

## **NONSURGICAL PERIODONTAL THERAPY**

**Instructed by Kelli R. Illyes, R.D.H, M.D.H.**

**INSTRUCTIONS:** Read and study the narrative. Complete the quiz and registration form, and mail (along with registration fee) to: **University of Tennessee Health Science Center, Continuing Dental Education, 875 Union Avenue, Memphis, TN 38163** or fax completed quiz, registration form and credit card information to **(901) 448-1514**.

**TUITION:** \$50 per registrant or \$40 per registrant for multiple registrants from the same office.

**CE Credit: 2 hours **\*\* (Registrants must correctly answer 75% of the quiz questions to receive credit) \*\*****

Please direct all questions to the CDE office, (901) 448-5386, fax us at (901) 448-1514, or email [utcde@utmem.edu](mailto:utcde@utmem.edu). For more information or a list of continuing education activities, visit our website at <http://cde.utmem.edu>.



**Instructor:** Kelli R. Illyes, RDH, MDH received a BS degree in Microbiology in 1997 from the University of Arkansas. In 2003 she received her second BS degree in DH from the University of Tennessee Health Science Center. During her time as a dental hygiene student she served as class president and college president of SGAEC. She received the following awards as a BS student at UT; award recipient in the ADHA research poster session, Tennessee Academy of Dental Hygiene Scholarship, Professional Leadership Award, Scholarly Research Award,

Faculty Medal, Sigma Phi Alpha National Dental Hygiene Honor Society, and Alpha Eta National Allied Health Honor Society. As a DH student she was elected to serve as student delegate to ADHA. She graduated in May 2008 from UTHSC with a master of dental hygiene (MDH) degree. Since becoming a licensed dental hygienist she has worked full time in private practice. Professional activities include serving as an active member and officer of MDHA and TDHA. She is presently serving as the President-elect for the Tennessee Dental Hygienists' Association. She currently teaches the Periodontology course in the UTHSC BS program where she also serves as a part time clinical instructor.

# **NONSURGICAL PERIODONTAL THERAPY**

**Instructed by Kelli R. Illyes, R.D.H, M.D.H.**

## **Introduction**

According to the 2000 Surgeon General's report *Oral Health Care in America*, a silent epidemic of oral and dental diseases is infecting our population. The study indicates that most adults demonstrate some signs of periodontitis or gingivitis with 14% of ages 45-54 and 23% of ages 64-74 suffering from severe periodontitis. (US Department of Health and Human Services, 2000) Chronic periodontitis is the most common form of periodontal disease encountered in private practice on a day to day basis. This disease entity is most commonly seen in adults over 35, but can occur at any age, including children and adolescents. Chronic periodontitis can present itself as either localized or generalized and can vary from person to person and site to site in the same mouth. Another characteristic of this disease is the slow to moderate progression intermixed with periods of rapid progression. Many patients are unaware they even suffer from periodontal disease. Therefore, it is the responsibility of the dentist and hygienist to diagnose and treat periodontal disease as well as educate patients on their role in the prevention and maintenance of the disease process. This is relevant, especially now, since several recent studies indicate a possible correlation between periodontal disease and cardiovascular disease. (Beck et al., 2009) The overall goal of periodontal therapy is to restore patient's natural dentition to a state of health by reducing the inflammation in the most conservative manner with adequate function and esthetics. The extent, severity, and progression of the disease will dictate the periodontal treatment necessary for each individual patient as well as when to treat and when to refer to the specialist.

The purpose of this continuing education self-study course is to provide an overview of the nonsurgical periodontal therapies available for the treatment of gingival and periodontal diseases. Upon completion of this study, participants will have a clearer understanding of these treatment modalities including the role of locally applied antibiotics as well as when to refer to the periodontist.

## **Goals of Nonsurgical Periodontal Therapy**

The rationale of nonsurgical therapy is to remove the causative agent of periodontal disease, bacterial plaque biofilm, as well as its associated factors. Clinical studies have repeatedly confirmed scaling and root planing reduces both gingival inflammation and probing depths, leading to a gain of clinical attachment in most periodontal patients. Reducing infection, preserving teeth, as well as improving the health, function, and appearance of the dentition are all goals of periodontal therapy.

Short term goals of treatment are to promote plaque biofilm control through patient education, instrumentation of tooth surfaces to disrupt plaque biofilm and remove calculus, and evaluation by explorer detection of smooth surface following treatment.

