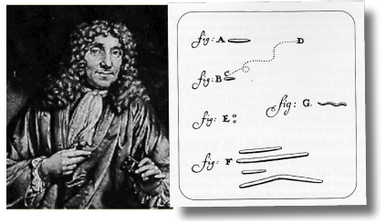
History of Antibiotic Therapy and Periodontal Disease

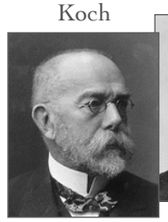
1683: Antony von Leeuwenhook: Dutch scientist who created the first microscope, and looked at the plaque from between his own teeth and drew sketches.

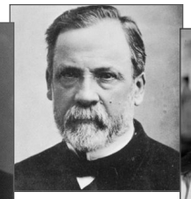


von Leeuwenhook

1880's: Robert Koch and Louis Pasteur (Germ Theory of Disease)

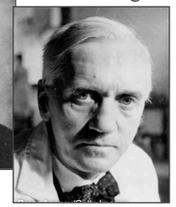
Koch





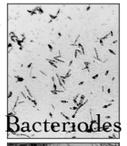
Pasteur

Fleming



1928: Alexander Fleming (discovered Penicillin)

1944: Penicillin first used to treat Necrotizing Gingivitis



1970: Plaque accepted as bacteria-laden cause of gingivitis and periodontitis.

1976: Microbe specificity determined at sites with periodontitis.

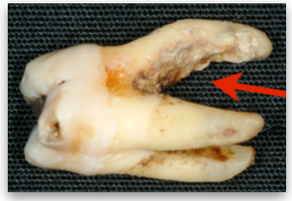
1998: Periostat (doxycyline) approved by the FDA for use in the treatment of periodontitis.

2001: Arestin (minocycline microspheres) FDA approved for treating periodontitis.

Bacteria and the Periodontium

Bacteria are all around us and all over us and inside us! Our bodies are generally very good at managing and maintaining bacterial balance in the body so that we can in fact benefit from their presence in terms of digestion and processes we have yet to understand. Of course, if the balance is upset, and there are too many bacteria present and the body cannot manage, then their volume must be reduced in order to regain homeostasis.

We all know periodontitis is caused by bacteria. Too many bacteria around the gingiva can cause bone loss. Scaling and root planing or flap surgery is our primary means of controlling subgingival bacteria by physically removing them to resolve infection in order to regain lost attachment levels. But 10-20% of the time, attachment loss still persists. Major reasons include ability of the bacterial pathogens to invade host tissue, reside in areas not accessible to our instruments even with flap access (furcations or difficult tooth anatomy, tonsils, or dorsum of tongue), or because the patient is immuno-compromised (uncontrolled HIV or diabetes, or white blood cell defects).



When physical means of control fall short, chemical means are then necessary. This issue of **ProbeTips** will review the different forms of chemical control of bacteria in the treatment of periodontitis.

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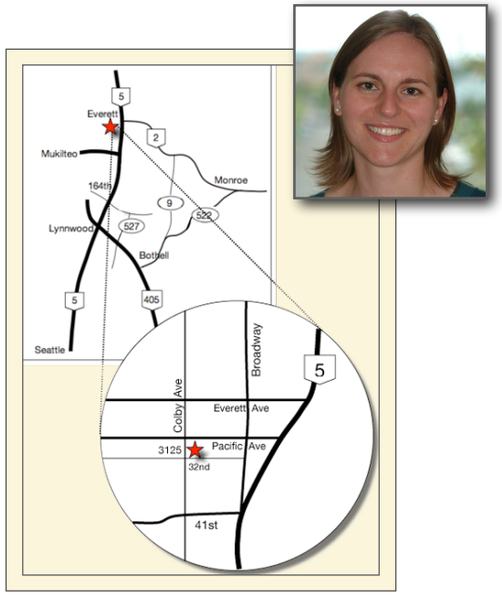
PERIODONTOLOGY IMPLANTOLOGY ORAL MEDICINE

Pamela Nicoara is a Board Certified Periodontist practicing in Everett since 2007. She is a UW Perio graduate, and a transplant from Dallas, Texas.

She is driven to achieve esthetic and predictable outcomes, particularly for anterior implant cases, and is always looking to improve processes and results. You can email her directly below with questions, comments, or suggestions for future newsletters.



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Probe Tips

A Quarterly Periodontal Newsletter

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Antibiotics in Periodontal Therapy

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Antibiotics in Periodontal Therapy

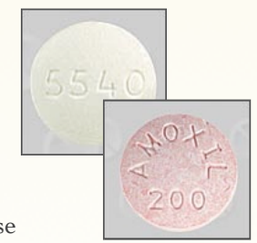
Systemic Antibiotics

The most effective antibiotic (AB) used to treat periodontitis is actually a combination of two drugs: Amoxicillin and Metronidazole. A systematic review of the use of systemic antibiotics in combination or alone concluded that the ***use of systemic antibiotics was most beneficial for patients with moderate to severe forms of aggressive or generalized recalcitrant periodontitis***, meaning that the 80% of patients with average chronic **generalized** periodontitis did not have significant benefit from combined use of antibiotics with scaling and root planing (SRP) beyond what was gained from SRP alone.

