

Guideline on Oral Health Care for the Pregnant Adolescent

Originating Council

Council on Clinical Affairs, Committee on the Adolescent

Adopted

2007

Revised

2012

Purpose

The American Academy of Pediatric Dentistry (AAPD), as the oral health advocate for infants, children, adolescents, and persons with special needs, recognizes that adolescent pregnancy remains a significant social and health issue in the US. This guideline is intended to address management of oral health care particular to the pregnant adolescent rather than provide specific treatment recommendations for oral conditions.

Methods

This document is an update of the guideline adopted in 2007. The revision included an electronic search of the PubMed® database using the following parameters: Terms: “pregnancy”, “adolescent pregnancy”, “maternal”, “pre-term birth”, “oral health”, “low birth weight delivery”, and “periodontal disease”; Fields: all; Limits: within the last 10 years, humans, English, clinical trials. The reviewers selected 79 articles that met the defined criteria to update this guideline. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

General considerations

In 2009, a total of 409,840 infants were born to 15 through 19 year olds, for a live birth rate of 39.1 per 1000 women in this age group.¹ While the US teen birth rate fell by more than one-third from 1991 through 2005, it then increased by five percent over two consecutive years. Data for 2008 and 2009 indicate that the long-term downward trend has resumed.² Approximately 50 percent of adolescent pregnancies occur within the first six months of initial sexual intercourse, even with increasing use of contraceptives by adolescents.³ The correlation between poverty and adolescent pregnancy is great, for as many as 83 percent of adolescent females who give birth are from low-income families.⁴ Once an adolescent has given birth to one child, she is at increased risk for giving birth to another child during adolescence.⁵ There exist racial, ethnic, and economic disparities related to oral hygiene practices and dental service utilization during pregnancy;

reports indicate minority pregnant adolescents had only limited dental visits and possessed limited knowledge of oral health and pregnancy outcomes.^{6,7}

Medical complications involving mother and child occur more frequently in pregnant females aged 11 through 15 years than those aged 20 to 22 years.⁸ These include the delivery of low birth weight infants, increased neonatal death rate, and increased mortality rate for the mother.⁸ In addition, pregnancy-induced hypertension, anemia, sexually transmissible diseases, and premature delivery are concerns for the pregnant adolescent.⁹ Hypertension increases the risk of bleeding during procedures. Blood pressure greater than or equal to 140/90 mmHg is considered mild hypertension, whereas values greater than or equal to 160/110 mmHg are considered severe.¹⁰

The diet of the pregnant adolescent can affect the health of the child. A healthy diet is necessary to provide adequate amounts of nutrients to the mother-to-be and the unborn child.¹¹ Nutrients of particular importance include folate, vitamin B-6, vitamin B-12, calcium, and zinc.¹² During pregnancy, a woman’s nutritional needs are increased, but certainly the “eating for two” concept is not recommended.¹³ The total energy needs during pregnancy range between 2,500 to 2,700 kcal a day for most women, but pre-pregnancy body mass index, rate of weight gain, maternal age, and physiological appetite must be considered in tailoring this recommendation to the individual.¹⁴ Nausea and vomiting occur in 50 to 90 percent of all pregnancies during the first trimester and often are associated with young age and low socioeconomic status.¹⁵ An expectant female may modify food choices due to morning sickness and/or taste aversions, but appropriate nutrition for the health of the mother and fetus is crucial.

The goal of any drug therapy during pregnancy is to improve maternal/fetal health while avoiding adverse drug reactions.¹⁶ Reporting that medications for pregnant patients sometimes are prescribed under less than optimal conditions, a study of obstetrician-gynecologists emphasizes the importance of generating and having available to health care providers up-to-date information on effects of medications during pregnancy.¹⁷ The US Food and Drug Administration has

defined five categories of drugs according to the risk they pose to pregnant women and their fetuses.¹⁸ These categories provide some guidance to the relative safety of the medication for use by pregnant women. Category A includes drugs that have been studied in humans and have evidence supporting their safe use; Category B drugs show no evidence of risk to humans. Generally, these drugs are considered acceptable for use during pregnancy.¹⁶ Category C drugs, such as aspirin and aspirin-containing products, may be used with caution, whereas drugs in categories D (eg, tetracycline) and X are not intended for use during pregnancy. The Organization of Teratology Information Services provides useful national information for drug safety during pregnancy.¹⁹

