

Earn
3 CE credits
 This course was
 written for dentists,
 dental hygienists,
 and assistants.

Women's Health

A Peer-Reviewed Publication
 Written by Cathy Hester Seckman, RDH

Abstract

Dental hygienists must be knowledgeable about women's oral and overall health. This course begins with a history of theories and research on the oral-systemic link going back to antiquity. It lists those issues most closely associated with the oral environment including; preeclampsia, osteoporosis, obesity, cardiovascular diseases, diabetes, chronic kidney disease and lung disease. The majority of hygienists are women and they spend more time with patients than other dental professionals. They are uniquely qualified to keep both female and male patients informed on oral-systemic links and contribute to individualized treatment planning.

Educational Objectives

At the conclusion of this educational activity participants will be able to:

1. List women's health issues that have known oral-systemic connections
2. Discuss the biological links between oral bacteria and different organ systems
3. Use the knowledge gained to tailor treatment plans for periodontal patients
4. Equip female patients with information to take charge of their oral and systemic health

Author Profile

Cathy Hester Seckman, RDH, a 1974 graduate of West Liberty State College, is a hygienist as well as an indexer, writer, and novelist. She has worked in dentistry 33 years, including 11 years in pediatrics. She presents CE courses on topics including pediatric management, nutrition, pre-natal to pre-school care, communication and adolescent risk behaviors. She is a member of the American Dental Hygienists Association and the Ohio Dental Hygienists Association. She can be contacted at cathy@cathyseckman.com

Author Disclosure

Cathy Hester Seckman, RDH has no commercial ties with the sponsors or providers of the unrestricted educational grant for this course.

Go Green, Go Online to take your course

Publication date: Dec. 2014
 Expiration date: Nov. 2017

Supplement to PennWell Publications

PennWell is an ADA CERP recognized provider

ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Concerns or complaints about a CE provider may be directed to the provider or to ADA CERP at www.ada.org/goto/cerp.

PennWell designates this activity for 3 continuing educational credits.

Dental Board of California: Provider 4527, course registration number CA# 03-4527-14087
"This course meets the Dental Board of California's requirements for 3 units of continuing education."

The PennWell Corporation is designated as an Approved PACE Program Provider by the Academy of General Dentistry. The formal continuing dental education programs of this program provider are accepted by the AGD for Fellowship, Mastership and membership maintenance credit. Approval does not imply acceptance by a state or provincial board of dentistry or AGD endorsement. The current term of approval extends from (11/1/2011) to (10/31/2015) Provider ID# 320452.



ADA CERP® | Continuing Education Recognition Program



This educational activity was developed by PennWell's Dental Group with no commercial support.

This course was written for dentists, dental hygienists and assistants, from novice to skilled.

Educational Methods: This course is a self-instructional journal and web activity.

Provider Disclosure: PennWell does not have a leadership position or a commercial interest in any products or services discussed or shared in this educational activity nor with the commercial supporter. No manufacturer or third party has had any input into the development of course content.

Requirements for Successful Completion: To obtain 3 CE credits for this educational activity you must pay the required fee, review the material, complete the course evaluation and obtain a score of at least 70%.

CE Planner Disclosure: Heather Hodges, CE Coordinator does not have a leadership or commercial interest with products or services discussed in this educational activity. Heather can be reached at hhodges@pennwell.com

Educational Disclaimer: Completing a single continuing education course does not provide enough information to result in the participant being an expert in the field related to the course topic. It is a combination of many educational courses and clinical experience that allows the participant to develop skills and expertise.

Image Authenticity Statement: The images in this educational activity have not been altered.

Scientific Integrity Statement: Information shared in this CE course is developed from clinical research and represents the most current information available from evidence based dentistry.

Known Benefits and Limitations of the Data: The information presented in this educational activity is derived from the data and information contained in reference section. The research data is extensive and provides direct benefit to the patient and improvements in oral health.

Registration: The cost of this CE course is \$59.00 for 3 CE credits.

Cancellation/Refund Policy: Any participant who is not 100% satisfied with this course can request a full refund by contacting PennWell in writing.

Educational Objectives

At the conclusion of this educational activity participants will be able to:

1. List women's health issues that have known oral-systemic connections
2. Discuss the biological links between oral bacteria and different organ systems
3. Use the knowledge gained to tailor treatment plans for periodontal patients
4. Equip female patients with information to take charge of their oral and systemic health

Abstract

Dental hygienists must be knowledgeable about women's oral and overall health. This course begins with a history of theories and research on the oral-systemic link going back to antiquity. It lists those issues most closely associated with the oral environment including; preeclampsia, osteoporosis, obesity, cardiovascular diseases, diabetes, chronic kidney disease and lung disease. The majority of hygienists are women and they spend more time with patients than other dental professionals. They are uniquely qualified to keep both female and male patients informed on oral-systemic links and contribute to individualized treatment planning.

Introduction

From our 21st-century viewpoint, oral-systemic links may seem like a relatively new idea, but its roots go back to Hippocrates and Aristotle. Hippocrates theorized such a connection and Aristotle believed "those persons who have the most teeth are the longest-lived." In the intervening centuries, one health professional after another has suspected a connection between dental disease and systemic disease. Unhealthy teeth were at different times linked with syncope, epilepsy, eyesight, rheumatism, septicemia, lung and heart disease, diphtheria, tuberculosis and syphilis.¹ At the beginning of the 20th century, a focus of infection theory (FIT) became popular. Lecturing at Stanford University in 1916, physician Frank Billings offered the following definition of FIT: ". . . a circumscribed area of tissue infected with pathogenic organisms. Foci may be primary or secondary. Primary foci usually are located in tissues communicating with a mucous or cutaneous surface. Secondary foci are the direct result of infections from other foci through contiguous tissues, or at a distance through the blood stream or lymph channels. Primary foci of infection may be located anywhere in the body."² Billings is credited with popularizing tonsillectomies and tooth extractions as intervention techniques for disease in distant parts of the body. The theory's popularity declined rapidly. By the 1940s, after inconsistent research results, it was rejected by most health professionals. Support for FIT never quite died out and by the 1980s began rising again to the level of interest shown today.³

