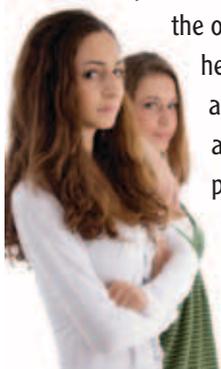


Caring for Adolescents: Opportunities to Improve Future Oral Health

Meeting the Oral Health Needs of Today's Adolescent

When we think of teenagers, our thoughts often go to high school, fast cars, dating, sports and the realities of peer pressure and popularity. Teenagers today continue to face all of those life experiences on a daily basis, however lurking just beyond



the obvious, are the less obvious: the current oral health status of today's adolescent population and the realities of caries, periodontal disease, and even tobacco and drug use in the teenaged patient. Current statistics in the United States show that 52% of teens, ages 12-19 years, have experienced caries in their permanent teeth. This trend will continue and increase as they progress through adulthood. While tobacco use in general has decreased

since 1997, 20% of teenagers today still use tobacco products and thousands of new smokers are joining the ranks each day. Cigarettes are not the only problem. The use of smokeless tobacco products is increasing amongst high school students and the use of hookahs, a Middle-Eastern style water pipe, is very popular among young adults. Periodontal disease is also prevalent in teenagers. Adolescents suffer the highest incidence of gingivitis and are also susceptible to the devastating effects of chronic periodontal disease. Unfortunately, those teens who are most affected also tend to be among the most disenfranchised of our society, members of low socioeconomic populations and minority ethnic groups. Disease prevention is key for change; working together to increase awareness of the potential oral-systemic health problems for our teen patients can open the door for a better future of oral health.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

1. Identify the risk factors for dental caries in the adolescent population
2. Describe the measures that can be taken to reduce caries risk in the adolescent population.
3. Explain the difference between gingivitis, chronic and aggressive periodontitis in adolescents.
4. Describe the role of the dental hygienist in tobacco use intervention and adolescents.

Teens and Dental Caries: An Unmet Need

According to the National Institute of Health, teens suffer the highest incidence of caries in comparison to the other child age categories. This is due in part to the fact that caries is classified as a cumulative disease starting in early childhood.¹ Statistics support this fact, as 52% of teens, ages 12 to 19 years, have experienced dental caries in their permanent teeth.² Contributing demographic factors include ethnicity and socioeconomic status. The teens most often affected by caries are those of Hispanic background (64.49%) and those living in households at or below 100% of the poverty level (65.55%).³ Females appear to be more affected by the presence of caries than males, 62.74% versus 55.66%, respectively.³ Additionally, it is estimated only 40% of adolescents have dental insurance coverage, reducing their ability to receive needed dental care, especially within low-income and minority populations. This is escalated by the fact that teens are the least likely to actively utilize dental care services.¹ Other contributing factors increasing the risk for caries within the teen population include a cariogenic diet, presence of orthodontic appliances, poor oral hygiene, the presence of gingivitis or periodontal disease, insufficient exposure to fluoride, susceptible tooth anatomy, fear of the dentist, and physiological or psychological impairments.^{4,5}

Because of the complex and varied factors contributing to the prevalence of caries within this population, it is vital that oral health professionals obtain an accurate and complete medical history prior to providing oral hygiene care.⁴ A complete social history should also be obtained as tobacco, drug and alcohol use, as well as eating disorders, can be a factor within this age group. This can be quite challenging as adolescents can be evasive in responding to questions regarding social and personal habits, and the presence of parents within the treatment room can limit open conversation. Encouraging separation from the parent during an appointment and

developing a trust relationship with the teenaged patient can foster open dialogue, giving the health professional the opportunity to provide useful and relevant oral health education.

Caries Prevention and Management

Management and prevention begins with a thorough caries risk assessment by the patient's dental care provider.⁴ Once the contributing factors to the occurrence of dental caries are identified, it is important for the oral health care provider to emphasize the positive benefits received from regular dental and dental hygiene care, fluoride application, placement of sealants, proper diet and nutrition, including the introduction of xylitol containing products, and oral hygiene education.⁴ Caries Management by Risk Assessment (CAMBRA) can be utilized to determine the current caries risk and to design a prevention program specific to the needs of the patient.