Long term goals of nonsurgical periodontal therapy include restored gingival health, adequate plaque control, complete periodontal debridement, sufficient time for healing to occur, and regular removal of new deposits at subsequent visits. (*Periodontology for the dental hygienist*, 2007) The success rate of treatment is evaluated by restored tissue health and patient compliance with established maintenance regimen.

### **Diagnosis**

Periodontal disease is categorized as mild (1-2 mm), moderate (3-4 mm) or severe (5+mm) based on the amount of clinical attachment loss over time. Performing a complete periodontal assessment including pocket depths, clinical attachment loss, and the level of the free gingival margin in relation to the CEJ as well as radiographs are paramount in the proper diagnosis of periodontitis. It is imperative for dental professionals to realize the most reliable method in recording disease activity is by determining loss of attachment over time. Not probing depths, but the level of attachment loss from the CEJ.

### **Scaling and Root Planing**

Once periodontal disease has been diagnosed, scaling and root planing is the gold standard of nonsurgical periodontal therapy. This includes instrumentation of the crown and root surfaces of the teeth with hand, sonic, or ultrasonic instrumentation to remove plaque, calculus, and stains. Success at time of therapy is determined by visual and explorer evaluation of tooth surfaces. Total calculus and plaque removal is impossible especially at base of deep pockets and furcations. Small, residual deposits do not appear to cause treatment failures. If after scaling, areas remain unresponsive, rescale and add antimicrobials to the treatment. Traditionally, the goal of root planing was to create a glassy, hard, smooth surface with the removal of cementum or surface dentin that is rough, impregnated with calculus, or contaminated with toxins or microorganisms because it was believed that endotoxins (LPS) formed by gram-negative bacteria invaded the root structure and this diseased cementum should be planed away. Recent studies have disproved these past theories and found that toxins are superficially located on root surfaces and relatively easily removed. In addition, extensive root instrumentation is not required beyond the removal of calculus and plaque and repeated removal of tooth structure is not a goal of periodontal therapy as it may result in thinned and sensitive root surfaces. Furthermore, removing the cementum hinders the regeneration potential of the site.

### **Instrumentation**

Periodontal debridement and scaling and root planing may include hand or powered scalers or a combination of the two. The method of instrumentation does not determine

success of treatment as much as skills, knowledge, and expertise of the dental hygienist. According to the research, both hand and powered instrumentation provided comparable clinical results in the treatment of periodontal disease. (Ioannou et al., 2009, pp. 132-41) Therefore, since both treatments are proven effective and safe, the choice of instrumentation is determined by the preference of the hygienist and/or patient. Ultrasonic instruments combine of mechanical, irrigation, cavitation (the inward collapsing of bubbles of water), and acoustic streaming forces. Increase efficiency, reduce time spent per tooth, and less demanding physically for dental hygienist are the leading reasons many hygienists reach for their ultrasonic more often than hand instrumentation.

At times, hand instrumentation may be necessary due to contraindications for the patient or clinician. Contraindications include the use of ultrasonic instruments with unshielded pacemakers because the electromagnetic field generated by ultrasonic instruments can interfere with the functioning of some cardiac pacemakers. However, it remains safe to use on shielded pacemakers. Dentists and hygienist with an unshielded pacemaker should not operate ultrasonic scalers. Sonic scalers do not create an electromagnetic field and may be used as a substitute to ultrasonic instrumentation.

The use of sonic and ultrasonic instrumentation produces splatter and aerosols and may contain blood which may compromise universal infection control standards. Using high volume suction devices and having patients rinse with antimicrobial solutions before treatment are recommended. Pre-procedural rinsing reduces bacteria in aerosols by 94%, however their effect on viruses is unknown. It is recommended to refrain from using powered instrumentation on patients with infectious, communicable diseases such as hepatitis and HIV.

### **Systemic Antibiotic Therapy**

Systemic antibiotics may be used to reduce bacterial load and enhance host's defense to infectious pathogens in chronic periodontitis, aggressive periodontitis, refractory periodontitis, periodontitis as a manifestation of systemic disease, and multiple sites in advanced disease. Tetracycline, Metronidazole, and Amoxicillin are among the antibiotics used in the treatment of periodontal disease and are determined based on a patient's medical and dental history, disease diagnosis, as well as possible side effects. Doxycycline is also used for its anti-collagenase activity in addition to its antibacterial activity.

Systemic antibiotics are most effective when specific bacteria have been identified and the appropriate antibiotic is selected. The usage of systemic antibiotics should be used on a case by case basis. Overuse of antibiotics has led to emergence of antibiotic resistance. Patient compliance is another disadvantage to systemic antibiotics. Patients tend to not complete treatment and discontinue taking their prescribed medications when their symptoms subside instead of when the prescription is all gone.