A 1998 study at Tokyo Dental College stated more than 300 species of bacteria are found in the oral cavity and that the number of individual oral bacteria can reach a thousand billion in an unclean mouth. Recent research indicates there are approximately 700

bacterial species in the oral cavity. The Tokyo Dental College study reported direct links between these bacterial and systemic diseases common to women including; bacterial pneumonia, endocarditis, pregnancy issues, circulatory problems and coronary heart disease.⁴ Since 2007, when a World Health Assembly determined oral health should be integrated into chronic disease prevention programs, the medical community has taken the oral-systemic link more seriously.⁵ A 2013 study examining a possible link between periodontitis and cancer discussed the idea that inflammation plays a crucial role in tumor progression; "Oral inflammation often has systemic effects leading to an increased concentration of circulating inflammatory markers."⁶ periodontal disease has also been linked to a number of systemic diseases and conditions.

Oral-systemic effects on women

Women's health issues are an important subset in the oral-systemic discussion. Ellen Daley, PhD, MPH of the University of South Florida, speaking to the American Public Health Association in 2010, defined women's health issues as a national priority. She said one area of women's health that has not received enough attention is the oral-systemic relationship. That relationship, Daley says, includes specific women's issues such as; menstruation, pregnancy, menopause, osteoporosis and oral contraceptives, as well as non-gender specific morbidities such as heart disease, diabetes and stroke.⁷

Pregnancy outcomes

Possible links between adverse pregnancy outcomes and periodontitis have been under study for years and reports can be contradictory. At the present time, the American Academy of Periodontology states there is a "modest association between maternal periodontitis and adverse pregnancy outcomes." It stops short of recommending periodontal therapy to reduce adverse pregnancy events, but says treatment during pregnancy is "considered safe". Dental professionals are cautioned to follow general obstetric guidelines during treatment.⁸

Studies have shown that pregnant women receive less dental care than usual while they are pregnant.⁹ Though oral health assessment is a vital part of prenatal care, it sometimes doesn't occur because of uncertainty about the safety of dental treatment, especially during the first trimester. The American College of Obstetricians and Gynecologists (ACOG) states that 56% of women do not visit a dentist during pregnancy. For optimal health ACOG states; "[women should be routinely counseled about the safety and importance of oral health care during pregnancy.]"¹⁰

A full-term pregnancy lasts between 39 weeks and 40 weeks 6 days. Anything less than 37 weeks is considered pre-term. From 1981 until as recently as 2006, the rate of preterm births in the United States was on the rise at 12.8%. This was of particular concern since preterm infants have an increased risk of early death and life-long disability. The preterm birth rate began to decline in 2007.¹¹

The March of Dimes reports the preliminary overall figure for preterm births in 2012 is 11.5%, on its way to a 2020 goal of 9.6%. By race and ethnicity, the percentages are as follows: Hispanic, 11.7%;

White, 10.5%, Black, 16.8%; Native American, 13.6%; and Asian, 10.3%. (National Center for Health Statistics)¹²

The importance of oral health care during pregnancy is highlighted by a 2012 systematic review of randomized controlled trials. The review found that scaling and root planing has a statistically significant effect in reducing the risk of preterm birth in groups which are already at high risk of preterm birth.¹³

Preeclampsia, another pregnancy issue in which a woman develops high blood pressure and protein in the urine after the 20th week of pregnancy, has also been linked to oral health. A 2013 study found that pregnant women with preeclampsia are at greater risk of early delivery if periodontal disease is present during pregnancy, or progresses during pregnancy.¹⁴

A 2013 study found that women with periodontal disease were at higher risk for developing preeclampsia, or of delivering babies too early, and/or with low birth weight. The percentage of preeclamptic women with periodontal disease in the study was 18.6 percent, compared with 7.3% in the control group.¹⁵ However, a meta-analysis done in China and also published in 2013 found that causality remained unclear in the association between periodontal disease and preeclampsia.¹⁶

At this writing, neither the Preeclampsia Foundation nor WebMD® list periodontal disease as a risk factor, although it is at the bottom of an “additional risk factors” list on Medscape®. In spite of contradictory research results, intersection points with pregnancy and oral health are intriguing and give researchers many paths to follow.

Gram-negative bacteria

Gram-negative bacteria are so defined by their reaction to the Gram staining method of bacterial identification, and are anaerobic. Those involved with oral disease include *A. actinomycetemcomitans*, *P. gingivalis*, *P. intermedia*, *T. forsythia*, *C. rectus*, *E. nodatum*, *P. micros*, *S. intermedius* and *T. denticola*, among others. In a disease state, the numbers of bacteria can be 10(5) times higher than those in a healthy state.¹⁷

In 2006, Yiping et al found direct evidence of oral-uterus microbial transmission. Gram-negative *Bergeyella* sp. clone AF14 was detected in a patient with clinical intrauterine infection and histologic necrotizing acute and chronic chorioamnionitis (an inflammation of fetal membranes), and was found to be 99.7% identical to a previously reported uncultivated oral *Bergeyella* strain, clone AK152. That same strain was detected in the patient's subgingival plaque.¹⁸

A 2013 study looked at the relationship between oral and vaginal microflora and preterm low birth weight. Acute genitourinary tract infection, the study points out, is one of the most important factors in preterm birth. The presence of *T. denticola*, the study noted, regardless of amount, adversely affects preterm delivery.¹⁹