Fluoride: Water fluoridation is the most convenient and economical source of fluoride. Drinking fluoridated water containing the recommended fluoride level can provide topical benefits.⁴ Over-the-counter products such as a fluoridated dentifrices should be used twice daily. Non-alcohol containing 0.05% Sodium fluoride (NaF) rinses are also beneficial. Depending upon the caries risk, professionally prescribed fluoride products including 1.1% NaF gels and pastes, 0.2% NaF rinse, 0.4% stannous fluoride gels may be recommended for home use, as well as the professional application of 5% NaF varnish during dental hygiene care appointments.^{4,6}

Sealants: Occlusal caries have been found to be the highest occurring type of caries in children.⁶ Research has demonstrated sealants to be beneficial in preventing pit and fissure caries in posterior teeth.⁷ Eruption of the permanent second molars and the first and second premolars occurs just before or during the early teen years. Application of dental sealants to susceptible tooth surfaces soon after eruption is most effective in providing the greatest amount of protection against the future development of occlusal caries. Sealant application can be accomplished through the use of either glass ionomer cement (GIC) or through use of resin based sealants as currently recommended by the American Dental Association (ADA).⁸



Xylitol: Recommendations during dental hygiene appointments may include daily use of xylitol containing products which are available in multiple forms including gum, mints, dentifrices, oral rinses, and sprays. Xylitol, a natural sweetener, possesses a sweetness quality similar to that of sugar while containing 40% less calories.⁹ Found within the same non-nutritive sweetener category as mannitol and sorbitol, xylitol is produced from natural xylan containing materials such as birch trees, corn cobs and sugar cane waste products.⁹ Xylitol reduces the cariogenic effects of *Streptococcus mutans* by lowering the overall quantity of cariogenic bacteria in plaque and saliva. Lower levels of *S. mutans* lead to less demineralization of the tooth structure due to the decreased levels of lactic acid present within the saliva.⁹

Dental Hygiene Care: Dental hygiene care frequency should be based on patient needs, including caries risk. Adolescents who are at an extremely high risk for dental caries should be placed on a three month recall schedule.⁶ Appointments should include a dental prophylaxis, NaF varnish application, oral hygiene care instruction and diet evaluation with recommended modifications to reduce the consumption amount and frequency of fermentable carbohydrates. In particular, an evaluation of the consumption of sweetened beverages, especially acidic beverages, should be completed. Other considerations in regards to nutritional patterns and needs include: physical activity levels, psychosocial aspects of eating patterns, and any other health related factors which could contribute to caries development. Physiological factors should also be taken into consideration when providing oral hygiene care and education.

Systemic disease and medications contributing to xerostomia should be considered and appropriate recommendations regarding oral saliva substitute should be made. Depending upon the severity of caries occurrence, salivary pH and caries bacterial testing may be recommended. For reduction in bacterial levels, patients may be advised to rinse with 0.12% chlorhexidine gluconate nightly for one week each month. Individuals using the bactericidal chlorhexidine gluconate regimen must be sure to wait one hour prior to brushing with a fluoride toothpaste to receive the beneficial effect of the rinse.⁶ Other recommendations may include using a baking soda rinse to aid in neutralizing the pH of the oral

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environment, as well as using a calcium phosphate paste to aid in remineralization.⁶

A thorough dental examination and individualized schedule of radiographs should be completed every six months, and patients should be strongly advised to complete any dental treatment as quickly as possible.

Periodontal Disease Begins in Adolescents

Periodontal disease often begins during adolescence, and if left untreated can result in future tooth loss and compromised health. The most common forms of periodontal disease identified in the adolescent population are gingivitis, chronic periodontitis and aggressive periodontitis.¹⁰ Necrotizing forms of periodontal disease have been shown to occur in less than 1% of this population.¹¹ It is estimated that 2% to 5% of adolescents and young adults in the United States experience chronic periodontitis with less than 1% experiencing aggressive periodontal disease. However, prevalence of periodontal disease among certain ethnic populations is much higher, with African-Americans suffering the highest incidence of both aggressive periodontitis (1-3%) and chronic periodontitis (8-20%).¹⁰ Hispanic (5-10%) and Asian (5-8%) populations also experience a higher prevalence of chronic periodontal disease than their Caucasian counterparts.¹⁰