## Locally Applied Antibiotic Therapy

Locally applied antibiotic therapy consists of a controlled release of medicament delivering a continuous high level of antibiotic placed directly at the site of infection. Commonly used locally applied antimicrobial agents are chlorhexidine, doxycycline, and minocycline. Advantages include a quick reduction of inflammation and bleeding as well as reduced side effects, due to the decreased amounts of drug levels in the blood stream. This treatment modality proves safe, biodegradable, and most effective in pockets 5mm or deeper. All are essentially equally effective so selection of a local antimicrobial should be based on personal preferences of the clinician, cost, and patient comfort. Research studies indicate placement of these drugs immediately after scaling, and at three and six months after initial placement for the best results. (Lessem & Hanlon, 2004)

One example of a locally delivered antimicrobial used today is Arestin. Arestin (minocycline hydrochloride) is a powdered microsphere delivery system that comes in a no preparation syringe and unit-dose cartridge. According to the manufacturer, Arestin maintains therapeutic drug concentrations for up to 21 days, and the localized delivery provides an effective drug concentration at the site of infection. Arestin is applied directly into the periodontal pocket and the patient is instructed to avoid hard, crunchy, or sticky foods for one week, avoid touching the area, and refrain from using interproximal cleaning aids such as flossing in the area for ten days.

## Healing

Healing after nonsurgical periodontal therapy occurs as repair of existing tissues rather than regeneration of tissues lost in the disease process. Periodontal pockets, alveolar bone, periodontal ligament, and epithelium will heal, inflammation will be resolved, long junctional epithelial attachment may occur, and recession may result. Subgingival bacterial plaque biofilm will repopulate with younger, less pathogenic bacterial initially. Formation of new bone to replace lost bone, new connective tissue attachment to root surfaces, and new cementum on the root are NOT predictable outcomes of nonsurgical periodontal therapy. Junctional epithelium can be expected to take approximately one week to heal following debridement whereas underlying connective tissue can take 4 weeks. Therefore, probing after treatment should be avoided for at least one month.

After scaling, the bacterial plaque shifts from the predominantly Gram-negative flora found in periodontal disease to Gram-positive bacteria. There is a decrease in motile forms, especially spirochetes following treatment. The bacteria after nonsurgical periodontal therapy consist of much less pathogenic and similar to those present in health. In addition to being less destructive, bacteria also tend to repopulate in a specific order: *Streptococcus* and *Actinobacillus* species followed by *Viellonella*, *Bacteroides*, *Porphyromonas*, *Prevotella*, and *Eusobacterium* species and finally *Capnocytophaga* species and spirochetes are the last to grow back. The repopulation cycle may take as

long as 6 months to complete, depending on operator competency and patient plaque control.

Expected clinical responses include noticeable reduction in redness, inflammation and bleeding. Generally, sites with deeper initial probe depths respond with greater improvements than shallower pockets. Pockets with initial depths of 4-6 mm tend to be reduced 1 – 2 mm, whereas, initial pockets over 7mm show the greatest improvement of 1.5 - 3mm. (*Periodontology for the dental hygienist*, 2007) Healing is greatest 3-6 weeks after nonsurgical periodontal therapy but changes occur continually for up to 12 months proceeding therapy. Remember, probing to re-evaluate probe depths should not be taken until at least 4 weeks after treatment.

### **Predictiveness of Results**

The fact that a pocket is deep does not mean that it cannot be stabilized through non-surgical therapy. The presence of plaque and bleeding over time is a source of concern and should be addressed, but these events are not absolute signs of disease activity. Increases in probing depths or attachment loss are cause for concern, re-treatment, and possibly referral to a periodontist for evaluation. A realistic goal of non-surgical periodontal therapy is to stop the disease process. The only way to stop active disease is to remove or reduce pathogenic bacteria. Two ways to know you have stopped disease progression include attachment loss over time does not occur and bone loss over time does not continue.

### **Referral to Periodontist**

The extent, severity, and progression of the disease will dictate the periodontal treatment necessary for each individual patient as well as when to treat and when to refer to the specialist. When nonsurgical therapy has been insufficient in controlling inflammation and disease progression in periodontal patients, it is time to call in the specialist for periodontal surgery. An indication for immediate referral is when the extent, severity, and progression of the disease are so severe the general dentist knows scaling and root planing alone will not combat the disease process and the treatment modalities will far exceed what can be achieved through nonsurgical periodontal therapy.