Prostaglandins

Prostaglandins are lipid compounds that are derived from fatty acids. In the oral cavity poor periodontal health results in, among other things, a chronic release of prostaglandins.²⁰

Prostaglandins have an essential role in labor and delivery, since they regulate the contraction and relaxation of smooth muscle tissue.²¹ Prostaglandins can be administered to induce labor or restricted to reduce myometrial contractility.²²

C-reactive protein (CRP)

CRP is a marker of systemic inflammation. High CRP levels in patients with aggressive periodontitis have been shown to be statistically significant. A study done in 2006 reported the levels “might represent a contribution of periodontal infections to systemic inflammation in relatively young individuals.”²³

Preterm delivery, preeclampsia and intrauterine growth restriction have all been associated with CRP. Specifically, CRP levels of more than 8 mg/liter in early pregnancy were associated with spontaneous preterm delivery in this study.²⁴

Cardiovascular disease

Cardiovascular diseases pose a significant risk for women, responsible for one in every four female deaths. Women can be in considerable danger of late diagnosis because they and their physicians may discount or downplay symptoms. The American Heart Association reports that CVD, particularly coronary heart disease (CHD) and stroke, are the leading killers of women in the United States. To put it in perspective, 1 in 2 women will die of heart disease or stroke, compared to 1 in 25 who will die of breast cancer. The rate of women's deaths from CVD is 69% higher in African American women.²⁵ Symptoms of a heart attack for women are different from those of men and may be so subtle that they occur during sleep or rest. They include:

- neck, jaw, shoulder, upper back or abdominal discomfort
- shortness of breath
- right arm pain
- nausea or vomiting
- sweating
- lightheadedness or dizziness
- unusual fatigue²⁶

Periodontal disease is a known risk factor, resulting in a 19% increase in the risk for CHD, according to Janket, et al, 2003.²⁷ The 2009 Periodontitis and Vascular Events (PAVE) study pointed out the important role of preventive periodontal care in reducing cardiovascular risk and also brought up the question of obesity as a secondary risk factor. Periodontal therapy was performed as an intervention in a secondary cardiac event prevention model. The effects on periodontal status and systemic levels of high-sensitivity C-reactive protein (hs-CRP) were studied after the control group was provided with community care, while the study group was provided with a scaling and root planing protocol. At the conclusion of the study, secondary analyses revealed that any preventive or periodontal care, compared to no treatment, showed a significant reduction in those with elevated hs-CRP levels. However, it was noted that obesity nullified the periodontal treatment effects on hs-CRP reduction. Researchers concluded; "This pilot study demonstrated the critical role of considering obesity as well as rig-

orous preventive and periodontal care in trials designed to reduce cardiovascular risk."²⁸

Hypertensin and stroke

A 2010 study known as INVEST (The Oral Infections and Vascular Disease Epidemiology Study) investigated the relationship between periodontal microbiota and hypertension. The INVEST study concluded there is [evidence of a direct relationship between the levels of subgingival periodontal bacteria and both systolic and diastolic blood pressure as well as hypertension prevalence.]²⁹

Obesity

The National Health and Nutrition Examination Survey (NHANES) conducted by the CDC for 2011-2012 reveal that about one-third of U.S. women are obese. Specifically, 31.8% of women ages 20-39; 39.5% of women ages 40-59; 38.1% of women age 60 and older; and 36.1% of all adult women are obese. Obesity prevalence did not change significantly between 2009-2010 and 2011-2012.³⁰ Obesity is defined as a Body Mass Index (BMI) greater than or equal to 30. A person who is underweight has a BMI of less than 18.5. Normal weight individuals have a BMI of 18.5 to 24.9. An overweight person has a BMI of 25 to 29.9.

A 2013 study in Eastern Europe looked at the associations between obesity, periodontitis, oral hygiene and tooth loss in non-smoking subjects aged 31-75. Prpic and colleagues noted that an increased body mass index was associated with oral health and tooth loss, and with severe forms of periodontal disease in poorly educated women aged 36-55 years. BMI could not be correlated with severity of periodontal disease, except in poorly educated women aged 36-55 years in this study.

292 patients were studied at a dental clinic in Croatia. A subset of obese, poorly educated women between 36 and 55 were up to six times more likely to develop severe periodontal disease. Prevention programs, researchers stressed, should aim at raising general health awareness and improving oral health.³¹

Related to obesity issues, other research has looked at the interfaces between bariatric surgery and oral health. A study e-published in January 2014 found that though the surgery may have improved systemic conditions, it had a negative impact on oral health because of an increase in periodontal disease and dental wear. The 59 subjects had gastric bypass. Salivary flow, periodontal pocket depth and dental wear were evaluated before and six months after surgery. Body mass index, C-reactive protein and glucose levels were obtained. The mean BMI decreased from 49.31 plus or minus 8.76 to 35.52 plus or minus 8.12. Salivary flow remained at the same values. CRP and blood glucose levels were significantly reduced. Both mean pocket depths and dental wear were significantly higher, but instances of enamel wear decreased.³²

Osteoporosis

According to the National Library of Medicine (NLM), osteoporosis is "a disease in which bones become fragile and more likely

to fracture. Usually the bone loses density, which measures the amount of calcium and minerals in the bone." The leading causes of osteoporosis are a drop in estrogen in women at the time of menopause and a drop in testosterone in men. Osteoporosis may also occur because of inherited tendencies toward thin bones and bone loss due to a lack of calcium and vitamin D; or for no known cause. Besides heredity, risk factors include long-term amenorrhea, heavy alcohol use, smoking and low body weight. Treatment for the disease includes dietary changes, exercise, estrogens and bisphosphonates, which have been implicated in osteonecrosis of the jaw. The National Library of Medicine also indicates that about half of women over age 50 will suffer a fracture of the hip, wrist or vertebrae because of osteoporosis.³³ Another consequence of osteoporosis may be periodontal disease.