Risk factors for periodontal disease among adolescents are multifactorial, with systemic factors including hormones, chronic disease, medications, pregnancy, tobacco use, ethnicity and socioeconomic status. Local factors include the presence of plaque and calculus, orthodontic appliances (fixed and removable), faulty restorations, malpositioned teeth, mouth-breathing, and tooth developmental anomalies.^{4, 10}

Social Health Gradient: Historically, chronic diseases including cardiovascular disease, cancer, and diabetes, were considered to be most prevalent in populations falling into the lowest socioeconomic groups. However, current research has identified a “social health gradient”, in which chronic disease can be found among all socioeconomic levels within society, with the risk for chronic disease increasing as you step down the ladder of social hierarchy. Additional social determinants influencing susceptibility to disease include environmental factors, education, ethnicity and genetic disposition, cultural beliefs and practices, social influences, and stress levels.^{12,13} Oral health inequalities, including the incidence of periodontal disease, have been found to fall into this social health

gradient. Although those populations most affected still fall within the lowest social levels of society, periodontal disease has been shown to affect adolescents from all gradients of society.¹²

Gingivitis

Gingivitis is a bacterial/plaque induced disease of the gingival tissues which does not exhibit attachment loss or bone loss. However, research has demonstrated that gingivitis can be a precursor to the onset of periodontal disease and its associated loss of periodontal structures.¹⁴ Adolescents experience a higher incidence of gingivitis than their prepubescent and adult counterparts, most likely due to the increased presence of sex hormones. Elevated sex hormones have been shown to cause changes to the composition of the oral microflora, impacting the body’s inflammatory response to plaque, and increasing the potential for fluid retention within the gingival tissues.⁴ *Actinomyces*, *Capnocytophaga*, and *Leptotrichia*, have been identified as the most commonly associated bacterial species found in gingivitis in children and adolescents.¹¹ Recommended treatment for adolescent cases of gingivitis is the thorough sub and supragingival removal of plaque and calculus deposits accompanied by oral hygiene education focused on improving daily oral hygiene care.

Chronic and Aggressive Periodontitis

Though more common in adults, chronic periodontitis is also found in adolescents.¹¹ The disease can present as localized (affecting <30% of the dentition) or generalized (affecting >30%), with attachment loss ranging from mild (1-2mm), moderate (3-4mm) or severe (\geq 5mm).¹¹ Chronic periodontitis in teens and young adults is most commonly due to systemic diseases affecting the immune system thus increasing their susceptibility to periodontal disease.^{10,11} Adolescents with poorly controlled diabetes also have a greater potential for increased inflammatory response.¹¹ Other risk factors for chronic periodontitis within this age group are plaque-retentive restorations and tobacco use.¹⁴ Though many forms of bacteria are involved in the plaque biofilm contributing to the presence of chronic periodontitis, *Tannerella forsythia* has been identified as being strongly associated with the progression of this disease in teens and young adults.¹⁴

Aggressive periodontal disease can present as localized or generalized. Both forms demonstrate rapid attachment loss of periodontal structures, including interproximal bone, on at least two permanent first molars and incisors.^{11,14} Localized

aggressive periodontal disease (LAGP) presents with interproximal attachment loss not involving more than two additional teeth. LAGP generally occurs in adolescents with no history of systemic disease, and the presence of subgingival calculus and plaque biofilm is not necessarily substantial.^{11,15} However, research has linked the occurrence of LAGP with the presence of *Actinobacillus actinomycetemcomitans*, and other highly virulent bacterial strains.¹¹

Generalized aggressive Periodontitis (GAgP) involves interproximal attachment loss of three or more teeth, in addition to the first molars and incisors. Unlike LAGP, the generalized form of this disease is usually associated with high levels of bacterial plaque biofilm and subgingival calculus, as well as the presence of facultative anaerobic, gram-negative pathogens such as *Porphyromonas gingivalis*, and *Treponema denticola* were prevalent within gingival pockets.¹¹ Immunological, environmental and genetic factors seem to play a part in the virulence of the disease, suppressing the chemotactic response of neutrophils, and reducing levels of immunoglobulin G (IgG2) resulting in increased attachment loss.¹¹

Early diagnosis of both the chronic and aggressive forms of periodontitis will provide the most successful outcomes for adolescent patients. Treatment for these forms of periodontal disease include nonsurgical and/or surgical debridement of root surfaces as well as antimicrobial therapy, followed by an appropriate periodontal maintenance schedule.^{11,14} The use of antibiotics, as prescribed by the attending dentist, may also be considered.¹¹ Providing age appropriate oral hygiene instruction will help to ensure patient compliance and a successful treatment outcome.

