tips, and air polishing. Effectiveness of plastic curette significantly lower than those of all machine-driven instruments. The rubber cup provided less cleaning effectiveness compared to the ultrasonic PEEK plastic tip and air polishing.

International Journal of Oral & Maxillofacial Implants 2014

“A therapeutic intervention starting with simple nonsurgical modalities (e.g., air polishing) should be initiated as soon as possible” Glycine powder air polishing was method with the most favorable outcomes. Conclusion based upon a systematic review of the literature for treatment of peri-implant diseases.

International Journal of Evidence-Based Dental Hygiene 2016

For additional research synopsis on this topic: Go to [www.Hu-Friedy.com/HFEMS](http://www.Hu-Friedy.com/HFEMS) and click on [Clinical Evidence Guide](#)

### Devices for Subgingival Air Polishing with Low-Abrasive Powders:

- **Hu-Friedy EMS AirFlow Master Piezon®** - Dual piezon and air polishing unit with interchangeable nozzles for shallow and deep subgingival pockets, a powder chamber for glycine powder, and powder chamber for sodium bicarbonate powder
- **Hu-Friedy EMS AirFlow Master®** - combination air polishing unit with nozzles for shallow and deep pockets and dual powder chambers for sodium bicarbonate and glycine powders
- **Hu-Friedy EMS AirFlow® Handy 3.0 Premium Package** - portable air polishing unit for supragingival air polishing & subgingival up to 4 mm with glycine and regular nozzle, coupled with an interchangeable nozzle for pockets > 4mm
- <http://www.hu-friedy.com/powerrequest> -to request an Air Flow demo in your own practice
- **Acteon Satelec Air-N-Go®** - Interchangeable portable unit for supragingival air polishing with sodium bicarbonate or calcium carbonate powder & subgingival air polishing nozzle for deep pockets with glycine powder
- **Coltene Biosonic Suvi®**- combination ultrasonic and air polishing unit for supragingival air polishing with sodium bicarbonate and subgingival air polishing nozzle with glycine powder

### HVE Solutions – Handout at [www.Karendavis.net](http://www.Karendavis.net)

- [www.Youngdental.com](http://www.Youngdental.com) Vento-O-Vac 3.75” long HVE tip
- [www.Amerdental.com](http://www.Amerdental.com) Widemouth HEV Tip Insert & 6” HVE tip (cut in half) & short On/Off HVE valve
- [www.theblueboa.com](http://www.theblueboa.com) Saliva ejector hose & Hygoformic saliva ejector
- [www.Isolitesystems.com](http://www.Isolitesystems.com) Isovac isolation/HVE system
- [www.Dryshield.com](http://www.Dryshield.com) - isolation HVE system
- [www.zirc.com/mrthirsty](http://www.zirc.com/mrthirsty) - isolation HVE system

### Contraindications for Low-Abrasive Powder Air Polishing:

- Communicable diseases?
- Respiratory diseases?
- Immunocompromised?
- Excessive hemorrhage

### Clinical Protocols for Guided Biofilm Therapy with Subgingival Air Polishing:

1. **Disclose plaque biofilm**
2. *Optional: Air polish with Sodium Bicarbonate on enamel for heavy stains*
3. **Supra and subgingival biofilm removal with Glycine Powder Air Polishing - prior to instrumentation**
4. **Power instruments to remove supragingival and subgingival calculus, as indicated**
5. **Site-specific hand instrumentation, as indicated**
6. *Optional: Laser sulcular debridement*
7. **Adjunctive agents/varnish/antioxidant gel, as indicated**

<b>Biofilm Management (Preventive TX/PM)</b>	<b>Traditional Method</b>	<b>Biofilm Management with Air Polishing</b>
Screenings/Data Collection/Diagnosis	8 min.	12 min.
Communication/Treatment Enrollment/Services	6 min.	12 min.
Clinical Treatment	35 min.	25 min.
Examination	7 min.	7 min.
Hand Off & Disinfect Room	4 min.	4 min.
	<b>60 min.</b>	<b>60 min.</b>

**Total Minutes Saved for Biofilm Removal First with Air Polishing: 10-12**

[www.Hu-Friedy.com/magicalminutes](http://www.Hu-Friedy.com/magicalminutes) Article online

**What would you do with 10 extra minutes with your patients?**

**NOTES:**