According to McLeod, “general practitioner should be able to treat mild-to-moderate periodontal disease and determine when to refer moderate-to-advanced cases to a specialist for treatment. The diagnostic skills and judgment necessary for critical discernment, diagnosis and knowing how a patient’s periodontal condition is best treated cannot be overemphasized.” (McLeod, 2000, p. 484) McLeod goes on to report that multiple studies have shown instrumentation in pockets greater than 5mm in ineffective in removing bacteria along the root surface. These studies examined the difference between scaling and root planing and open debridement in the reduction of periodontal pocketing. The studies revealed that open debridement provided more bacterial removal

from root surface in 6 mm pockets and greater than scaling and root planing alone. (McLeod, 2000, p. 484)

General consideration for periodontal surgery comprise patient age and status of the dentition including importance of the tooth, amount of attachment/bone present, probing depth, and long term prognosis. Three advantages for periodontal surgery consist of access to enhance root debridement, particularly in multi-rooted teeth, improved access for plaque control by the patient during home care, and esthetic improvement for certain types of procedures (root coverage grafting).

Periodontal surgeries are not indicated for all patients even with advanced periodontal disease. Contraindications include uncontrolled medical conditions such as unstable angina, uncontrolled hypertension, uncontrolled diabetes, myocardial infarction or stroke within 6 months; poor plaque control; high caries rate; and unrealistic patient expectations or desires.

Gingivitis and chronic periodontitis are the more predictable forms of periodontal disease that can typically respond well to either nonsurgical or surgical periodontal therapy or a combination of both. Immediate referral to a periodontist is required for all cases of prepubertal periodontitis, rapidly progressive periodontitis, necrotizing ulcerative periodontitis, and refractory periodontitis due to their less predictable nature. Aggressive periodontitis, previously known as juvenile periodontitis, is also considered to be less predictable especially for more severe cases with moderate to advanced attachment loss. (McLeod, 2000, p. 484) Periodontitis as a manifestation of systemic disease is another classification of disease that has less predictable outcomes and more complex cases indicate involvement of a periodontist. General dentists should use caution before treating these disease modalities without consulting with a specialist.

Regardless of the disease classification and the sequence of referral, communication between the periodontist and general dentist is imperative. Diagnosis, treatment planning, and patient care require teamwork between the periodontist, the referring dentist, and the patient to provide the ultimate results for the patient. All three parties must be invested and involved throughout all phases to achieve the desired outcome.

### **Conclusions**

The field of periodontology is continually changing. Dentists and Hygienist must stay abreast of the latest research discoveries in periodontal treatments in order to offer the most comprehensive therapy for patients. With the recent studies indicating a possible correlation between periodontal disease and cardiovascular disease, it is even more imperative to remain current in knowledge of the diseases as well as the new treatment modalities as they become available. (Beck et al., 2009)

The focus of this article is to provide clinicians with an overview of the various nonsurgical periodontal therapies available for patients. Participants will gain insight to

the assorted treatment modalities including the role of systemic and locally applied antibiotics as well as when to refer to the periodontist.

### References

1. *Periodontology for the dental hygienist.* (D. A. Perry & P. L. Beemsterboer, Eds.) (Third). (2007). Philadelphia: Saunders by Elsevier.
2. US Department of Health and Human Services. (2000). *Oral Health in America: A Report of the Surgeon General -- Executive Summary* (US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, and National Institute of Health). Rockville, MD.
3. Beck, J., Couper, D., Falkner, K., Graham, S., Grossi, S., Gunsolley, J. et al. (2009, March 1). The periodontitis and vascular events (PAVE) pilot study: Adverse events. *Journal of Evidence Based Dental Practice*, 9(1), 36-7.
4. Ioannou, I., Dimitriadis, N., Papadimitriou, K., Sakellari, D., Vouros, I., & Konstantinidis, A. (2009, February 1). Hand instrumentation versus ultrasonic debridement in the treatment of chronic periodontitis: A randomized clinical and microbiological trial. *Journal of Clinical Periodontology*, 36(2).
5. Lessem, J., & Hanlon, A. (2004, October 1). A post-marketing study of 2805 patients treated for periodontal disease with arestin. *Journal of the International Academy of Periodontology*, 6(4), 150-3.
6. McLeod, D. E. (2000, April 1). A practical approach to the diagnosis and treatment of periodontal disease. *Journal of the American Dental Association*, 131, 483-491.

Test on next page.

**\*\*Please duplicate and complete one form for each registrant.\*\***

**Instructions:** Answer the questions by choosing the best possible answer. Registrants must correctly answer 75% of the test questions to receive CE credit.

