

clinical data

Clinical Studies - Oral Hygiene

Principles of Aesthetic Dental Hygiene A Patient Centered Approach

Kristy Menage Bernie, RDH, BS

Abstract

Aesthetic dental hygiene is a process of care that will improve oral health through prevention and aesthetics. Recent research has identified a correlation between oral infection and systemic conditions such as cardiac infection, stroke, and low birthweight. As a result, it is even more critical to minimize and eliminate oral infection. The primary emphasis of the dental hygienist has been the prevention and treatment of periodontal disease; however, patient compliance in maintenance of the periodontium has been unpredictable and less than successful. In fact, research shows that the average time spent by patients on their oral health routine is just 24 to 60 seconds. The principles of aesthetic dental hygiene apply a patient-centered approach that incorporates aesthetic and social factors, in addition to periodontal factors, into the dental hygiene appointment. By focusing on the patient's desire for a great smile and fresh breath, the clinician acknowledges the patient's needs and creates a motivated and healthier patient.

New Health Concerns

Recent research suggests a correlation between periodontal pathogens and systemic conditions. *P. gingivalis*, a primary organism in periodontal infection, has been linked with cardiac disease.^{1,3,4} In addition, a link has been established between a mother's periodontal infection and her risk of delivering a low birthweight baby.^{1,5} These findings confirm what many oral health care professionals have long suspected—an unhealthy oral cavity can have a profound impact on total body health. As a result, it has become even more important to devise and implement strategies to enhance and increase patient compliance with daily oral hygiene practices.

Patient Needs and Desires

The billion-dollar cosmetic/antiaging/social-based industry represents "elective" related medical and dental procedures that patients not only want,

but are willing to pay for, regardless of insurance coverage. National consumer-based publications are increasing their focus to include oral-health-related articles. This increases consumer interest in elective dental procedures that are not necessarily associated with relieving pain or trauma. As a result, progressive clinicians are “rethinking” strategies to enhance oral health while giving patients what they want; great smiles and fresh breath.

National trends indicate that cosmetic/aesthetic dentistry is the fastest growing area within the profession. Not only will this arena focus on patient-based desires, but will give oral health care professionals the opportunity to enhance health by creating aesthetically pleasing results that the patient will want to maintain.⁶ Therefore, it is imperative that the dental hygienist become knowledgeable and involved in case identification, presentation, and treatment. The principles of aesthetic dental hygiene provide a “big picture” approach that acknowledges the patient’s needs and desires while keeping periodontal concerns in mind. This “win-win” approach elevates the dental hygienist as a value to the practice and as a resource for the patient.

The primary motivation behind successful oral hygiene habits is largely due to social factors.² An aesthetically pleasing smile and fresh breath represent an opportunity for dental hygienists to expand their services while enhancing periodontal health. Past research has indicated that when patients tie social factors to good oral hygiene habits, long-term compliance increases.

Principles of aesthetic dental hygiene

The principles of aesthetic dental hygiene include evaluation of aesthetic needs and social concerns of the patient. Today’s aesthetic options vary from tooth-whitening procedures to the most sophisticated of restorative/aesthetic treatment plans. Smile-enhancing procedures provide the patient with tangible results that increase social acceptability and status. The dental hygienist is in a key position to assess patient interest and to present aesthetic treatment options to the patient (Table I).

In addition to an aesthetically pleasing smile, patients are also concerned with fresh breath, as demonstrated by the billions of dollars spent on fresh-breath-related products, infomercials, and advertising. The stigma associated with bad breath is a reality that many patients live with daily. Addressing social concerns such as oral malodor will not only increase patient interest and motivation, but enhance oral health.

By and large, dental hygienists have recognized the need for reducing bacteria as a means to improve periodontal and overall oral health. Treatment options that address social concerns, such as oral malodor management, create an additional avenue to increase patient involvement and motivation. Research is continuing in the area of oral malodor and its possible relationship with periodontal infection and bacteria found on the posterior dorsal surface of the tongue, as well as the odor-producing bacteria found in periodontal pockets. Current rationale suggests that daily mechanical tongue debridement will not only control oral malodor, but improve and maintain total oral health.⁷

Table 1
The Aesthetic Dental Hygiene Self-Evaluation

- Do you ask your patients what they want in regards to their smile?
- Do you ask your patients if they are concerned about bad breath?
- Are you up-to-date on the latest aesthetic dental options?
- Are you satisfied with your patient's adherence to recommended oral hygiene protocols?
- Do your patients look forward to the dental hygiene appointment?
- Do your patients understand the role of the dental hygienist in oral and total body health?