Researchers are divided on the question of whether osteoporosis is a risk factor for periodontal disease. There does not appear to be a bidirectional risk. A literature review of studies on postmenopausal women was undertaken in 2013, published in the *Journal of Dental Hygiene*, to determine whether the relationship is causal or casual. Four of the five longitudinal studies reviewed suggested a positive association between osteoporosis and periodontal disease.³⁴ The osteoporosis-caused loss of bone density, another research paper concludes, may result in a host system susceptible to the infectious destruction of periodontal tissue. The majority of studies show that low bone mass can be independently associated with the loss of alveolar crest height and tooth loss. A relationship between osteoporosis and clinical attachment loss, however, has not been proven conclusively. Researchers point to small sample sizes, limited control of confounding factors and inconsistent definitions of terms. Heredity, hormones and other host factors common to osteoporosis also influence periodontal disease states.³⁵

Diabetes

More men than women suffer from diabetes in the United States, according to the CDC, but the problem is on the rise overall. Between 1980 and 2011, the percentage of diagnosed diabetes for men increased 156%, to 6.9. For women, the percentage rose 103%, to 5.9.³⁶ The risks of morbidity and mortality from diabetes are significant and frightening for both genders.

The relationship between diabetes and oral health is truly bidirectional. Diabetes raises the risk of periodontal disease, because diabetics are more susceptible to infection; and periodontal disease increases insulin resistance and blood sugar levels and disturbs glycemic control, which can lead to diabetic complications.^{30, 37} How does the relationship work? The National Library of Medicine indicates that the impaired neutrophil function that accompanies diabetes may hinder the suppression of bacteria in a periodontal pocket. In the other direction, diabetics with periodontitis who also have HbA1c levels of more than 8% have twice the normal levels of cytokines in gingival crevicular fluid. The oxidative stress of gum disease increases the release of proinflammatory cytokines. Those with HbA1c levels greater than 9% are observed to have severe periodontitis with higher probing depths and more attach-

ment loss than those with lower HbA1c levels. Insulin resistance may be perpetuated by C-reactive protein. Diabetes also affects the levels, pH and buffering capacity of saliva, leading to xerostomia and increased potential for dental disease.³⁰ A 2010 study demonstrated that treatment of periodontal disease improves oral health and glycemic control in type 2 diabetics. Researchers note that additional studies are needed to confirm these conclusions.³⁸

Kidney disease

Chronic kidney disease (CKD) is more common in adult women than it is in adult men, at 17% for women and 15% for men. (http://www.cdc.gov/diabetes/pubs/pdf/kidney_factsheet.pdf) Studies support a bidirectional relationship between CKD and periodontal disease. Moderate to severe disease (meaning two or more teeth with at least 6mm of attachment loss) is associated with cardiovascular death among patients on hemodialysis. In the other direction, edentulousness and the presence of *A. actinomycetemcomitans*, a Gram-negative periodontal pathogen, can be risk indicators for CKD.³⁰ CKD affects oral health by inducing hyperplasia and xerostomia. Periodontitis affects CKD by increasing systemic inflammation and altering serum albumin and C-reactive protein levels. Treating periodontal disease, say researchers, could be a factor in decreasing the systemic inflammatory burden.³⁹

None of the major CKD websites, including the National Kidney Foundation, the Centers for Disease Control and Prevention and the Mayo Clinic, list periodontitis as a risk factor for CKD at the time of this writing.

Lung disease

Both pneumonia and chronic lower respiratory disease, which includes asthma and COPD, are among the top 10 causes of death in women.⁴⁰ In March, researchers at Capital Medical University, Beijing, China, published results of a two year pilot randomized controlled trial that evaluated the effects of periodontal therapy on COPD patients. Patients were randomly assigned to either oral hygiene instruction only; supragingival scaling; or scaling and root planing. Patients in the second and third treatment groups had improved measurements in both periodontal indices and forced expiratory volume compared with the control group. Frequencies of COPD exacerbation were also lower in the two treatment groups. Preliminary results from the trial report that COPD patients with periodontal disease may experience improved lung function and less COPD exacerbation by having periodontal therapy.⁴¹

Another 2014 study looked at dental plaque and lung bacteria in patients with severe acute exacerbations of COPD (AE-COPD), which is a leading cause of mortality in intensive care units. Subgingival plaque biofilm and aspirations from the trachea were collected and analyzed. Anaerobic, aerobic, pathogenic, opportunistic, novel and uncultivable bacteria were found in both paired samples, including known oral pathogens *A. actinomycetemcomitans*, *C. sputigena*, *P. gingivalis*, *T. forsythia*, and *T. denticola*. Researchers concluded that “[dental bacteria may contribute to the pathology of severe AE-COPD].”⁴²

Tobacco and alcohol use

More than 18% of U.S. women are smokers, compared to more than 23% of men. The gap in percentages has been decreasing and women are suffering from more smoking related disease. The American Lung Association lists the following facts about female smokers:

- 80% of lung cancer deaths in women are directly attributable to smoking and cause more deaths than breast cancer.
- Deaths from COPD are 13 times more likely to occur in female smokers than non-smokers.
- Female smokers have an increased risk for developing oral cancer, cancers of the pharynx, larynx, esophagus; pancreas, kidney, bladder and cervix. Their risk of coronary heart disease doubles.
- Postmenopausal female smokers have lower bone density and a higher risk of hip fracture than women who have never smoked.
- Women and teen girls are heavily targeted in tobacco ads which portray cigarettes as slimming.
- Smoking during pregnancy is linked to preterm deliveries, low-birth weight babies and 10% of infant deaths. The odds of an infant or child developing asthma are high when their mothers smoke more than 10 cigarettes per day.