Low socioeconomic status and lack of parental involvement can place an adolescent at increased risk of initiating tobacco use.²⁰ Smoking during pregnancy is associated with adverse outcomes.^{20,21} Women who smoke may have increased risks for ectopic pregnancy, spontaneous abortion, and preterm delivery.^{20,21} Infants born to women who smoke during pregnancy are more likely to be small for gestational age and have low birth-weight.²⁰⁻²³ The longer the mother smokes during pregnancy, the greater the effect on the infant's birth weight.²¹ Increasing evidence shows that maternal tobacco use is associated with intellectual disability and birth defects such as oral clefts.²⁰ The risk for perinatal mortality (ie, stillbirths and neonatal deaths) and sudden infant death syndrome (SIDS) is increased for infants of women who smoke.^{20,21} Infants and children exposed to environmental tobacco smoke (ie, second hand smoke) have higher rates of lower respiratory illness, middle ear infections, asthma, and caries in the primary dentition.²⁰⁻²⁵ Women are more likely to stop smoking during pregnancy, both spontaneously and with assistance, than at other times in their lives.²¹

Use of ionizing radiation in the US is a well-regulated activity.²⁶ The federal government establishes performance standards for manufacture and installation of x-ray generating equipment. States implement regulations that govern users; these regulations pertain to facility design, shielding, and use and maintenance of equipment.²¹ Major biological risks from radiation exposure are carcinogenesis, fetal effects, and mutations. Health benefits will outweigh the risk from radiation exposure from any radiographic examination if:

1. the examination is clinically indicated and justified;
2. technique is optimized to ensure high quality diagnostic images; and
3. principles are followed to minimize exposure.²⁶

Oral conditions associated with pregnancy

Changes in the oral cavity have been associated with pregnancy. These include alterations in both the hard and soft tissues. An increase in caries has been associated with carbohydrate loading as snacking becomes more frequent.¹¹ In some instances, morning sickness and vomiting/reflux may contribute to the onset of perimyolysis, an erosion of the lingual surfaces of the teeth caused by exposure to gastric acids. A confounding factor is that pregnancy-associated hormonal changes may cause

dryness of the mouth. Approximately 44 percent of pregnant participants in one study reported persistent xerostomia.²⁷

From a periodontal perspective, the effects of hormonal levels on the gingival status of pregnant women may be accompanied by increased levels of *Bacteroides*, *Prevotella*, and *Porphyromonas*.²⁸ Signs of gingivitis (eg, bleeding, redness, swelling, tenderness) are evident in the second trimester and peak in the eighth month of pregnancy, with anterior teeth affected more than posterior teeth.²⁹ These findings are exacerbated by poor plaque control and mouth breathing.²⁹ Increased tooth mobility has been associated with microbial shifts from aerobic to anaerobic bacteria.²⁸ These bacterial shifts are accompanied by increased inflammation in the attachment apparatus, as well as mineral disturbances in the lamina dura, causing tooth mobility. This condition appears to reverse postpartum.²⁸

The study of periodontitis during pregnancy and its effect on preterm, low birth weight infants is ongoing. Early studies noted an increase rate of preterm/low birthweight deliveries associated with periodontal disease.^{29,30} However, a more recent study of 116 postpartum women noted clinical attachment level measures were not different between those with preterm/low birthweight babies and control groups. Therefore, maternal periodontal microbiota and clinical characteristics of periodontal disease were not associated with having preterm/low birthweight babies.³¹

More recent studies continue to demonstrate conflicting results.³²⁻³⁹ Several studies conducted in the US, including the Oral Conditions and Pregnancy (OCAP) Cohort Study, have shown an increased risk of adverse pregnancy outcome(s) with periodontal disease. The OCAP studies also showed increased odds of the adverse pregnancy outcomes of preeclampsia,⁴⁰ fetal immune response,⁴¹ and very early preterm birth,⁴² among other conditions. The best available evidence to date shows that periodontal treatment has no effect on birth outcomes of preterm labor and low preterm birthweight and is safe for the mother and fetus.⁴³ The effect of periodontitis and the development of preeclampsia, a rapidly progressing condition occurring in pregnancy characterized by hypertension and the presence of proteinuria, continues to be studied as well.^{34,38,44,45}

Oral health care during pregnancy

A multi-state study concluded that, besides neglecting medical care during pregnancy, most expectant females of all ages do not seek dental care, even though 50 percent of them have a dental problem.⁹ A woman's lack of receiving routine dental care when not pregnant was the most significant predictor of lack of receiving care during pregnancy.⁶ The expectant mother might question the safety of dental treatment during pregnancy. Untreated oral disease may compromise the health of the pregnant female and the unborn child.⁴⁶ The consequences of not treating an active infection during pregnancy outweigh the possible risks presented by most of the medications required for dental care.¹⁷ In addition, deferring elective dental treatment during a healthy pregnancy is not justified.⁴⁶