Adolescents and Traumatic Injury

Traumatic injury to the permanent dentition is prevalent among this age group. Injury due to falls, automobile accidents, violence and sports related activities can cause serious and permanent damage to teeth, including tooth loss. Participation in contact sports is common during this age period and should be addressed by the oral health professional. Identification of specific sports activities such as football, baseball, soccer, basketball, wrestling, hockey, biking, skateboarding, and other athletic and leisure activities which promote physical contact should be made, followed by recommendations to promote the use of safety devices such as mouth-guards or face shields. Mouth-guards should be professionally designed and fabricated to assure proper fit,

protection and comfort. Instructions for proper wear and care should be provided upon delivery of the appliance. Warnings regarding the modification of mouth-guards in reducing potentially safety benefits, as well as information regarding the potential for injury even when wearing a properly fitted appliance, should be given to both the athletes and their parents.⁴

Tobacco Use: Prevention is the Key

Although tobacco use among adolescents has decreased by nearly 40% since 1997, currently 20% of our youth still actively use tobacco products, including cigarettes, cigars and smokeless tobacco.¹ It is estimated that 1.5 million teens start smoking each year.¹⁶ Though tobacco companies are no longer able to market directly to children due to the implementation of the 1998 Master's Settlement Agreement, tobacco companies have been able to circumvent this prohibition by targeting young adults who are often in the position of being role models for kids. The American Lung Association (ALA) emphasized that the exposure to tobacco use through indirect media marketing, particularly movies and television, can increase the risk of tobacco uptake 2.6 times among teens and adolescents.¹ Additionally, tobacco companies are utilizing reduced pricing of target tobacco products to entice more price sensitive teens to sample their goods.¹⁷



Other influencing factors found to increase the risk for uptake of tobacco use by teens are peer pressure, parental smoking, depression and psychiatric disorders such as Attention Deficit Hyperactivity Disorder (ADHD).¹⁶ Though gender does not seem to affect smoking rates, American Indian and non-Hispanic, white teens have a higher risk of tobacco use than their Hispanic and non-Hispanic, black counterparts. In addition, those teens who tend to have fewer social connections in school, as well as those falling within the lower academic performance category, tend to be at higher risk for tobacco use.¹⁷ Correlations have also been found between negative body image views in young females and the use of tobacco as a method for weight loss, control and increased body image.¹⁸ The end result for many adolescents who take their

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first puff is tobacco addiction, as an increased regularity in tobacco use often results in a lifelong addiction to nicotine.¹⁹ Nearly 90% of the current adult tobacco users started their habit before the age of eighteen.¹

Tobacco cessation as a result of nicotine addiction is as difficult for teens as it is for adults, in spite of the teen attitude of “I can quit anytime”. Adolescent tobacco use results in an increased incidence of respiratory complications such as asthma, as well as decreased lung capacity and lung development. There are also well established causal relationships between long-term tobacco use and an increased risk for cardiovascular disease, stroke, cancer, infertility, premature births, respiratory disease, decreased bone density, and premature death.^{1, 17, 20} The link between periodontal disease and the use of tobacco products is also well established. Adolescent smoking has also been associated with increased risks for alcohol and illicit drug use.¹⁶

Table 1

Table 1	
ASK. ADVISE. REFER.	www.askadviserefer.org
Step 1: ASK	Ask adolescents about tobacco use at each appointment
Step 2: ADVISE	Advise adolescents to quit; use oral/systemic health links
Step 3: REFER	Refer patients to National Network of Tobacco Quit lines, 1-800-QUIT NOW Follow-up at each appointment