Causes of Oral Malodor

An estimated 40,000,000 Americans suffer from oral malodor and spend billions of dollars on over-the-counter remedies. Research in the area of oral malodor has been minimal compared to the amount of investigation into other oral conditions; yet, it has been of great interest to the consumer. With oral malodor being a major social concern, it is important that the dental hygienist understand the causes, diagnosis, and treatment options.

The history of halitosis is well documented with references to the condition dating back to ancient civilizations. Halitosis, from the Latin for breath (hali) and condition (tosis),⁸ refers to a systemic-related malodor. Fetor ex ore and fetor oris are terms that directly relate to oral conditions producing malodor. Researchers and experts in the malodor field have suggested that the condition should be referenced as oral malodor or nonoral malodor.⁹ Oral malodor can be either transitory or chronic. Transitory malodor is described as a food-related malodor that may last up to 72 hours and is a condition all individuals suffer from at one time or another. Chronic malodor is generally oral-related and in some cases due to a medical/ systemic condition, such as diabetes.

There are seven common sources/ causes of malodor:

- (1) the mouth and tongue;
- (2) the nasal, nasopharyngeal, sinus, and oropharyngeal areas;
- (3) xerostomia;
- (4) the primary lower respiratory tract and lungs;
- (5) systemic disease;
- (6) gastrointestinal disease and disorders; and
- (7) odiferous ingested foods, fluids, and medications.⁹ An estimated 80–90% of malodor originates in the oral cavity.^{10,12} For this reason, this article deals only with oral-related malodor; additional readings, seminars, and resources are recommended on page 8.

Research identifies the production of volatile sulfur compounds (VSCs) by gram-negative anaerobic bacteria in the oral cavity as the chief culprit in oral malodor. The posterior dorsum of the tongue^{8,9} and the sulcus^{11, 12} have been identified as key areas for harboring these bacteria. The coating on the tongue comprises dead epithelial cells, anaerobic gram-negative bacteria, and food debris. In periodontally healthy patients, this is the primary cause of oral malodor. In the patients with periodontal disease, the gingival sulcus/ periodontal pocket has proven to be an additional reservoir for odor-producing bacteria. In addition, the shift from gram-positive to gram-negative bacteria populations, as seen in gingivitis and periodontitis, increases oral malodor.^{8–12}

Hydrogen sulfide (H₂S) and methyl mercaptan (CH₃SH) are the two main odor-causing VSCs produced by gram-negative anaerobic bacteria.^{8–12} Hydrogen sulfide has been associated with periodontally healthy individuals,

whereas methyl mercaptan has been associated with periodontal patients.¹¹ Additionally, research suggests that these compounds may be especially important in periodontal infection, as they may interfere with collagen and protein synthesis.^{11–15} Research also suggests that the presence of these compounds may affect the permeability of the gingival sulcus, may enhance the ability of bacteria-produced toxins to pass into the bloodstream, and may accelerate the infection process.^{11–15} This correlation between oral malodor and periodontal infection warrants serious clinical consideration and treatment for patients.

Diagnosis and Management of Oral Malodor

Identification and diagnosis of the patient who suffers from oral malodor is not a specific science. This can make the diagnostic process difficult and uncomfortable for the dental hygienist. In addition, oral malodor may or may not be an issue to the patient when addressed during the preventive appointment (see Table II). From the most complex of equipment, to the use of organoleptic judges, researchers have yet to establish a method that will consistently and easily quantify oral malodor.⁹

The most effective means of oral malodor identification is counterpart assessment.⁹ Family members, close friends, and spouses can assist patients in identifying objectionable malodor and provide key information about its duration, frequency, time of the day, and intensity. Additional diagnostic means include the use of a volatile sulfur monitor, bacterial culturing tests, and use of organoleptic judges. The first two options have limitations, while the use of specially trained researchers (organoleptic judges) has been the most reliable method and is the standard against which diagnostic tools are measured.

Regardless of the method utilized, patients are interested in the prevention of oral malodor. A simple preventive approach will provide the desired results. Therefore, daily management of oral malodor, versus a one-time treatment, should be implemented to achieve effective oral malodor control.

