What can we control as therapists?
- Boost immunity?
- Modulate the immune response?
- Smoking cessation
- Glycemic control
- Can control microbial load via effective mechanical removal and oral hygiene

Challenges of Treatment
- Abundance of microorganisms
- Microorganisms are protected by the gingival sulcus/pocket
- Impossible to effectively remove the microbes if pockets are greater than 5 mm
- Impossible to effectively remove the microbes in furcations
- A opportunistic yet painless disease
- Non-responsive to systemic antibiotics
- Gingival crevicular flow washes out medications placed into the sulcus
- Destruction is caused by an over reactive immune response to the microbial presence

Unique Properties of the Mouth
- Warm and moist environment
- Teeth are the only non-shedding surface for microbial colonization in the body
- Leads to development of thick biofilm

Do microbes really cause periodontitis?
- Studies in germ free rats have shown that ligatures tied around their teeth do not induce periodontitis
- Periodontitis is developed as soon as periodontal pathogens are introduced


Properties that Influence Microbial Growth
- Disturbance in a key environmental factor
  - Increase in temperature promotes pathogens
  - Anaerobic condition promotes pathogens
  - Increase in pH promotes pathogens
  - Presence of blood particles promotes pathogens
- Genetics can influence susceptibility
- Race may have an influence
- Lifestyle, age, and habits
  - Smoking increase risk 7x
  - Diabetes increase risk 4x
  - Aging – decrease immunity leads to increased disease
Host Defense and Microbial Interaction

- Host defenses “cross talk” to resident microbes to maintain a constructive relationship
- They tolerate beneficial bacteria but mount a defense against the pathogens
- The relationship can change if the biofilm composition changes

Biofilm Composition

- Healthy biofilm is mostly gram positive and low bacterial counts
- Unhealthy biofilm is mostly gram negative anaerobes, and very dense (heavy “microbial load”)
- Pathogens arrive via oral reservoirs, or the outside environment
- When microbial load reaches a critical mass then inflammation ensues
- Inflammation can then cause a change in the environment which actually promotes more pathogens (increase in haemen, pH)
- Leads to inappropriate inflammatory response leading to “by stander” damage to sub-gingival tissues.

Objective of Periodontal Therapy

- Reduction of inflammation leading to periodontal destruction
  - Complete calculus and microbial biofilm removal is a primary part of achieving a biologically acceptable root surface

What predicts future bone loss?

- Bleeding on probing
- Pocket depth

**Bleeding on probing. A predictor for the progression of periodontal disease?**

How do we measure clinical success?

- Sites that do not bleed
- Sites that have pocket depth reduction of 2mm or more following therapy

Conventional Periodontal Therapy

- Oral hygiene
- Scaling and root planing
- Surgical access and debridement
- Periodontal maintenance therapy

Effectiveness of Calculus Removal with scaling and root planing

- Only effective in pockets 3 mm or less
- Pockets between 3-5mm are partially effective
- Pockets greater than 5 mm are nearly impossible to completely clean


Effectiveness of Calculus Removal with surgery

- Flap surgery increases the effectiveness of calculus removal
- Pockets greater than 5mm retain 62% of their calculus with s/rp alone
- With flap surgery calculus retention drops down to 11%

**Calculus removal by scaling/root planing with and without surgical access.** Buchanan SA, Robertson PB.

Effectiveness of Calculus Removal based on experience
No difference in operator experience level in pockets 1-3mm in depth
More experienced operators render more effective root surface debridement in pockets greater than 4mm


Effectiveness of Calculus Detection by Tactile Sensation
- Teeth were evaluated for the presence of calculus by explorer, and then extracted and evaluated via a microscope
- 77.4% of the surfaces that were clinically scored as being calculus free were found to have calculus
- 12% of sites that were clinically determined to have calculus were calculus free.

Effectiveness of subgingival scaling and root planning. I. Clinical detection of residual calculus. Sherman PR, Hutchens LH Jr, Jewson LG, Moriarty JM, Greco GW, McFall WT Jr

Hand vs. Ultrasonic Debridement
- Both achieve the same level of bacterial reduction
- Tip design and type of ultrasonic instrumentation does not have clinical advantage over hand instrumentation or calculus removal

Single vs. Multiple sessions
- Control teeth were root planed for 10 minutes and then extracted
- Experimental teeth were root planed for 10 minutes on session 1, and then 5 minutes on session 2, and 5 minutes again on session 3
- No significant difference in the effectiveness of calculus removal between two methods
  Effectiveness of subgingival scaling and root planing: single versus multiple episodes of instrumentation. Anderson GB, Palmer JA, Bye FL, Smith BA, Caffesse RG

Effectiveness of Calculus Removal conclusions:
- Scaling and root planing is only partially effective in removal of calculus and plaque in pockets greater than 5mm regardless of method or instrumentation
- Operator experience improves results
- Surgical access is significantly more effective in calculus removal
- Without visualization it is nearly impossible to correctly assess the presence or absence of calculus

Periodontal Maintenance
- Patients who do not receive proper periodontal maintenance will continue to experience attachment loss
- Proper maintenance period should be no longer than 3 months

Periodontal Maintenance – Does it matter who does it?
- Patients who were maintained at a specialist office lost an average of .2mm of attachment over a 6 year period
- Patients who were maintained at a general practitioners office lost an average of 2.8mm over the same period

Periodontal Maintenance – Does patient’s oral hygiene matter?
- Patients who were on 3 month maintenance were followed for 8 years
- Personal oral hygiene did not influence post treatment attachment levels


Conventional Periodontal Therapy – Conclusions:
- Has been proven by numerous studies to be effective in managing and arresting periodontitis
- Surgical access is often required in the management of deeper pockets
- Operator experience and expertise does matter in the long term outcome of treatment
- Proper maintenance is essential