The effects of smoking and other forms of tobacco use on oral health are well known and are of particular concern in pregnant women. The World Health Organization (WHO) provided guidelines in 2013 for the prevention and management of tobacco use and second-hand smoke exposure during pregnancy. The recommendations are as follows:

1. Assessment of tobacco use and second-hand smoke exposure in pregnancy
2. Psychosocial interventions for tobacco-use cessation in pregnancy
3. Use of pharmacotherapy for tobacco-use cessation in pregnancy
4. Protection from second-hand smoke in pregnancy (smoke-free public places)
5. Protection from second-hand smoke in pregnancy (smoke-free homes)⁴³

Oral effects of tobacco include, higher incidences of oral cancer and oral cancer recurrence, as well as periodontal disease and a higher risk of cleft lip and palate with maternal smoking during pregnancy. The immune system response to oral infection is suppressed by tobacco and healing is compromised. The WHO urges dental professionals to promote tobacco cessation programs because of the seriousness of oral health effects.⁴⁴

Alcohol is absorbed differently in women's bodies and takes longer to metabolize, causing women to be more vulnerable to the long-term health effects of alcohol use and abuse. Half of all women of childbearing age use alcohol, and 15% are binge drinkers. Seven and a half percent of pregnant women use alcohol, increasing their risk of fetal alcohol spectrum disorders which can cause mental retardation, birth defects and miscarriage.⁴⁵

Oral effects of alcohol include higher incidences of periodontal disease, caries and precancerous lesions.⁴⁶

HPV-related oropharyngeal cancer

Public health experts say most people who are sexually active will be infected with a human papilloma virus at some point in their lives, but the virus will normally go away without treatment. Increasingly, the development of cancer has been linked to HPV infection via vaginal, anal and oral sex, and the risk increases with the numbers of sexual partners.⁴⁷ There are more than 100 HPVs, but thus far vaccines are available only for types 6, 11, 16 and 18. Since the CDC indicates that 47% of high school students report having had sexual intercourse, and 34% of those don't always use condoms, teenagers are especially at risk and urged to get vaccinations. HPVs are responsible for two out of three oropharyngeal cancers, which are best detected during dental exams or self-exams. A 2000 study in the *Journal of the National Cancer Institute* strongly suggests that HPV-positive oropharyngeal cancers are likely causally associated with HPV infection.⁴⁸ HPV-associated oropharyngeal cancers are more than twice as common in men as women.

For 2014, the American Cancer Society predicts that 27,000 people will develop oral or oropharyngeal cancer. Of those, about 7,300 will die.

Conclusion

With the constant availability of health information in the media, our female patients have become more aware of total body health, wellness and the oral-systemic link. We have a responsibility as healthcare professionals to educate ourselves about the specific connections between our patients' oral conditions and their overall health, so we can add to their knowledge and self-efficacy.

References

1. Genco and Williams. Periodontal Disease and Overall Health: A Clinician's Guide. 53. © 2010 Colgate-Palmolive Co.
2. Billings, F.: Focal infection. The Lane Medical Lectures. D. Appleton & Co., New York, 1916.
3. http://en.wikipedia.org/wiki/Focal_infection_theory.
4. Okuda K, Ebihara Y. Relationships between chronic oral infectious diseases and systemic diseases. *Bull Tokyo Dent Coll*. 1998 Aug;39(3):165-74
5. Viera C, Caramelli B. The history of dentistry and medicine relationship: Could the mouth finally return to the body? *Oral Dis*. 2009 Nov;15(8):538-46. Epub 2009 Jul 13.
6. Pendyala G et al. Links demystified: Periodontitis and cancer. *Den Res J (Isfahan)*. 2013 Nov;10(6):704-712.
7. <https://apha.confex.com/apha/138am/webprogram/Paper228619.html>
8. http://www.perio.org/perio.org/consumer/EFP_AAP_Workshop_Proceedings
9. Steinberg BJ, Hilton IV Iida H, Samuelson R. Oral health and dental care during pregnancy. *Dent Clin North Am* 2013 Apr;57(2)
10. http://www.acog.org/Resources_And_Publications/Committee_Opinions/Committee_on_Health_Care_for_Underserved_Women/Oral_Health_Care_During_Pregnancy_and_Through_the_Lifespan
11. <http://www.cdc.gov/nchs/data/databriefs/db39.pdf>
12. <http://www.marchofdimes.com/materials/premature-birth-report-card-united-states.pdf>
13. Kim AJ et al. Scaling and root planing treatment for periodontitis to reduce preterm birth and low birth weight: a systematic review and meta-analysis of randomized controlled trials. *J Periodontol*. 2012 Dec.;83(12) 1508-19.
14. Pattanashetti JI, Nagathan VM, Rao SM; Evaluation of Periodontitis as a Risk for Preterm Birth among Preeclamptic and Non-Preeclamptic Pregnant Women – A Case Control Study. *J Clin Diagn Res*. 2013 Aug;7(8). Epub 2013 Aug 1
15. Alchalabi HA et al. Association between periodontal disease and adverse pregnancy outcomes in a cohort of pregnant women in Jordan. *Clin Exp Obstet Gynecol*. 2013;40(3):399-402.
16. Wei BJ, Chen YJ, Yu L, Wu B. Periodontal disease and risk of preeclampsia; a meta-analysis of observational studies. *PLoS One* 2013 Aug12;8(8) e70901.
17. Lovegrove JM. Dental plaque revisited: bacteria associated with periodontal disease. *JNZ Soc Periodontol*. 2004;(87):7-21.
18. Yiping WH et al. Transmission of an Uncultivated *Bergeyella* Strain from the Oral Cavity

to Amniotic Fluid in a Case of Preterm Birth. *J. Clin. Microbiol.* April 2006 vol. 44 no. 4 1475-1483 doi: 10.1128/JCM.44.4.1475-1483.