The amount of radiation exposure from dental x-rays is very small, ranging from 0.038 millisieverts (mSv) for bite-wing radiographs to 0.15 mSv for a full mouth series.⁴⁷ During dental radiographic examination of a pregnant patient, optimizing techniques, shielding the thyroid and abdomen, choosing the fastest available image receptor (ie, high-speed film, rare earth screen-film systems, digital radiography), and avoiding retakes help minimize radiation exposure to the fetus.^{26,48} The health care provider must be aware that the primary dental x-ray beam may pass near or through the thyroid gland, even with attention to proper radiographic techniques. The juvenile thyroid is among the most sensitive organs to radiation-induced tumors, both benign and malignant.²⁶ Risk decreases significantly with age at exposure, essentially disappearing after age 20.²⁶ Evidence shows that radiation exposure to the thyroid during pregnancy is associated with low birthweight.⁴⁹ Common dental projections rarely, if ever, deliver a measurable absorbed dose to the embryo or fetus.²⁶ Gonadal absorbed dose from a typical dental x-ray procedure is equivalent to about one hour of natural background radiation.²⁶ The National Council on Radiation Protection and Measurements recommends if dental treatment is to be deferred until after the delivery, so should the dental radiographs.²⁶

The objectives of professional oral health care during the first trimester include avoiding fetal hypoxia, premature labor/fetal demise, and teratogenic effects.⁴⁶ Due to the increased risk of pregnancy loss, use of nitrous oxide may be contraindicated in the first trimester of pregnancy.⁵⁰ Prevention, diagnosis, and treatment of oral diseases (including needed dental x-rays and use of local anesthesia) are highly beneficial and can be undertaken any time during pregnancy with no additional fetal or maternal risk as compared to not providing care.⁴³ It is safe to provide dental treatment throughout pregnancy; however, because the pregnant uterus is below the umbilicus, the woman is generally more comfortable during weeks 14 to 20 of gestation. Pregnant women are considered to have a “full stomach” due to delayed gastric emptying and, therefore, are at increased risk for aspiration, particularly during the last trimester.^{51,52} Elective restorative and periodontal therapies during the second trimester may prevent any dental infections or other complications from occurring in the third trimester.⁴⁶ In the final trimester, a dental prophylaxis may be repeated, especially if home oral care is inadequate or if soft tissue is abnormal.

Evidence is insufficient to support or refute that mercury exposure from dental amalgams contributes to adverse pregnancy outcomes.^{53,54} Currently, there is no evidence that the exposure of a fetus to mercury releases from the mother's existing amalgam fillings causes any adverse effects.^{53,55} Mercury vapor released during the removal or placement of amalgam restorations may be inhaled and absorbed into the blood stream and does cross the placental barrier. The use of rubber dam and high speed suction can reduce the risk of vapor inhalation.⁵⁵ Because use of tooth whitening products that

contain or generate hydrogen peroxide results in release of inorganic mercury from dental amalgams, these products should be avoided during pregnancy by patients who have amalgam restorations.⁵⁶

Suppression of the mother's reservoirs of Mutans streptococci (MS) by dental rehabilitation and antimicrobial treatments may prevent or at least delay infant acquisition of these cariogenic microorganisms.⁵⁷ MS, present in children with early childhood caries, is predominantly acquired from mother's saliva.⁵⁸ MS generally is considered to be a principal group of bacterial organisms responsible for the initiation of dental caries.⁵⁹ MS colonization of an infant may occur from the time of birth.⁶⁰⁻⁶⁶ Improving oral health during pregnancy leads to a reduction in salivary MS in the offspring.⁵⁸ Beginning in the sixth month of pregnancy, a daily rinse of 0.05 percent sodium fluoride and 0.12 percent chlorhexidine has resulted in significant reduction in levels of caries-causing bacteria, consequently delaying the colonization of such bacteria among offspring.⁵⁷ Xylitol, a naturally occurring sweetener, has been added to a variety of products because of its potential to reduce caries incidence. Evidence suggests maternal use of xylitol chewing gum (at least two or three times a day) has a significant impact on mother-child transmission of MS and subsequent decrease of the child's caries rate.⁶⁷⁻⁶⁹