### **Nonsurgical Periodontal Therapy**

1. Which of the following is a contraindication for periodontal surgery?
  - a. Unrealistic patient expectations
  - b. Poor plaque control
  - c. Uncontrolled medical conditions
  - d. All of the above
  
2. Which of the following are clinical responses to nonsurgical periodontal therapy?
  - a. reduced gingival inflammation and probing depths
  - b. a gain of clinical attachment in most periodontal patients.
  - c. Reduced infection, preserving teeth
  - d. All of the above
  
3. The periodontium can be probed without penetrating through immature connective tissue for approximately how long after the periodontal debridement appointment?
  - a. 4 to 6 days
  - b. 4 to 6 weeks
  - c. 1 to 2 days
  - d. 1 to 2 weeks
  
4. The various powered scalers are equal in their abilities to remove plaque biofilm and calculus. They are more effective than hand instrumentation.
  - a. Both statements are TRUE.
  - b. Both statements are FALSE.
  - c. The first statement is TRUE, and the second is FALSE.
  - d. The first statement is FALSE, and the second is TRUE.
  
5. The antimicrobial agents commonly prescribed for systemic application are:
  - a. Tetracycline, Metronidazole, and Amoxicillin
  - b. Ampicillin, cephalosporin, and tetracycline.
  - c. Penicillin, metronidazole, and chlorhexidine.
  - d. Minocycline, doxycycline, and chlorhexidine.
  
6. The antimicrobial agents commonly prescribed for local site application are:
  - a. Amoxicillin, erythromycin, and ampicillin.
  - b. Ampicillin, cephalosporin, and tetracycline.
  - c. Penicillin, metronidazole, and chlorhexidine.
  - d. Minocycline, doxycycline, and chlorhexidine.

7. Which of the following nonsurgical approaches will reduce the bacterial flora of the periodontal pocket?
- Irrigation
  - Power scaling
  - Hand scaling
  - All of the above
8. Current evidence regarding root planing indicates that the goal of this procedure is to:
- Remove all plaque biofilm and calculus, preserving the tooth structure.
  - Remove all cementum and endotoxins, rendering the surface glassy smooth.
  - Remove all plaque biofilm and calculus, rendering the surface glassy smooth.
  - Remove all cementum impregnated with calculus, rendering the surface glassy.
9. What is the most commonly occurring periodontal disease requiring nonsurgical periodontal therapy?
- Chronic periodontitis.
  - Recurrent periodontitis.
  - Aggressive periodontitis.
  - Periodontitis as a manifestation of systemic diseases.
10. Immediate referral to a periodontitis is required for all cases of prepubertal periodontitis, rapidly progressive periodontitis, necrotizing ulcerative periodontitis, and refractory periodontitis due to their less predictable nature. Aggressive periodontitis, previously known as juvenile periodontitis, is also considered to be less predictable especially for more severe cases with moderate to advanced attachment loss.
- Both statements are TRUE.
  - Both statements are FALSE.
  - The first statement is TRUE, and the second is FALSE.
  - The first statement is FALSE, and the second is TRUE.
11. According to the 2000 Surgeon General's report *Oral Health Care in America* very few adults demonstrate some signs of periodontitis or gingivitis.
- True
  - False
12. Systemic antibiotics are most effective when specific bacteria have been identified and the appropriate antibiotic is selected. Locally applied antibiotic therapy consists of a controlled release of medicament delivering a continuous high level of antibiotic placed directly at the site of infection.
- Both statements are TRUE.
  - Both statements are FALSE.
  - The first statement is TRUE, and the second is FALSE.
  - The first statement is FALSE, and the second is TRUE.

13. What is a disadvantage to systemic antibiotics?
- a. overuse of antibiotics resulting in resistance
  - b. patient compliance
  - c. both a. and b.
  - d. none of the above

---

**SELF INSTRUCTIONAL REGISTRATION FORM:  
NONSURGICAL PERIODONTAL THERAPY**

Duplicate and complete one registration form for each registrant. Send, along with payment, to the address below. Please direct all questions to the Continuing Dental Education office at 901-448-5386. Make checks payable to The University of Tennessee. Mail completed test, form and payment to Continuing Dental Education, 875 Union Ave., Memphis, TN 38163.

Name \_\_\_\_\_ Last 4 digits of SS# \_\_\_\_\_

Mailing Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

E-mail \_\_\_\_\_ Phone \_\_\_\_\_

Card # \_\_\_\_\_ Exp Date \_\_\_\_\_

Signature \_\_\_\_\_