

# From Risk to Results: Periodontal Instrumentation for the Advanced Practitioner

## COURSE DESCRIPTION

This course is based on current scientific literature providing the clinician with evidence based tools and strategies which include the use of periodontal risk assessment protocols, salivary diagnostics, incorporation of the dental exam and progressive treatment planning. Advantages of ultrasonic instrumentation will be examined as demonstrated in the current research for obtaining successful clinical outcomes while providing comprehensive patient care.

## COURSE OBJECTIVES

Upon completion of this course, participants will be able to:

- Develop an understanding of the Evidence-based Decision Making (EBDM) process while providing a mechanism for staying current in practice by addressing gaps in knowledge so that the clinician can provide the best care possible.
- Understand the unique relationship between oral and systemic conditions utilizing the patient's risk factors including current medical status, dental & periodontal considerations, and total patient history.
- Discuss the use salivary diagnostics for the presence of diabetes, C-reactive protein and other biomarkers which play a role in periodontal disease.
- Develop an understanding of the role ultrasonic instrumentation plays in the delivery of successful preventive and therapeutic debridement through an examination of the current evidence based research.

### 1. Evidence Based Approach

Evidence Based Approach: A decision making process which integrates

- Best available scientific evidence
- Clinician's experience & expertise
- Patient's treatment needs and preferences
  - Make best decision about appropriate care


## 2. Accessing, Utilizing and Interpreting the Research Results

### Evidence Based Research

- Define the levels of evidence
  - Primary vs. Secondary Research
    - Clinical Trials
    - Systematic Reviews, Meta-Analysis
  - Interpreting Research Results
    - Questions to ask
      - Who published it
      - Where did funding come from
      - Study structure
    - Clinical vs Statistical Significance
      - P value
      - Clinical application
- Where to Find the Research
  - Web/Mobile Apps
    - EBSCO HOST
    - Pub Med
    - Medline Plus


## 3. The Assessment Process

### Traditional Clinical Assessments

- Medical history
- Periodontal charting
  - Dental Rat™ & Florida Probe®
- Radiographs

### Risk Based Approach

- Recognizes patients at higher risk for periodontal disease
  - Modifiable
    - Smoking, oral hygiene, diet, etc
  - Non-modifiable
    - Genetics, age, history of perio disease
  - Patients with systemic conditions
    - Significantly affected by oral inflammation
      - Diabetes
      - CVD

- Pregnancy
- Biofilm and Host Response
  - Biofilm formation and Role
  - Inflammatory Response
- Salivary diagnostics
  - Chair Side Testing
    - Bacterial loads
    - Genetics
    - C-Reactive Protein
    - Future capabilities
- Progressive Treatment Planning
  - 4 Part Plan
    - Behavior Modification
      - Oral hygiene
      - Smoking cessation
      - Nutrition
    - Clinical Procedures
      - Debridement
      - Antimicrobials
      - Laser Therapy
    - Lab Testing
      - Bacterial load
      - CRP
    - Systemic Options
      - Antimicrobial or host modulation therapy
      - Nutritional Supplements


**4. Comprehensive Periodontal Therapy**

**Research published 1982-1991 initiated:**

- Instrumentation paradigm shift from definitive root planing to periodontal debridement
- Research showed that:
  - Endotoxins are loosely adherent to root surface
  - Extensive cementum removal is unnecessary
  - Cell-activating proteins which stimulate attachment are found within cementum

**Periodontal Debridement**

- Creates a biologically-acceptable root surface that favors healing
- Objective of instrumentation:

- Disrupt/remove biofilm, calculus, endotoxins from root surface & subgingival environment (vs. removing part of root surface itself)
- Success of instrumentation is defined by:
  - Positive tissue response (vs. smoothness of root surface)

**Debridement Therapy**

- Includes:
  - Scaling- hard deposit removal
  - Root Debridement- biofilm and endotoxin removal
- Preventive intervention
  - Before periodontal destruction initiates
- Therapeutic intervention
  - Occurs after initiation of periodontal destruction
    - Definitive or complete treatment
      - Condition resolves
    - Preparatory or initial therapy
      - Prior to surgery