Education is an important component of prenatal oral health care and may have a significant effect on the oral health of both the mother and the child. Counseling for the pregnant adolescent includes topics directed toward all adolescent patients (eg, dietary habits, injury prevention, third molars), as well as oral changes that may occur during pregnancy and infant oral health care. Since the pregnant adolescent may be receptive to information that will improve the infant's health, anticipatory guidance, a proactive developmentally-based counseling technique, can be introduced to focus on the needs of the child at each stage of life. Studies have documented that early oral health care promotion starting during pregnancy can lead to a sustained and long-term improvement of the oral health of children.^{70,71}

Legal considerations

Statutes and case law concerning consent involving pregnant patients less than 18 years of age vary from state to state. In some states, dentists are required to obtain parental consent for non-emergency dental services provided to a child 17 years of age or younger who remains under parental care.⁷² This would involve obtaining consent from the parent who must be aware of the pregnancy in order to understand the risks and benefits of the proposed dental treatment.⁴⁶ However, if the parent is unaware of the pregnancy, the pregnant adolescent may be entitled to confidentiality regarding health issues such as the pregnancy.⁷³ In other states, there are “mature minor” laws that allow minors to consent for their own health care when a dentist deems the minor competent to provide informed consent. In addition, some states emancipate minors

who are pregnant or by court order. Practitioners are obligated to be familiar with and abide by the laws specific to where they practice and where the patient resides.

Recommendations

The AAPD recommends that all pregnant adolescents seek professional oral health care during the first trimester. After obtaining a thorough medical history, the dental professional should perform a comprehensive evaluation which includes a thorough dental history, dietary history, clinical examination, and caries risk assessment. The dental history includes, but is not limited to, discussion of preexisting oral conditions, signs/symptoms of such, current oral hygiene practices and preventive home care, previous radiographic exposures, and tobacco use.²⁰⁻²⁵ The adolescent's dietary history should focus on exposures to carbohydrates, especially due to increased snacking, and acidic beverages/foods. During the clinical examination, the practitioner should pay particular attention to health status of the periodontal tissues.^{27,28} The AAPD's caries-risk assessment guideline⁷⁴, utilizing historical and clinical findings, will aid the practitioner in identifying risk factors in order to develop an individualized preventive program.

Based upon the historical indicators, clinical findings, and previous radiographic surveys, radiographs may be indicated. Because risk of carcinogenesis or fetal effects is very small but significant, radiographs should be obtained only when there is expectation that diagnostic yield (including the absence of pathology) will influence patient care.²⁶ If dental treatment must be deferred until after delivery, radiographic assessment also should be deferred. All radiographic procedures should be conducted in accordance with radiation safety practices. These include optimizing the radiographic techniques, shielding the pelvic region and thyroid gland, and using the fastest imaging system consistent with the imaging task. Image receptors of speeds slower than American National Standards Institute (ANSI) speed group E shall not be used.²⁶

Counseling for all pregnant patients should address:

- Relationship of maternal oral health with fetal health⁴³ (eg, possible association of periodontal disease with preterm birth and pre-eclampsia),
- An individualized preventive plan including oral hygiene instructions, rinses, and/or xylitol gum to decrease the likelihood of MS transmission postpartum,⁶⁷⁻⁶⁹
- Dietary considerations (eg, maintaining a healthy diet, avoiding frequent exposures to cariogenic foods and beverages, overall nutrient and energy needs¹¹⁻¹³),
- Anticipatory guidance for the infant's oral health including the benefits of early establishment of a dental home,^{70,71}
- Anticipatory guidance for the adolescent's oral health to include injury prevention, oral piercings, tobacco and substance abuse, sealants, and third molar assessment,⁷⁵

- Oral changes that may occur secondary to pregnancy^{28,29} (eg, xerostomia, shifts in oral flora),
- Individualized treatment recommendations based upon the specific oral findings for each patient.

Preventive services must be a high priority for the adolescent pregnant patient. Ideally, a dental prophylaxis should be performed during the first trimester and again during the third trimester if oral home care is inadequate or periodontal conditions warrant professional care. Referral to a periodontist should be considered in the presence of progressive periodontal disease.^{28,29} While fluoridated dentifrice and professionally-applied topical fluoride treatments can be effective caries preventive measures for the expectant adolescent, the AAPD does not support the use of prenatal fluoride supplements to benefit the fetus.⁷⁶