19. Cassini MA et al. Periodontal bacteria in the genital tract: Are they related to adverse pregnancy outcome? *Int J Immunopathol Pharmacol*. 2013 Oct-Dec;26(4):931-9.
20. Rajesh KS, Thomas D, Hegde S, Kimar MS; Poor periodontal health: A cancer risk? *J Indian Soc Periodontol*. 2013 Nov;17(6):706-10.
21. <http://en.wikipedia.org/wiki/Prostaglandin>
22. O'Brien WF. The role of prostaglandins in labor and delivery. *Clin Perinatol*. 1995 Dec.;22(4):973-84
23. Salzberg TN et al; C-reactive protein levels in patients with aggressive periodontitis. *J Periodontol*. 2006 Jun;77(6):933-9.
24. Waranuch P et al. Plasma C-Reactive Protein in Early Pregnancy and Preterm delivery. *Am J Epidemiol*. Dec 1, 2005; 162(11): 1108-1113. Published online Oct 19, 2005. doi:10.1093/aje/kwi323.
25. <http://circ.ahajournals.org/content/96/7/2468.full>
26. <http://www.mayoclinic.org/diseases-conditions/heart-disease/in-depth/heart-disease/ART-20046167>
27. Janket SJ, Baired AE, Chuang SK, Jones JA. Meta-analysis of periodontal disease and risk of coronary heart disease and stroke. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2003;95:1173-9.
28. Offenbacher S et al. Results from the Periodontitis and Vascular Events (PAVE) Study: a pilot multicentered, randomized, controlled trial to study effects of periodontal therapy in a secondary prevention model of cardiovascular disease. *J Periodontol* 2009 Feb;80(2): 190-201.
29. Desvarieux M et al. Periodontal Bacteria and Hypertension: The Oral Infections and Vascular Disease Epidemiology Study (INVEST). *J Hypertens*. July 2010;28(7) 1413-21.
30. <http://www.cdc.gov/nchs/data/databriefs/db131.htm>
31. Prpic J, Kuis D, Glazar I, Ribaric SP; Association of obesity with periodontitis, tooth loss, and oral hygiene in non-smoking adults; *Cent Eur J Public Health* 2013 Dec;21(4):196-201.
32. Garcia de Moura-Grec P et al. Impact of bariatric surgery on oral health conditions: 6-month cohort study. *Int Dent J* 2014 Jan 11 [Epub ahead of print]
33. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001400/>
34. Dodd DZ Rowe DJ. The relationship between postmenopausal osteoporosis and periodontal disease. *J Dent Hyg* 2013 Dec;87(6):336-44.
35. Wactawski-Wende J. Periodontal diseases and osteoporosis: association and mechanisms. *Ann Periodontol*. 2001 Dec.;6(1):197-208.
36. <http://www.cdc.gov/diabetes/statistics/prev/national/figbysex.htm>
37. <http://www.perio.org/consumer/diabetes.htm>
38. Teeuw WJ, Gerdes VE, Loos BG. Effect of periodontal treatment on glycemic control of diabetic patients. *Diabetes Care* 2010; 33(2):421-427.
39. Wahid A et al. Bidirectional Relationship between Chronic Kidney Disease & Periodontal Disease. *Pak J Med Sci*. 2013 Jan;29(1):211-21
40. <http://www.cdc.gov/women/lcod/2008/index.htm>
41. Zhou X et al. Effects of Periodontal Treatment on Lung Function and Exacerbation Frequency in Patients with COPD and Chronic Periodontitis: A 2-Year Pilot Randomized Controlled Trial. *J Clin Periodontol*. 2014 March 4 [Epub ahead of print]
42. Tan L, Wang H, Li C, Pan Y. 16SrDNA-based metagenomic analysis of dental plaque and lung bacteria in patients with severe acute exacerbations of chronic obstructive pulmonary disease. *J Periodontol Res*. 2014 Feb 1 [Epub ahead of print]
43. <http://www.ncbi.nlm.nih.gov/books/NBK190305/>
44. http://www.who.int/oral_health/action/risks/en/index2.html
45. <http://www.cdc.gov/alcohol/fact-sheets/women-health.htm>
46. Alcohol abuse, higher incidence of oral health problems linked. *JADA* (May 2003) 134, 554.
47. <http://www.cancer.org/cancer/oralcavityandoropharyngealcancer/detailedguide/oral-cavity-and-oropharyngeal-cancer-key-statistics>
48. Gillison ML, Koch WM, Capone RB, Spafford M, Westra WH, Wu L, Zahurak ML, Daniel RW, Viglione M, Symer DE, Shah KV, Sidransky D. Evidence for a causal association between human papillomavirus and a subset of head and neck cancers. *J Natl Cancer Inst*. 2000 May 3;92(9):709-20.

Author Profile

Cathy Hester Seckman, RDH, a 1974 graduate of West Liberty State College, is a hygienist as well as an indexer, writer, and novelist. She has worked in dentistry 33 years, including 11 years in pediatrics. She presents CE courses on topics including pediatric management, nutrition, pre-natal to pre-school care, communication and adolescent risk behaviors. She is a member of the American Dental Hygienists Association and the Ohio Dental Hygienists Association. She can be contacted at cathy@cathyseckman.com

Author Disclosure

Cathy Hester Seckman, RDH has no commercial ties with the sponsors or providers of the unrestricted educational grant for this course.