The goal of oral malodor management is achieved by eliminating the associated odor producing bacteria from the oral cavity. A combined approach that includes mechanical debridement with chemotherapeutic adjuncts will provide patients with good results. Mechanical debridement includes daily deplaquing of the dorsum of the tongue. This procedure alone will significantly decrease oral malodor.^{7–10} Tongue deplaquing is best achieved through the use of implements designed exclusively for use on the tongue rather than brushes designed for teeth. The higher profile of toothbrushes make them less effective on the tongue.^{7,16} In addition, tongue scraping has proven to be more effective in reducing odor-causing bacteria because it facilitates an even pressure that will force bacteria, food debris, and dead cells from the crevices of the tongue surface. Daily tongue hygiene, combined with chemotherapeutic support, will control oral malodor as well as enhance overall oral health.

Chemotherapeutic products such as mouthrinses, toothpaste, and tongue gels are popular with patients; therefore, the progressive clinician needs to have a good understanding of the options available. By and large, product criteria should include products that are alcohol-free and sugar-free, and contain an antibacterial agent known for its effectiveness in controlling oral malodor. Agents such as zinc chloride, essential oils, and chlorine dioxide have proven effective in reducing oral malodor. Chlorine dioxide acts by neutralizing the VSCs.^{17,18} Essential oils, such as thymol and eucalyptol, kill anaerobic bacteria,^{17,18} while zinc chloride will effect bacteria cell walls and neutralize volatile sulfur compounds.^{17,18} Other antibacterial agents also may prove effective in oral malodor control. More research in the arena will assist clinicians in making appropriate product recommendations.

Mouthrinses, toothpastes, tongue gels, and chewing gum are popular vehicles for delivering antibacterial agents. It is important to recognize that patients want and use chemotherapeutic options. The combined approach of mechanical deplaquing and chemotherapeutics will provide effective oral malodor control and should be introduced and utilized during the dental hygiene appointment.

Table 2
Oral Malodor Patient Types

<p>Type I - Those who have it and know it. Type II - Those who have it but don't know it or deny they have it. Type III - Those who don't have it, but think they do.</p>

Integrating Aesthetic Assessment into the Preventive Appointment

Cosmetic dental procedures make up the largest growing arena within dentistry^{6,19,20} Patients are interested in and opting for smile-enhancing procedures. Today, the options for aesthetically enhancing procedures include tooth whitening; use of tooth-colored restorative materials, porcelain veneers, and crowns and bridges; periodontal cosmetic procedures; and dental implants. The dental hygienist should be thoroughly educated on the procedures offered within the practice and from specialists to which the practice refers.

Assessment can begin during the health history update. Verbal “probing” will assist the dental hygienist in determining the patient’s interest in smile-enhancing procedures. The single most useful tool in aesthetic assessment is the intraoral camera. By providing the patient with a “tour” of his or her oral cavity, the clinician is giving the patient the most convincing visual information regarding both needed treatment and elective aesthetic procedures.

Tooth whitening, one of the most popular and simple aesthetic procedures,^{6,19,20} has been offered primarily as a result of patient interest, not professional recommendation. This simple, safe and effective procedure can dramatically change a person’s smile.^{21–23} Professionally supervised products are recommended by researchers and aesthetic clinicians so that the patient may be carefully monitored and appropriate treatment recommendations made.

The primary whitening agent used is carbamide peroxide in 10%, 16%, or 22% solutions. The carbamide peroxide is placed in a custom-fitted tray and breaks down to hydrogen peroxide. This process whitens the enamel surface through oxidation. There are also products on the market that contain hydrogen peroxide and produce results in a shorter period of time. Some patients may need to be retreated, especially if they have staining-related habits (i.e., coffee, tea, tobacco use).

The keys to successful whitening include product selection, a custom-fitted tray, and patient compliance. Clinicians should evaluate a product based upon its ease in use, high viscosity, and proven results. The patient should be instructed to wear the tray either a few hours during the day, or throughout the night, depending on the manufacturer’s instructions and the patient’s preference. Age- and food-related stains respond best to the whitening process, usually within 7–14 days. Intrinsic stain, such as from tetracycline or fluorosis, can respond to the whitening procedure but may take longer. The

most common side effect is tooth sensitivity, which is easily addressed through the use of desensitizing agents such as 1.1% sodium fluoride or potassium nitrate.²²

When asked, the majority of patients express an interest in enhancing their smiles. From tooth whitening to full aesthetic reconstruction, today's progressive practice offers an array of treatment options. It is important that dental hygienists become and stay informed about all aspects of aesthetic options, including professional and home care maintenance. Discussions with the dentist, specialist, and manufacturer establish the dental hygienist's role as an integral part of the aesthetic team. Patients with an enhanced aesthetic appearance are more likely to take the time to care for their oral cavity, thereby maintaining optimal oral health.