A pregnant adolescent experiencing morning sickness or gastroesophageal reflux should be instructed to rinse with a cup of water containing a teaspoon of sodium bicarbonate and to avoid tooth brushing for about one hour after vomiting to minimize dental erosion caused by stomach acid exposure.⁶ Women should be advised about the high sugar content and risk for caries associated with long term frequent use of over the counter antacids. Where there is established erosion, fluoride may be used to minimize hard tissue loss and control sensitivity. A daily neutral sodium fluoride mouth rinse or gel to combat enamel softening by acids and control pulpal sensitivity may be prescribed.⁷⁷ A palliative approach to alleviate dry mouth may include increased water consumption or chewing sugarless gum to increase salivation.²⁷

Common invasive dental procedures may require certain precautions during pregnancy, particularly during the first trimester. Elective restorative and periodontal therapies should be performed during the second trimester. Dental treatment for a pregnant patient who is experiencing pain or infection should not be delayed until after delivery. When selecting therapeutic agents for local anesthesia, infection, postoperative pain, or sedation, the dentist must evaluate the potential benefits of the dental therapy versus the risk to the pregnant patient and the fetus. The practitioner should select the safest medication, limit the duration of the drug regimen, and minimize dosage.⁴³ Health care providers should avoid the use of aspirin, aspirin-containing products, erythromycin estolate, and tetracycline in the pregnant patient.¹⁰ Non-steroidal anti-inflammatory drugs routinely are not recommended during pregnancy; if necessary, administration should be avoided during the first and third trimesters and be limited to 48 to 72 hours.⁴³

Patients requiring restorative care should be counseled regarding the risk and benefits and alternatives to amalgam fillings.⁵³⁻⁵⁵ The dental practitioner should use rubber dam and high speed suction during the placement or removal of amalgam to reduce the risk of vapor inhalation.⁵⁵ Consultation with the prenatal medical provider should precede use of nitrous oxide/oxygen analgesia/anxiolysis during pregnancy. Nitrous oxide inhalation should be limited to cases where topical and local

anesthetics alone are inadequate. Precautions must be taken to prevent hypoxia, hypotension, and aspiration.⁵¹

The pediatric dentist should incorporate positive youth development (PYD)⁷⁵ into care for the adolescent patient. This approach goes beyond traditional prevention, intervention, and treatment of risky behaviors and problems and suggests that a strong interpersonal relationship between the adolescent and the pediatric dentist can be influential in improving adolescent oral health and transitioning to adult care. Through PYD, the dentist can promote healthy lifestyles, teach positive patterns of social interaction, and provide a safety net in times of need. At a time agreed upon by the patient, parent, and pediatric dentist, the patient should be transitioned to a practitioner knowledgeable and comfortable with managing that patient's specific oral care needs.⁷⁵

Dental practitioners must be familiar with state statutes that govern consent for care for a pregnant patient less than the age of majority. If a pregnant adolescent's parents are unaware of the pregnancy, and state laws require parental consent for dental treatment, the practitioner should encourage the adolescent to inform them so appropriate informed consent for dental treatment can occur.