Online Completion

Use this page to review the questions and answers. Return to www.needce.com and sign in. If you have not previously purchased the program select it from the "Online Courses" listing and complete the online purchase. Once purchased the exam will be added to your Archives page where a Take Exam link will be provided. Click on the "Take Exam" link, complete all the program questions and submit your answers. An immediate grade report will be provided and upon receiving a passing grade your "Verification Form" will be provided immediately for viewing and/or printing. Verification Forms can be viewed and/or printed anytime in the future by returning to the site, sign in and return to your Archives Page.

Questions

- The Focus of Infection theory states that secondary foci are the direct result of:**
 - Infections from other foci
 - Pathogenic organisms
 - Malignant humors
 - Oral disease
- In an unclean mouth, the numbers of individual bacteria can reach:**
 - 300
 - One billion
 - 25 million
 - A thousand billion
- Adverse pregnancy outcomes are linked to:**
 - Acute necrotizing ulcerative gingivitis
 - Aphthous ulcers
 - Periodontal disease
 - Caries
- Preeclamptic women experience:**
 - High blood pressure and urinary tract infections
 - Water retention and migraines
 - Protein in the urine and high blood pressure
 - Low blood pressure and water retention
- Gram-negative bacteria including *P. gingivalis* and *T. denticola* have been shown to be transmitted between the oral environment and:**
 - The nasal cavity
 - The uterus
 - The kidneys
 - The ovaries
- During labor and delivery, which of the following compounds regulate the contraction and relaxation of smooth muscle tissue?**
 - Prostaglandins
 - Gram-negative bacteria
 - C-reactive protein
 - Phospholipids
- The death rate for women from cardiovascular diseases is:**
 - 1 in 50
 - 1 in 1,000
 - 1 in 20
 - 1 in 2
- Periodontitis is a known risk factor for CVD. A secondary risk is suspected to be:**
 - Chronic kidney disease
 - Obesity
 - Diabetes
 - Edentulousness
- The INVEST study investigated whether periodontal infections could ultimately lead to:**
 - Tooth loss
 - CVD death
 - Kidney failure
 - Congestive heart failure
- Which of the following represents the percentage of obese women in the U.S.?**
 - One half
 - One quarter
 - One third
 - One fifth
- Which of the following is the body mass index associated with obesity?**
 - 25
 - 13
 - 30
 - 20
- Obese women are up to six times more likely to have:**
 - Decayed, missing or filled teeth
 - Aphthous ulcers
 - Gingivitis
 - Periodontitis
- Which of the following are the leading causes of osteoporosis?**
 - A drop in estrogen and testosterone
 - A genetic tendency for thin bones and bone loss
 - An increase in testosterone in females
 - Lack of calcium and vitamin D
- According to the NLM, risk factors for osteoporosis include smoking, heavy alcohol use, amenorrhea, and:**
 - Periodontitis
 - Low body weight
 - Drug abuse
 - Sedentary lifestyle
- Osteoporosis may be associated with:**
 - Loss of alveolar crest height
 - Clinical attachment loss
 - Tooth loss
 - Both a and c
- Impaired neutrophil function in diabetics disturbs:**
 - Healthy pocket depths
 - Suppression of bacteria in periodontal pockets
 - Remineralization of tooth enamel
 - Healthy pH levels in the mouth
- Severe periodontal disease is observed in diabetics with HbA1C levels:**
 - 6.0 and below
 - 6.5
 - 7.0 and above
 - 9.0 and above
- Chronic kidney disease affects which percentage of women?**
 - 17%
 - 23%
 - 9%
 - 15%
- CKD patients on hemodialysis who have moderate to severe periodontal disease are at risk for:**
 - Kidney stones
 - Blindness
 - Cardiovascular death
 - Increased bladder infections
- CKD affects oral health by inducing:**
 - Hyperplasia and xerostomia
 - Xerostomia and periodontal disease
 - Increased pocket depths and bleeding
 - Hyperplasia and candida infections
- Periodontal therapy for patients with chronic obstructive pulmonary disease results in improved periodontal measurements and:**
 - Exacerbation of COPD
 - Improvement in forced expiratory volume
 - Less gingival bleeding
 - Less tooth loss
- Paired samples of dental plaque and lung bacteria in patients with severe AE-COPD include:**
 - A. actinomycetemcomitans* and *P. gingivalis*
 - P. gingivalis* and *S. pneumoniae*
 - M. tuberculosis* and *C. sputigena*
 - T. forsythia* and *S. pneumoniae*
- Smoking is a direct cause of lung cancer in which percentage of women?**
 - 73%
 - 22%
 - 87%
 - 80%
- Female smokers have an increased risk of developing:**
 - Cancer of the pharynx
 - Coronary heart disease
 - Cancer of the kidneys
 - All of the above
- With exposure to second-hand smoke, an infant or child has an increased risk of developing:**
 - Lung cancer
 - ADHD
 - Asthma
 - Tuberculosis
- WHO guidelines for the prevention and management of tobacco use and second-hand smoke exposure during pregnancy include all of the following except:**
 - Pharmacotherapy
 - Psychosocial interventions
 - Protection from second-hand smoke in public and at home
 - Hypnotism
- Oral effects of alcohol use include all of the following except:**
 - Increased incidence of aphthous ulcers
 - Periodontal disease
 - Caries
 - Precancerous lesions
- Human papilloma viruses are responsible for which percentage of oropharyngeal cancers?**
 - 3 out of 5
 - 2 out of 3
 - 7 out of 10
 - 1 out of 2
- A causal association has been demonstrated between oropharyngeal cancer and:**
 - HPV72
 - HPV18
 - HPV16
 - HPV6
- For 2014, the American Cancer Society predicts that the incidence of oral cavity or oropharyngeal cancer will be:**
 - 30,000
 - 7,300
 - 21,000
 - 27,000