Enhancing Oral Health through Prevention and Aesthetics

The dental hygienist is in a key position to implement a patient-centered approach that will address social consideration and ultimately improve oral health. The following represents a suggested process of care that will include oral malodor assessment and assessment of the patient's interest in smile-enhancing procedures as well as traditional dental hygiene treatment protocols

Dental Hygiene Assessment

Health History/Patient Update Information

- 1.) Review medical history/Take blood pressure. Include questions regarding family history of systemic illnesses.
- 2.) Assess interest in smile-enhancing procedures.
- 3.) Review current oral hygiene routine. Assess "real" time and tools utilized as well as technique.
- 4.) Determine current usage and frequency of usage of oral malodor related products:
Toothpaste: Specific brand/times per day
Mouthrinse: Specific brand/times per day and how long
Breath Mints: Specific brand/times per day
Chewing Gum: Specific brand/ times per day
Other: Tongue gels, breath sprays, etc.
- 5.) Perform oral cancer screening and extra-/intraoral exam.
- 6.) Perform comprehensive periodontal examination. Pocket depths of 4 mm or greater are more likely to produce VSCs; in addition, the tongue coating in periodontal patients can be up to six times greater than a periodontally healthy patient.
- 7.) Note the condition of the surface of the tongue. Coating, thickness, color, and texture.
- 8.) Identify restorations, crowns, and bridges that need replacing. These ideal bacteria traps must be eliminated as a possible cause of oral malodor.
- 9.) Note the presence of oral lesions and tonsilloliths. Tonsilloliths are calcified material and bacteria that embed in the tonsillar tissue. These as well as oral lesions can contribute to oral malodor.

Clinical Protocol/Introduction of Oral Malodor Management and Aesthetic Assessment

1.) Pre- and postprocedural use of an antibacterial mouth rinse to neutralize VSCs.

2.) Eliminate/reduce plaque and calculus.

A. Instrumentation as indicated—Take the opportunity to correlate periodontal conditions with oral malodor.

B. Subgingival irrigation to neutralize VSCs that have been linked with an increase in mucosa permeability, interference with collagen and protein synthesis.

C. Remove remaining plaque from interproximal regions.

D. Perform selective polishing as indicated.

E. Perform tongue deplaquing procedure using tongue scraper and antibacterial tongue gel. Involve the patient in this process and open dialog regarding the tongue coating and its relationship to oral malodor and bacteria accumulation.

3.) Evaluate for additional preventive care :

- Sealants

- Topical fluoride treatment

- Daily fluoride use

- Professional and daily fluoride therapy is indicated based upon caries activity. A patient, regardless of age, who has had an incipient or active lesion within the past year is a candidate for fluoride therapy

4.) Introduce smile-enhancement options

Toothwhitening, laminate veneers, crown/ bridge, composites, perio-cosmetic options, and dental implants are all examples of aesthetic options. Be aware and informed about these options and discuss them with each patient

5.) Patient education for daily care

Consideration of appropriate tools should include automated devices, interproximal cleansing, use of appropriate chemotherapeutics and tongue scrapers. Make the correlation between plaque removal and fresh breath

6.) Appoint for recare and restorative/ aesthetic procedures

Conclusion

Research linking various systemic diseases to oral infection validates the necessity for an effective oral hygiene program and the importance of the preventive appointment. By offering treatment and procedure options that address social and aesthetic factors, dental hygienists will broaden their scope beyond the traditional disease motivation model concept. This will affirm the dental hygienist's importance to the patient and value to their practice. The principles of aesthetic dental hygiene are based on a patient-centered approach and a process of care that will improve oral health through prevention and aesthetics while improving patient satisfaction.

References

1. Position Paper of the American Academy of Periodontology: Periodontal disease as a potential risk factor for systemic diseases. *Journal of Periodontology* 1998;69(7):841-850.

2. Cancro L, Fischman L: The expected effect on oral health of dental plaque control through mechanical removal. *Periodontology* 2000 1995;8:60-74.