References

- Hamilton BE, Martin JA, Ventura SJ. Births: Preliminary data for 2009. *National Vital Statistics Reports* 2010;59(3):Table 2.
- CDC. Teen pregnancy: The importance of prevention. Available at: "<http://www.cdc.gov/teenpregnancy/>". Accessed November 21, 2011.
- Haffner DW, ed. *Facing Facts: Sexual Health for America's Adolescents: The Report of the National Commission on Adolescent Sexual Health*. New York, NY: Sexuality Information and Education Council of the United States; 1995.
- Klein JD, Committee on Adolescence. Adolescent pregnancy: Current trends and issues. *Pediatrics* 2005;116(1):281-6.
- Kirby D. *Emerging Answers: Research Findings on Programs to Reduce Teen Pregnancy* (summary). Washington, DC: National Campaign to Prevent Teenage Pregnancy; 2001. Available at: "http://www.catalystforchildren.org/pdf/Emerging_Answers.pdf". Accessed July 10, 2012.
- Bogges KA, Urlaub DM, Massey KE, Moos MK, Matheson MB, Lorenz C. Oral hygiene practices and dental services utilization among pregnant women. *J Am Dent Assoc* 2010;141(5):553-61.
- Fadavi S, Sevandal MC, Koerber A, Punwani I. Survey of oral health knowledge and behavior of pregnant minority adolescents. *Pediatr Dent* 2009;31(5):405-8.
- Forrest JD. Timing of the reproductive life stages. *Obstet Gynecol* 1993;82(1):105-11.
- Gaffield ML, Colley Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy. *J Am Dent Assoc* 2001;132(7):1009-16.
- New York State Dept of Health. Oral health care during pregnancy and early childhood practice guidelines. New York, 2006. Available at: "<http://www.health.ny.gov/publications/0824.pdf>". Accessed June 25, 2012.
- American Dental Association. Pregnancy: Patient version, frequently asked questions. Available at: "<http://www.ada.org/3019.aspx#faq>". Accessed June 25, 2012.
- National Research Council. *Recommended Dietary Allowances*, 10th ed. Washington, DC, National Academy Press; 1989.
- McCann AL, Bonci L. Maintaining women's oral health. *Dent Clin North Am* 2001;45(3):571-601.
- Kaiser LL, Allen L. Position of the American Dietetic Association: Nutrition and lifestyle for a healthy pregnancy outcome. *J Am Diet Assoc* 2002;102(10):1479-90.
- Koren G, Bishai R, eds. *Nausea and Vomiting in Pregnancy. State of the Art 2000*. Toronto, Canada, Motherisk Hospital for Children; 2000:5-9.
- Moore PA. Selecting drugs for the pregnant dental patient. *J Am Dent Assoc* 1998;129(9):1281-6.
- Morgan MA, Cragan JD, Golderberg RL, Rasmussen SA, Schulkin J. Management of prescription and nonprescription drug use during pregnancy. *J Matern Fetal Neonatal Med* 2010;23(8):813-9.
- US Food and Drug Administration. Labeling and prescription drug advertising: Content and format for labeling for human prescription drugs. *Fed Regist* 1979;44(124):434-67.
- The Organization of Teratology Information Services. Available at: "<http://www.otispregnancy.org>". Accessed June 25, 2012.
- US Dept of Health and Human Services. *Healthy people 2020 Topics and objectives: Tobacco use*. Washington, DC. Available at: "<http://healthypeople.gov/2020/topics/objectives2020/overview.aspx?topicid=41>". Accessed June 25, 2012.
- US Dept of Health and Human Services, CDC, National Center for Chronic Disease Prevention. *Preventing Smoking and Exposure to Secondhand Smoke Before, During, and After Pregnancy*. Available at: "<http://www.cdc.gov/nccdphp/publications/factsheets/Prevention/pdf/smoking.pdf>". Accessed June 25, 2012.
- Matthews TJ. *Smoking during pregnancy in the 1990s*. National vital statistics report. Hyattsville, Md: National Center for Health Statistics; 2001:49;7. CDC. Dept of Health and Human Services. Publication No. (PHHS) 2001-1120; PRS 01-0539 (8/2001).
- World Health Organization. *International consultation on environmental tobacco smoke (ETS) and child health – Consultation report*. Geneva, Switzerland: World Health Organization; 1999.