Preventing teens from lighting up their first cigarette, as well as providing cessation counseling for those who currently use tobacco products, is the most effective means of reducing the risk of future tobacco related health problems and nicotine addiction. The American Dental Hygienists’ Association (ADHA) supports smoking cessation through their “Ask. Advise. Refer.”(table 1) program designed to assist dental hygienists in effectively helping patients’ quit.²¹ As oral healthcare professionals, dental hygienists possess both the communication skills and most importantly, the one-to-one access to adolescent patients, providing ample opportunity to assess tobacco use status, give the necessary education and

provide referrals. The most difficult part can often be starting the conversation by asking the question, “Do you, or have you ever used tobacco?” Dental hygienists often need to remind themselves of the tremendous impact this simple question can have on the life of an adolescent and remember to initiate the dialog.

Adolescents and the Opportunity for Better Health

As dental hygienists, we each have the opportunity to improve the current and future health of our adolescent patients. Regularly performing thorough oral assessments as well as identifying any current caries and periodontal disease risks provides the opportunity for early disease detection and treatment in addition to reducing the potential for future tooth loss. Developing a positive and open, two-way communication process with adolescent patients can allow for the identification of social factors which may negatively impact their oral and systemic health and in turn provide hygienists the opportunity to share vital information in order to make an impact on their total health throughout their lifetime.

References are available in the online version of this issue at www.cdha.org

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Julie Coan is a 2002 graduate of Diablo Valley College. She completed her BSDH through the on-line degree completion program at Loma Linda University in 2009, and is currently working towards a Master’s degree in public health practice. Julie has worked in private practice for 10 years and is a part-time faculty member at Chabot College where she loves working with future dental hygiene professionals. Julie is the chair of the CDHA Student Relations Council and a firm believer that association membership is vital for the future growth and advancement of the profession.



Home Study Correspondence Course

“Caring for Adolescents: Opportunities to Improve Future Oral Health”

2 CE Units – Member \$25, Potential member \$35

Circle the correct answer for questions 1-10

1. According to the National Institute of Health, the caries experience amongst the adolescent population in the United States is:
 - a. 35%
 - b. 41%
 - c. 52%
 - d. 67%
2. The teen group with the highest caries experience is from which ethnic background?
 - a. African American
 - b. Hispanic
 - c. American Indian
 - d. Asian
3. The incidence of gingivitis in adolescents is higher than that of children or adults primarily due to which of the following?
 - a. hormonal changes
 - b. poor oral hygiene
 - c. lack of sleep
 - d. xerostomia
4. Which of the following social history considerations can be a factor in teen caries prevalence:
 - a. use of tobacco, drugs and alcohol
 - b. poverty
 - c. eating disorders
 - d. only a and b
 - e. all of the above
5. Which of the following is NOT a risk factor for caries in the teen population:
 - a. poor oral hygiene
 - b. presence of orthodontic appliances
 - c. fear of the dentist
 - d. cariogenic diet
 - e. tooth loss
6. Occlusal sealants for adolescents :
 - a. are not recommended for most teens since the first molars are already erupted
 - b. are recommended for teens since second molars and premolars can benefit
 - c. should be placed soon after eruption of molars and premolars
 - d. both b and c
7. Which of the following is TRUE about exposure to tobacco media marketing strategies and the uptake of tobacco in the adolescent population:
 - a. can increase the risk of tobacco uptake by 10 times
 - b. has no more effect on the teen population than on the adult population
 - c. can increase the risk of tobacco uptake by 2.6 times
 - d. only increases the risk for those teens who are in higher socioeconomic groups
8. The first step in a tobacco intervention strategy is to:
 - a. advise the patient of the negative consequences of tobacco use
 - b. refer the patient to a quit line
 - c. explain the products available to assist in quitting
 - d. ask the patient if they use or have ever used tobacco
9. Which of the following is TRUE about periodontal disease in the adolescent population:
 - a. less than 1% experience aggressive periodontitis
 - b. 2-5% experience chronic periodontitis
 - c. African-Americans experience a higher incidence of aggressive and chronic periodontitis
 - d. all of the above is true
10. Which of the following bacteria is more often associated with the progression of chronic periodontitis in the adolescent and young adults than in the older adult population?
 - a. *Actinomyces species*
 - b. *Tannerella forsythensis*
 - c. *Capnocytophaga species*
 - d. *Streptococcus mutans*

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