**Successful Debridement**

- Criteria for thorough instrumentation:
  - Ability to contact root surface
  - Efficacy of deposit removal
  - Effect on root surface
  - Maintain patient comfort and clinician ergonomics
- Successful debridement can be accomplished
  - Manual or ultrasonic instrumentation
  - Ultrasonic instrumentation is beneficial in meeting criteria for debridement


## 5. Power Scaling Technology



<b>Ultrasonic Technology</b>	4 Mechanisms of Action:	
	Mechanical	<ul style="list-style-type: none"> <li>• Rapid movement of tip mechanically removes deposits</li> </ul>
	Irrigation	<ul style="list-style-type: none"> <li>• Lavage created by water flow</li> <li>• Facilitates removal of biofilm &amp; endotoxins</li> </ul>
	Cavitation	<ul style="list-style-type: none"> <li>• Implosion of minute bubbles releases energy</li> <li>• Disrupts cell wall of bacteria</li> </ul>
	Acoustic Microstreaming	<ul style="list-style-type: none"> <li>• Forceful flow of cavitating fluid</li> <li>• Enhances debridement of root surface beyond area contacted by tip</li> </ul>
	Frequency	<ul style="list-style-type: none"> <li>• Number of cycles (one complete stroke path) per second</li> <li>• Frequency correlates to the active tip area</li> <li>• <i>Example:</i> 30k = 4.2mm of active tip area</li> </ul>
	Power	<ul style="list-style-type: none"> <li>• Length of the stroke path</li> <li>• Power increases- the stroke becomes longer</li> <li>• Increases amplitude</li> <li>• Lowest <b>effective</b> power should be used</li> </ul>
	Piezoelectric Technology	<ul style="list-style-type: none"> <li>• Electrical energy activates piezo-ceramic disks in handpiece</li> <li>• 25,000 to 42,000 cps</li> <li>• Linear movement</li> <li>• Only lateral sides active</li> </ul>
	Magnetostrictive Technology	<ul style="list-style-type: none"> <li>• Electrical energy is applied to metal stack</li> <li>• 25,000 to 30,000 cps</li> <li>• Elliptical movement</li> <li>• All sides are active</li> </ul>

<b>Sonic Technology</b>		<ul style="list-style-type: none"><li>• Compressed air runs handpiece to activate tip</li><li>• 6000 to 16,000 cps</li><li>• Limited power options</li><li>• Circular movement</li><li>• All sides are active</li></ul>
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## 6. Ultrasonic Instrumentation Guidelines

	Standard Diameter	Slim Diameter	Perio Specialty Design
	Power – Low to High	Power – Low to Medium	
<b>Magnetostrictive Inserts</b>  <b>Piezoelectric Tips</b>	<b><i>Single bend (#10)</i></b> <ul style="list-style-type: none"> <li>Gross removal of mod-heavy calculus &amp; stain</li> <li>Supra/Subgingival use</li> </ul>	<b><i>Straight</i></b> <ul style="list-style-type: none"> <li>Light calculus and/or biofilm debridement</li> <li>Pockets <u>less</u> than 4mm</li> <li>Light calculus &amp; biofilm debridement</li> <li>Anterior teeth with pockets &gt; 4mm</li> </ul>	<b><i>Furcation</i></b> <ul style="list-style-type: none"> <li>Furcation access</li> <li>Power – Low to Medium</li> </ul>
	<b><i>Double bend (#100)</i></b> <ul style="list-style-type: none"> <li>Gross removal of mod-heavy calculus &amp; stain</li> <li>Supra/Subgingival use</li> </ul>	<b><i>Curved</i></b> <ul style="list-style-type: none"> <li>Light calculus and/or biofilm debridement</li> <li>Pockets <u>greater</u> than 4mm</li> </ul>	<b><i>Implant (SofTip™)</i></b> <ul style="list-style-type: none"> <li>Implant debridement</li> <li>Power - Low</li> </ul>
		<b><i>UltraSlim</i></b> <ul style="list-style-type: none"> <li>47% thinner than Slimline straight</li> <li>Provides access                             <ul style="list-style-type: none"> <li>Tight tissue</li> <li>Interproximal surfaces</li> <li>Misaligned teeth</li> </ul> </li> <li>Usable at all power levels</li> </ul>	
	<b><i>Triple bend (#1000)</i></b> <ul style="list-style-type: none"> <li>Gross removal of moderate to heavy tenacious calculus &amp; stain</li> <li>Improves access to line angles and interproximal areas</li> <li>Supragingival use only</li> </ul>	<b><i>Specialty Inserts</i></b> <ul style="list-style-type: none"> <li><b>Diamond coat</b> – removal of tenacious calculus and soft tissue</li> <li>In surgical treatment settings</li> <li>For surgical use only</li> </ul>	
	<b><i>Beavertail (#3)</i></b> <ul style="list-style-type: none"> <li>Heavy supragingival calculus &amp; stain</li> </ul>		