24. US Dept of Health and Human Services. Preventing Tobacco Use Among Young People: Report of the Surgeon General. Atlanta, Ga: US Dept of Health and Human Services, Public Health Service, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1994.
25. Aligne CA, Moss ME, Auinger P, Weitzman M. Association of pediatric dental caries with passive smoking. *JAMA* 2003;289(10):1258-64.
26. National Council on Radiation Protection and Measurements. Radiation protection in dentistry. Report No. 145. NRC Publications, Bethesda, Md; 2003.
27. Steinberg BJ. Women's oral health issues. *J Dent Educ* 1999;63(3):271-5.
28. Raber-Durlacher JE, van Steenberghe TJM, van der Velden U, de Graaff J, Abraham-Inpijn L. Experimental gingivitis during pregnancy and postpartum: Clinical, endocrinological, and microbiological aspects. *J Clin Periodontol* 1994;21(8):549-58.
29. McGaw T. Periodontal disease and preterm delivery of low-birth-weight infants. *J Can Dent Assoc* 2002;68(3):165-9.
30. Mitchell-Lewis D, Engebretson SP, Chen J, Lamster IB, Papananou PN. Periodontal infections and pre-term birth: Early findings from a cohort of young minority women in New York. *Eur J Oral Sci* 2001;109(1):34-9.
31. Vettore MV, Leão AT, Leal Mdo C, Feres M, Sheiham A. The relationship between periodontal disease and preterm low birth weight: Clinical and microbiological results. *J Periodontol Res* 2008;43(6):615-26.
32. Jeffcoat MK, Geurs NC, Reddy MS, Cliver SP, Goldenberg RL, Hauth JC. Periodontal infection and preterm birth: Results of a prospective study. *J Am Dent Assoc* 2001;132(7):875-80.
33. Davenport ES, Williams CE, Sterne JA, Murad S, Sivapathasundram V, Curtis MA. Maternal periodontal disease and preterm low birthweight: Case-controlled study. *J Dent Res* 2002;81(5):313-8.
34. Contreras A, Herrera JA, Soto JE, Arce RM, Jaramillo A, Botero JE. Periodontitis is associated with preeclampsia in pregnant women. *J Periodontol* 2006;77(2):182-8.
35. Heimonen A, Rintamäki H, Furuholm J, Janket SJ, Kaaja R, Meurman JH. Postpartum oral health parameters in women with preterm birth. *Acta Odontol Scand* 2008;66(6):334-41.
36. Khader Y, Al-shishani L, Obeidat B, et al. Maternal periodontal status and preterm low birth. *Arch Gynecol Obstet* 2009;279(2):165-9.
37. Guimarães AN, Silva-Mato A, Miranda Cota LO, Siqueira FM, Costa FO. Maternal periodontal disease and preterm or extreme preterm birth: an ordinal logistic regression analysis. *J Periodontol* 2010;81(3):350-8.
38. Newnham JP, Newnham IA, Ball CM, et al. Treatment of periodontal disease during pregnancy: A randomized controlled trial. *Obstet Gynecol* 2009;114(6):1239-48.
39. Shub A, Wong C, Jennings B, Swain JR, Newnham JP. Maternal periodontal disease and perinatal mortality. *Aust N Z J Obstet Gynaecol* 2009;49(2):130-6.
40. Boggess KA, Lieff S, Murtha AP, Moss K, Beck J, Offenbacher S. Maternal periodontal disease is associated with an increased risk for preeclampsia. *Obstet Gynecol* 2003;101(2):227-31.
41. Ruma M, Boggess K, Moss K, et al. Maternal periodontal disease, systemic inflammation, and risk for preeclampsia. *Am J Obstet Gynecol* 2008;198(4):389-91.
42. Offenbacher S, Boggess KA, Murtha AP et al. Progressive periodontal disease and risk of very preterm delivery. *Obstet Gynecol* 2006;107(1):29-36.
43. California Dental Association Foundation. Oral health during pregnancy and early childhood: Evidence based guidelines for health professionals. Perinatal Oral Health Practice Guidelines Feb 2010. Available at: "http://www.cdafoundation.org/library/docs/poh_guidelines.pdf". Accessed November 21, 2011.
44. Straka M. Pregnancy and periodontal tissues. *Neuro Endocrinol Lett* 2011;32(1):34-8.
45. Pitiphat W, Joshipura KJ, Gillman MW, Williams PL, Douglass CW, Rich-Edwards JW. Maternal periodontitis and adverse pregnancy outcomes. *Community Dent Oral Epidemiol* 2008;36(1):3-11.
46. Hilgers KK, Douglass J, Mathieu G. Adolescent pregnancy: A review of dental treatment guidelines. *Pediatr Dent* 2003;25(5):459-67.
47. American Dental Association. Oral Health Topics: X-rays, Patient Version. Available at: "<http://www.ada.org/2760.aspx>". Accessed November 21, 2011.
48. American Dental Association, US Dept Health Human Services. The selection of patients for dental radiographic examinations – 2004. Available at: "[http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations\(1\).pdf](http://www.ada.org/sections/advocacy/pdfs/topics_radiography_examinations(1).pdf)". Accessed June 25, 2012.
49. Berthold M. JAMA dental radiography study bolsters ADA recommendations. Available at: "<http://jada.ada.org/cgi/content/full/135/6/724>". Accessed June 25, 2012.
50. Rowland AS, Baird DD, Shore DL, Weinberg CR, Savitz DA, Wilcox AJ. Nitrous oxide and spontaneous abortion in female dental assistants. *Am J Epidemiol* 1995;141(6):531-8.
51. Rosen MA. Management of anesthesia for the pregnant surgical patient. *Anesthesiology* 1999;91(4):1159-63.
52. Creasy RK, Resnik R. *Maternal-Fetal Medicine: Principles and Practice*. 5th ed. Philadelphia, Pa: WB Saunders, 2004.
53. US Food and Drug Administration. White Paper: FDA Update/Review of Potential Adverse Health Risks Associated with Exposure to Mercury in Dental Amalgam. Available at: "<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/DentalAmalgam/ucm171117.htm#1>". Accessed July 11, 2011.