ANSWER SHEET
Women's Health

Name: _____ Title: _____ Specialty: _____

Address: _____ E-mail: _____

City: _____ State: _____ ZIP: _____ Country: _____

Telephone: Home () _____ Office () _____

Lic. Renewal Date: _____ AGD Member ID: _____

Requirements for successful completion of the course and to obtain dental continuing education credits: 1) Read the entire course. 2) Complete all information above. 3) Complete answer sheets in either pen or pencil. 4) Mark only one answer for each question. 5) A score of 70% on this test will earn you 3 CE credits. 6) Complete the Course Evaluation below. 7) Make check payable to PennWell Corp. **For Questions Call 216.398.7822**

Educational Objectives

1. List women's health issues that have known oral-systemic connections
2. Discuss the biological links between oral bacteria and different organ systems
3. Use the knowledge gained to tailor treatment plans for periodontal patients
4. Equip female patients with information to take charge of their oral and systemic health

Course Evaluation

1. Were the individual course objectives met?

Objective #1: Yes No Objective #2: Yes No

Objective #3: Yes No Objective #4: Yes No

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

- | | | | | | | |
|---|-------|---|-----|---|----|---|
| 2. To what extent were the course objectives accomplished overall? | 5 | 4 | 3 | 2 | 1 | 0 |
| 3. Please rate your personal mastery of the course objectives. | 5 | 4 | 3 | 2 | 1 | 0 |
| 4. How would you rate the objectives and educational methods? | 5 | 4 | 3 | 2 | 1 | 0 |
| 5. How do you rate the author's grasp of the topic? | 5 | 4 | 3 | 2 | 1 | 0 |
| 6. Please rate the instructor's effectiveness. | 5 | 4 | 3 | 2 | 1 | 0 |
| 7. Was the overall administration of the course effective? | 5 | 4 | 3 | 2 | 1 | 0 |
| 8. Please rate the usefulness and clinical applicability of this course. | 5 | 4 | 3 | 2 | 1 | 0 |
| 9. Please rate the usefulness of the supplemental web bibliography. | 5 | 4 | 3 | 2 | 1 | 0 |
| 10. Do you feel that the references were adequate? | | | Yes | | No | |
| 11. Would you participate in a similar program on a different topic? | | | Yes | | No | |
| 12. If any of the continuing education questions were unclear or ambiguous, please list them. | _____ | | | | | |
| 13. Was there any subject matter you found confusing? Please describe. | _____ | | | | | |
| 14. How long did it take you to complete this course? | _____ | | | | | |
| 15. What additional continuing dental education topics would you like to see? | _____ | | | | | |

If not taking online, mail completed answer sheet to
Academy of Dental Therapeutics and Stomatology,
A Division of PennWell Corp.
P.O. Box 116, Chesterland, OH 44026
or fax to: (440) 845-3447

**For IMMEDIATE results,
go to www.ineedce.com to take tests online.
Answer sheets can be faxed with credit card payment to
(440) 845-3447, (216) 398-7922, or (216) 255-6619.**

Payment of \$59.00 is enclosed.
(Checks and credit cards are accepted.)

If paying by credit card, please complete the following: MC Visa AmEx Discover

Acct. Number: _____

Exp. Date: _____

Charges on your statement will show up as PennWell

- | | |
|---|---|
| 1. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 16. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 2. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 17. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 3. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 18. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 4. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 19. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 5. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 20. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 6. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 21. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 7. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 22. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 8. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 23. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 9. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 24. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 10. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 25. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 11. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 26. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 12. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 27. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 13. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 28. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 14. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 29. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 15. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 30. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |

AGD Code 742

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

COURSE EVALUATION and PARTICIPANT FEEDBACK
We encourage participant feedback pertaining to all courses. Please be sure to complete the survey included with the course. Please e-mail all questions to: hhodges@pennwell.com.

INSTRUCTIONS
All questions should have only one answer. Grading of this examination is done manually. Participants will receive confirmation of passing by receipt of a verification form. Verification of Participation forms will be mailed within two weeks after taking an examination.

COURSE CREDITS/COST
All participants scoring at least 70% on the examination will receive a verification form verifying 3 CE credits. The formal continuing education program of this sponsor is accepted by the AGD for Fellowship/Mastership credit. Please contact PennWell for current term of acceptance. Participants are urged to contact their state dental boards for continuing education requirements. PennWell is a California Provider. The California Provider number is 4527. The cost for courses ranges from \$20.00 to \$110.00.

PROVIDER INFORMATION
PennWell is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Concerns or complaints about a CE Provider may be directed to the provider or to ADA CERP at www.ada.org/cotocerp/

The PennWell Corporation is designated as an Approved PACE Program Provider by the Academy of General Dentistry. The formal continuing dental education programs of this program provider are accepted by the AGD for Fellowship, Mastership and membership maintenance credit. Approval does not imply acceptance by a state or provincial board of dentistry or AGD endorsement. The current term of approval extends from (11/1/2011) to (10/31/2015) Provider ID# 320452

RECORD KEEPING
PennWell maintains records of your successful completion of any exam for a minimum of six years. Please contact our offices for a copy of your continuing education credits report. This report, which will list all credits earned to date, will be generated and mailed to you within five business days of receipt.

Completing a single continuing education course does not provide enough information to give the participant the feeling that s/he is an expert in the field related to the course topic. It is a combination of many educational courses and clinical experience that allows the participant to develop skills and expertise.

CANCELLATION/REFUND POLICY
Any participant who is not 100% satisfied with this course can request a full refund by contacting PennWell in writing.

IMAGE AUTHENTICITY
The images provided and included in this course have not been altered.