In an alternate application, I will place patients on systemic antibiotics *prior* to flap surgery to reduce **severe generalized** inflammation for better post operative flap closure. *Post* flap surgery, I prescribe antibiotics if there is no obvious calculus on root surfaces indicating bacteria may have invaded the root surface limiting success of gross debridement.

Factors limiting effectiveness of systemic antibiotics:

- Patient non-compliance
- Altered patient metabolism
- Drug interactions with medications patient is currently taking
- Lack of blood supply to area of infection
- Bacterial biofilm self-defense (a thicker biofilm means more protection available for virulent bacteria to thrive and cause more harm to host) needing mechanical removal before AB use.



Disadvantages of systemic antibiotic use:

- Dispersal of antibiotic to whole body rather than locus of infection
- Irradication of 'good' bacteria (normal oral flora) leading to other infections (yeast infection)
- Development of antibiotic resistant organisms
- Adverse reactions/allergy

Systemic Host Modulator

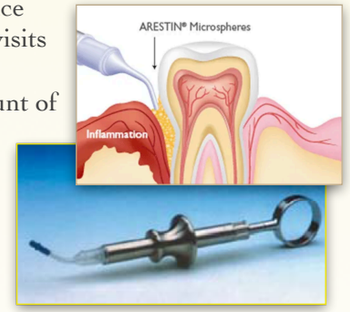
Of special mention is a drug called **Periostat** which is a form of doxycycline not used as an antibiotic, but instead prescribed at a low enough dosage to act as a host modulator rather than a bacteria killer. As with systemic antibiotic use, this drug is reserved for patients not responding well to either surgical (flap surgery), or non-surgical (SRP) therapy if probings are 4-6mm but don't warrant surgery, to treat **generalized** disease rather than a single area resistant to improvement.

Periostat is used twice per day indefinitely. The dosage tells the body not to over-react to the bacteria in the mouth, similar to the way Benadryl reduces the overproduction of histamine in some excessive reactions to certain allergens. We all have come across those patients who have great oral hygiene and follow up with 3 month periodontal maintenance, but still have generalized mild inflammation, bleeding on probing and mild to moderate 4-6mm pocketing. ***While Periostat does not replace good home care or regular maintenance, or provide a license to begin smoking or become lax with general health such as diet or exercise, patients with a high risk due to thin biotype or genetic compromise can benefit greatly from the use of Periostat.***

Another population that I have treated with this medication are patients with a history of periodontitis who need to undergo orthodontic treatment. We know that any tooth movement in the face of periodontal inflammation can increase the loss of soft tissue and bone. Periostat can give those with the greatest sensitivity to oral bacteria ***an opportunity to get through orthodontic care while under the watch of a periodontist***, which they may not otherwise be able to withstand.

Local Antibiotics

For those patients with a **localized** area of disease, perhaps an area of prior flap surgery or bone regeneration that is responding poorly, a local treatment such as **Arestin** can be used to manage the area at each maintenance visit, or at alternating visits with the periodontist, depending on the amount of bleeding on probing at each visit. The more bleeding, the more the need for the Arestin assuming all calculus has been removed.



Arestin is packaged as microspheres of minocycline, and is placed into a periodontal pocket eliminating some of the problems inherent with systemic antibiotic use such as having adequate blood supply to the area, focus and maintenance of a cidal level of antibiotic in the area most needed, or patient compliance. In another systematic review of the use of local anti-infectives, it was concluded that ***local antibiotics are most beneficial for patients with good hygiene compliance and a generally good response to scaling, but with unresolved localized residual bleeding pocketing in the 4-6mm range.***

Arestin is to be used as an adjunct to initial therapy rather than during initial scaling and root planing (SRP) therapy. This is because calculus should first be removed from the pocket for the area to demonstrate healing ability and how necessary Arestin may be. If good scaling has been complete and healing is still poor with residual 4-6mm pockets and bleeding, then Arestin can be used. But if probings are in the 6+mm range and it is unlikely that all calculus was removed during scaling, flap surgery should be performed prior to relying on Arestin to 'hide' a locus of inflammatory calculus.

Therapeutic effects are maintained for 3 months after placement, and should not be used more frequently than every 3 months.

One last scenario where I use Arestin: Patients during flap surgery with a lack of obvious calculus on the root surfaces. As mentioned previously, this indicates that bacteria may have invaded the root surface and mechanical debridement will be of limited benefit. Chemotherapy of the root surface with Arestin may allow for better pocket reduction.

Factors limiting effectiveness:

- Difficulty inserting antibiotic in correct location
- Inaccessibility to furcations

Disadvantages:

- Foreign body reaction to carrier holding the antibiotic

References

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Int Dent J Jorgensen, Aalam, Slots. 2005

Complete References Available on Request.