3. Beck J, Garcia R, Heiss G, Vokonas PS, Offenbacher S: Periodontal disease and cardiovascular disease. *Journal of Periodontology* 1996;67:1123-1137.

4. Bouffard C: Heart disease: Established and emerging risk factors. *Access* 1998;12(3):23-30.

5. Offenbacher S, Katz V, Fertik G, et al.: Periodontal infection as a possible risk factor for preterm low birth weight. *Journal of Periodontology* 1996;67:1103-1113.
6. Joyal F: Making people want dentistry. *California Dental Association Journal* 1998;26(7):502-505.
7. Christensen G: Why clean your tongue? *Journal of the American Dental Association* 1998;129(11):1605-1607.
8. Messadi D: Oral and nonoral sources of halitosis. *California Dental Association Journal* 1997;25(2):127-131.
9. Clark GT, Nachnani S, Messadi DV: Detecting and treating oral and nonoral malodors. *California Dental Association Journal* 1997;24(2):133-143.
10. Tonzetich, J: Production and origin of oral malodor: A review of mechanisms and methods of analysis. *Journal of Periodontology* 1997;48(1):13-20.
11. Yaegaki K, Sanada K: Biochemical and clinical factors influencing oral malodor in periodontal patients. *Journal of Periodontology* 1992;63:783-789.
12. Klokkevold P: Oral malodor: A periodontal perspective. *California Dental Association Journal* 1997;24(2):153-159.
13. Bosy A, Kulkarni GV, Rosenberg M, McCulloch CAG: Relationship of oral malodor to periodontitis: Evidence of independence in discrete subpopulations. *Journal of Periodontology* 1994; 65(1):37-46.
14. Tonzetich J: Oral malodour: An indicator of health status and oral cleanliness. *International Dental Journal* 1978;28:309-319.
15. Rizzo AA: The possible role of hydrogen sulphide in human periodontal disease. I. Hydrogen sulphide production in periodontal pockets. *Periodontics* 1967;5:223-236.
16. Tonzetich J, Ng SK: Reduction of malodor by oral cleansing procedures. *Oral Surgery Oral Medicine Oral Pathology* 1976;42(2):172-181.
17. Nachnani S: The effects of oral rinses on halitosis. *California Dental Association Journal* 1997;24(2):145-150.
18. Rosenberg M, et al.: *Bad Breath: Research Perspectives*. Ramot Publishing, Tel Aviv University, 1995.
19. Burhahl B: Bleaching business is booming. *AGD Impact* 1998;April.
20. Christensen G: How the trend to elective dental procedures influences your practice. *Journal of the American Dental Association* 1998;129(3):355.
21. Dunn JR: Dentist-prescribed home bleaching: Current status. *Compendium* 1998;19(8):760-764.
22. Leonard RH Jr: Efficacy, longevity, side effects, and patient perceptions of nightguard vital bleaching. *Compendium* 1998;19(8):766-781.
23. Li Y: Toothbleaching using peroxide-containing agents: Current status of safety issues. *Compendium* 1998;19(8):783-794.

Additional Reading, Continuing Education Seminars & Resources

Hodsdon KA: Supportive aesthetic therapies: What every dental hygienist should know. Access 1998;12(9):47-51.

Linder AA: This hygiene check will build your practice. Dental Practice & Finance 1998;6(6):57-60.

Guide to Success—Enhancing Oral Health through Prevention and Aesthetics. Includes information on presenting oral malodor management, tooth whitening and fluoride therapy to patients. Available from Discus Dental, Inc. Call 1-800-826-9711 for a copy.

Haywood VB (ed.): Current opinions on nightguard vital bleaching. Compendium 1998;19(8, special issue).

Principles of Aesthetic Dental Hygiene: A Patient Centered Approach. Continuing education seminar (four hours) hosted by associations throughout the country. Contact Educational Designs at 1-925-735-3238 for the seminar schedule or to schedule a presentation for your group.

4th Annual Super Seminar on Aesthetics in Las Vegas, NV, May 14-16, 1999. Sponsored by Discus Dental, Inc. Call 1-800-600-6748 for registration information.

4th International Conference on Breath Odor, UCLA, Los Angeles, CA, August 20-21, 1999. Call 1-310-206-8388 for registration information.

In-Office Training & Education on oral malodor, tooth whitening and preventives through MSG at Discus Dental. Call 1-800-600-6748 for more information.