54. Hujoel PP, Lydon-Rochelle M, Bollen AM, Woods JS, Geurtsen W, del Aguila MA. Mercury exposure from dental filling placement during pregnancy and low birth-weight risk. *Am J Epidemiol* 2005;161(8):734-40.
55. Whittle KW, Whittle JG, Sarll DW. Amalgam fillings during pregnancy. *Br Dent J* 1998;185(10):500.
56. Al-Salehi SK. Effects of bleaching on mercury ion release from dental amalgam. *J Dent Res* 2009;88(3):239-43.
57. Brambilla E, Felloni A, Gagliani M, Malerba A, García-Godoy F, Strohmenger L. Caries prevention during pregnancy: Results of a 30-month study. *J Am Dent Assoc* 1998;129(7):871-7.
58. Caulfield PW. Dental caries – A transmissible and infectious disease revisited: A position paper. *Pediatr Dent* 1997;19(8):491-8.
59. Ge Y, Caulfield PW, Fisch GS, Li Y. *Streptococcus mutans* and *Streptococcus sanguis* colonization correlated with caries experience in children. *Caries Res* 2008;42(6):444-8.
60. Berkowitz RJ, Jordan HV, White G. The early establishment of *Streptococcus mutans* in the mouths of infants. *Arch Oral Biol* 1975;20(3):171-4.
61. Stiles HM, Meyers R, Brunnelle JA, Wittig AB. Occurrence of *Streptococcus mutans* and *Streptococcus sanguis* in the oral cavity and feces of young children. In: Stiles M, Loesch WJ, O'Brien T, eds. *Microbial Aspects of Dental Caries*. Washington, DC: Information Retrieval; 1976:187.
62. Loesche WJ. Microbial adhesion and plaque. In: *Dental Caries: A Treatable Infection*. 2nd ed. Grand Haven, Mich; Automated Diagnostic Documentation, Inc; 1993:81-116.
63. Wan AK, Seow WK, Purdie DM, Bird PS, Walsh LJ, Tudehope DI. A longitudinal study of *Streptococcus mutans* colonization in infants after tooth eruption. *J Dent Res* 2003;82(7):504-8.
64. Wan AK, Seow WK, Walsh LJ, Bird P, Tudehope DI, Purdie DM. Association of *Streptococcus mutans* infection and oral developmental nodules in predentate infants. *J Dent Res* 2001;80(10):1945-8.
65. Berkowitz RJ. Mutans streptococci: Acquisition and transmission. *Pediatr Dent* 2006;28(2):106-9, discussion 192-8.
66. Law V, Seow WK, Townsend G. Factors influencing oral colonization of mutans streptococci in young children. *Aust Dent J* 2007;52(2):93-100.
67. Isokangas P, Söderling E, Pienihäkkinen K, Alanen P. Occurrence of dental decay in children after maternal consumption of xylitol chewing gum: A follow-up from 0 to 5 years of age. *J Dent Res* 2000;79(11):1885-9.
68. Söderling E, Isokangas P, Pienihäkkinen K, Tenovou J. Influence of maternal xylitol consumption on acquisition of mutans streptococci by infants. *J Dent Res* 2000;79(3):882-7.
69. Thorild I, Lindau B, Twetman S. Caries in 4-year-old children after maternal chewing of gums containing combinations of xylitol, sorbitol, chlorhexidine, and fluoride. *Eur Arch Paediatr Dent* 2006;7(4):241-5.
70. Murphey C, Rew L. Three intervention models for exploring oral health in pregnant minority adolescents. *J Spec Pediatr Nurs* 2009;14(2):132-41.
71. Meyer K, Geurtsen W, Günay H. An early oral health care program starting during pregnancy: Results of a prospective clinical long-term study. *Clin Oral Investig* 2010;14(3):257-64.
72. Weber TJ, Fernsler HL. Treating the minor patient. *Penn Dent J* 2002;69(3):11-4.
73. Hasegawa TK, Matthews M Jr. Confidentiality for a pregnant adolescent? *Texas Dent J* 1994;111(2):23-5.
74. American Academy of Pediatric Dentistry. Guideline on caries risk-assessment and management for infants, children, and adolescents. *Pediatr Dent* 2011;33(special issue):110-17.
75. American Academy of Pediatric Dentistry. Guideline on adolescent oral health care. *Pediatr Dent* 2011;33(special issue):129-36.
76. American Academy of Pediatric Dentistry. Guideline on fluoride therapy. *Pediatr Dent* 2012;34(special issue):162-5.
77. Linnett V, Seow WK. Dental erosion in children: A literature review. *Pediatr Dent* 2001;23:37-43.