<b>Clinical Application</b>	Subgingival technique	• Positioned like a probe
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	<p>“Vertical Adaptation”</p> 	<ul style="list-style-type: none"> <li>• Facilitates access of active area to depth of pocket</li> <li>• Predominantly horizontal strokes on buccal/lingual surfaces</li> <li>• Oblique strokes on interproximal surfaces</li> </ul>
	<p>Contact area/supragingival technique “Oblique Adaptation”</p> 	<ul style="list-style-type: none"> <li>• Positioned like a hand instrument</li> <li>• Predominantly oblique strokes</li> <li>• Vertical strokes thru contact area</li> </ul>
	<p>Calculus removal assessment</p>	<ul style="list-style-type: none"> <li>• Assess with</li> <li>• Probe</li> <li>• Explorer</li> <li>• inactivated tip</li> </ul>
	<p>Ultrasonic lavage/rinse</p>	<ul style="list-style-type: none"> <li>• Water</li> <li>• Chlorhexidine</li> <li>• Povidone-iodine</li> <li>• Other</li> </ul>


- Deplaquing
  - Instrumentation in healthy sulci
    - Biofilm removal
    - Less traumatic
  - Perio maintenance
    - Biofilm removal
  - Ultra-Thin insert
- Lasers in soft tissue management
  - Uses and contraindications
    - Disinfection
    - Tissue modification



- Types of lasers
  - Diode
- Pain control
  - Perceived pain
  - Non-injectable options
- Medical and Dental considerations
  - Medical
    - Respiratory problems
    - Swallowing difficulties
    - Transmissible diseases
    - Pacemaker considerations
  - Dental
    - Exposed dentin
    - Demineralization
    - Implants
- Ergonomic considerations
  - Cord and insert
    - Grasp
    - Research evaluated
    - Cord control/management
  - Water/Fluid control
    - Suctioning options & techniques
      - Isolite/Isodry
      - Mr. Thirsty
      - Small or ½ length HVE
      - Blue Boa


**7. <http://www.adha.org/timelineBibliography>**

<http://www.adha.org/timeline>

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## 8. Websites & Mobile Sites Referenced

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[www.ebd.ada.org](http://www.ebd.ada.org)

### Progressive Treatment Planning:

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### Salivary diagnostics:

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[http://www.midmark.com/docs/default-source/architectdesignercenter/dental/sterilization\\_packet.pdf](http://www.midmark.com/docs/default-source/architectdesignercenter/dental/sterilization_packet.pdf)

### Pacemaker References

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<http://bostonscientific.com/templatedata/imports/HTML/CRM/patient/index.html>

<https://professional.sjm.com/~media/pro/resources/emi/med-dental/fl-dental-equipment-042009.ashx?la=en>

### Research:

[www.nlm.nih.gov/medlineplus](http://www.nlm.nih.gov/medlineplus)

### Apps:

Ebco Host App

Bone Box App



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