New Approaches to Treatment
- Chemotherapeutics
- Localized delivery vehicles
- Laser assisted periodontal treatment
- Perioprotect®
- Host modulation – Periostat®
- Screening tests – Myperio path®, MyperioID®PST®

Chemotherapeutics
- Systemic antibiotics as a mono-therapy are not effective in treating periodontal disease
- The biofilm confers protection to the bacteria and prevents the effective penetration of the antibiotics
- Do not remove calculus which acts as a reservoir for more pathogenic bacteria

Sub-gingival irrigation
- Chlorhexidine is the most extensively studied anti-microbial for sub-gingival irrigation
- Numerous studies have shown it to be ineffective as an adjunct to scaling and root planing
- Does not penetrate the biofilm, and does not stay around long enough to kill bacteria
- Is ineffective against yeast, viruses, or protozoa
- Povidone Iodine irrigation
- When combined with scaling and root planing is significantly more effective in reduction of pathogens
- Is not effective without mechanical debridement
- Does not lead to increase in pocket depth reduction
  Povidone-iodine as a periodontal pocket disinfectant. Hoang T, Jorgensen MG, Keim RG, Pattison AM, Slots J.
  Systematic review on the effect of rinsing with povidone-iodine during nonsurgical periodontal therapy. Sahrmann P, Puhan MA, Attin T, Schmidlin PR

- Hydrogen Peroxide
- Its effect is no different than saline irrigation
- May cause oral mucosal changes and its long term use is not recommended

- Bleach (Sodium hypochlorite)
- .1 - .5% solution administered by the patients via an irrigator device has been shown to significantly reduce bacterial counts
- Kills yeast
- Long term effects on the oral mucosa are unknown

*Periodontal antimicrobials--finding the right solutions.* Jorgensen MG, Aalam A, Slots J

**Arestin®**
- Sustained release antibiotic
- Low systemic absorption
- Easy delivery
- Not effective as mono therapy
- Pocket depth reduction is not clinically relevant (average reduction 0.3 mm)
- Has to be repeated
- Does not take the place of poor root instrumentation
- Has more of a use in maintenance phase than active phase
- Is effective in reducing bacterial reservoirs during the maintenance phase
- May be beneficial in treatment of incipient peri-implantitis

**Perioprotect – The claims**
Custom made trays are laboratory fabricated
- A hydrogen peroxide gel is mixed with doxycycline syrup and placed in the tray
- Tray is worn every night
- Periodontists can kiss their careers goodbye!
- Unsubstantiated claims- not a single published study!
- Does not remove calculus or penetrate deep enough to effectively remove subgingival plaque
- The therapeutic agent (hydrogen peroxide) has been shown to be ineffective and a gingival irritant
- Will mask the underlying disease process

**Claims of laser therapy**
- Pocket sterilization
- Laser light is absorbed by pigmented tissues only
- The claim that “black pigmented” bacteria absorb the laser light is ludicrous
- Pocket sterilization
- Bacteria in their natural state lack any pigmentation
- There is no evidence in the literature that laser light of any wave length sterilizes the pocket bacteria with any consistency
- Laser Curettage
- Lasers can effectively remove the pocket lining
- Removal of pocket lining or “curettage” does not cause an improvement in periodontal health regardless of the method used
- Laser curettage is not an effective treatment
- Laser root debridement
- Soft tissue laser lights are very inefficient and ineffective in removing calculus and plaque buildup
- Er:YAG hard tissue laser can remove calculus but can also cause irreversible damage to the root surface
- Can cause an elevation in pulp temperature
- Photodynamic healing
- Very little evidence that the laser light aids in the healing or regeneration of periodontal tissues
Laser therapy conclusions:

- Laser is a tool and not a treatment
- When properly used can aid in providing a better access for calculus removal
- Is effective for gingivoplasty and gingivectomy
- Without proper root instrumentation is completely ineffective

Periostat®

- Subantimicrobial-Dose Doxycycline (20 mg bid)
- Is used in conjunction with S/RP
- Is effective in reducing BOP and pocket depths
• Longer studies are needed. Patients have only been followed up for 9 months
  Long-Term Efficacy of Subantimicrobial-Dose Doxycycline as an Adjunctive Treatment to Scaling and Root Planing: A Systematic Review and Metaanalysis
  Fabrizio Sgolastra, DDS* Ambra Petrucci, DDS* Roberto Gatto, MD* Mario Giannoni, MD* and Annalisa Monaco, DDS*

New Diagnostic Tests
• For a test to have utility it must either accurately diagnose an active disease or process or predict the potential for future disease

My PerioPath ®
• Salivary diagnostic test identifies the type and concentration of specific perio-pathogenic bacteria
• Patient swishes saline for 30 seconds then expectorates it
• The sample is analyzed via DNA testing
• Great screening tool to determine the presence of pathogenic bacteria
• A good motivational tool for some patients
• Does not indicate the presence of disease or future potential for disease
• Does not test for the susceptibility of the bacteria to different antibiotics

My PerioID ®PST ®
• Claims to identify individuals with genetic susceptibility to severe periodontal disease
• It tests for the presence of specific polymorphisms of the IL-1α and IL-1β genes
• There have not been any large scale tests that show that this test has any additional benefit for identifying patients who are at risk of severe periodontal disease
• Does not detect the presence of disease and does not effectively predict the risk of future disease
• Its utility as a diagnostic test is very limited

In Conclusion
Utilizing ineffective therapies to avoid traditionally effective ones oftentimes results in progression of the disease around teeth that, when finally referred to a periodontist, are truly hopeless and have no other option but extraction